The application of VAT and indirect "cascade" taxes on financial services: The case of Greece, a comparative evaluation with Spain and Portugal.

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ABSTRACT

This thesis aimed to investigate:

a) the distortions arising from the existing system of indirect taxation of financial services in Greece and the EU Member States;
b) the economic effects of taxing financial services under the VAT system in Greece including the estimation of the fiscal revenue loss under the currently applied financial exemptions;
c) the economic effects on total tax revenues, expenditures and growth of the existing indirect financial taxes in Greece, Spain and Portugal.

The research design included a review and synthesis of the academic literature and was based on: a) comparative study of the relevant legislation b) construction of input-output/economic tables for financial sectors and c) analysis of time-series data, employing mainly the Johansen methodology to test for cointegration among the variables. The analytical research yielded:

a) a detailed profile, through the study of legislation, of VAT treatment of financial services in Greece and the other EU Member States, identifying similarities and differences as well as potential sources for distortions of competition;
b) estimation of the economic effects of taxing financial services under the Greek VAT system, using the input-output/economic tables;
c) a detailed profile of the indirect tax structure in Greece, Spain and Portugal, estimating the marginal productivity and elasticity of indirect taxes (i.e. VAT, consumption and indirect financial taxes) as well as the average effective tax rates on consumption;
d) identification of the impact of consumption and indirect financial taxes on total revenues, expenditures and growth (employing the Johansen methodology to test for cointegration).

These findings enabled us to draw conclusions about: a) the economic implications of taxing financial services under the VAT system in Greece. We obtained an estimate of 5.51% of VAT revenues over the period 1989-1998 for the fiscal revenue loss of exempting financial sectors from VAT in Greece; b) the economic effects of consumption taxes (i.e. taxes that fall only on final consumption) and indirect financial taxes (i.e. taxes

that may fall on intermediate and investment goods) identifying similarities and differences in Greece, Spain and Portugal. We found that consumption taxes (including VAT) may affect permanently the level of real output. This effect could be either negative or positive depending on the whole tax structure in each country. On the other hand, although indirect financial taxes may have a positive impact on total tax rate, their effects on growth are minor and negative. However, indirect financial taxes are important for spending decisions in Spain and Portugal. In addition, the thesis enabled the development of guidelines and of a transitional operational model for the indirect taxation of financial services. Finally, the limitations of this thesis are outlined in the conclusions and concrete avenues for future research are provided.

Some of the findings of this thesis have been published in four articles in Academic Journals as follows:

Smyth, D and Kaliva, A (2002) "VAT and indirect taxes on financial services in Greece and EU" *The Hellenic Banks Association Review* A' Quarter pp 79-92 (Chapter five of the present thesis) [*www.hba.gr/7publ/index7.deltio.htm*]

Kaliva, A (2002) " The economic performance of VAT in Greece: Comparisons with Spain and Portugal" *Tax Journal* No 638 pp 617-22 (From chapter seven of the present thesis)

Kaliva, A (2001) "The impact on Revenues from Taxing Financial Services under the VAT System in Greece" *The Hellenic Banks Association Review* D' Quarter pp 64-71 (Chapter six of the present thesis) [*www.hba.gr/7publ/index7.deltio.htm*]

Kaliva, A (2001) "Average effective rates on consumption in Greece: Comparisons with Spain and Portugal" *Tax Journal* No 632 pp 1785-1791 (From chapter seven of the present thesis)

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INTRODUCTION TO THE THESIS

The taxation of financial services in the global Market and trade is of economic as well of political significance. The financial services industry accounts for a significant portion of GDP in EU Member States affecting levels of employment and income, the balance of payments, economic growth and valuable inward foreign investment. In addition, the financial system is the medium through which most of the transactions of a market economy are conducted. Banks especially play a major role in the transmission of monetary policy to the economy; they are also expected to provide safe assets to small depositors for whom monitoring and scrutinising financial institutions is costly, and they make loans to borrowers who are less visible in capital markets, such as SMEs that require credit to carry on their regular business. It has been also argued (Dobson and Jacquet, 1998) that the development of the whole financial system affects the long term growth and development of the economy.

Few industries have experienced such rapid change in the past three decades as have banking and insurance, the principal industries in the financial services sector. Rapid innovation and advances in telecommunications and computer technology have facilitated the movement of money, domestically and across borders, at ever-faster rates and in ever-greater volumes. As new financial services have proliferated, additional competitors, such as asset management companies, credit card suppliers, and security analysts, now challenge the traditional service providers and accelerate the rate of change. Many governments have also fanned the winds of competition by removing past regulations on ownership, operations, foreign entry etc. In fact financial services are one of three majors sectors, along with telecommunications services and information technology products, where multilateral liberalisation agreements were reached in the WTO during the 90s. The expected total welfare gain from these reforms by 2010 for the EU area according to Dobson and Jacquet (op.cit), amounts to 0.69% of the EU GDP. Subsequently, any measure (including taxation) that affects this industry and its future operation is very important for the financial sector itself as well as for the whole economy.

One of the most difficult areas in the taxation and in the operation of VAT systems has been the treatment of financial services. A workable method of taxing such services has eluded tax authorities for decades. As a consequence, almost all countries employing a VAT have opted to exempt financial services rendered to residents of their countries and to apply, other than VAT, indirect "cascade" taxes (e.g. gross sales tax, transaction tax etc.). Although the exemption approach has been widely used, there have been significant problems in its operation. The resulting tax cascading creates numerous economic distortions and adversely affects the competitive position of domestic institutions in international markets, while the definitions and allocations needed to operate the system have proven to be very complex (Poddar and English, 1997).

This thesis aims to investigate the application of indirect taxes on financial services by taking Greece as a focus. The practices of the indirect taxes on financial services in Greece are examined in order to determine whether or not and to what extent VAT on financial services is operational. In addition, the practices of the VAT treatment of financial services in the EU Member States in the field of legislation are also examined. Finally, the thesis clarifies the way in which indirect financial taxes contribute to the total tax revenues, expenditures and economic growth.

Analytically, the basic aim of our research, subsequent to a better understanding of the current system of taxing financial services, is to design new VAT structures including financial services within the framework and in the light of the EU Member States experience. In addition, by establishing empirical relationships, using time series data, between VAT revenues, VAT base (exemptions) and VAT rates as well as by assessing the economic effect of indirect financial taxes on tax rate, expenditures and growth, we hope to give a clear indication of the areas that need special probing and where the risk for the revenues and for the whole economy lies when taxing financial services under a consumption type VAT. To this end we hope to set out the long run relationship between the variables of interest (e.g. consumption and indirect financial taxes and growth) and how they interact in a system. Our research will focus on the case of Greece but we will compare and evaluate our results with those derived for selected EU countries (Spain and Portugal).

The special features of its indirect taxation of financial services motivate the choice of Greece. Specifically, Greece continues to apply cascade indirect taxes on banking services and a turnover tax on insurance services. In addition, the whole tax system in Greece is dominated by indirect taxes other than VAT. During the period 1965-1998 for which data are available (OECD, 2001) indirect taxes are the most important category, constituting for the whole period 47% of total taxation (14.8% of GDP). No other EU State depends to the same extent on indirect taxation to finance its expenses. Moreover the tax system in Greece seems to be rather complicated and inefficient. The level of aggregate taxation in Greece for the period 1965-1998 was 25.7% of GDP, quite below the international (OECD) and European (EU) standards. It is hypothesised that the existing "cascade" indirect financial taxes contribute to this inefficiency.

Apart from the specific structure of the Greek tax system the financial sector is very significant for the Greek economy. Banking and insurance accounted for 3.6 percent of Greece's GDP in year 1997 (16.5% annual rate of change) and contributed with 2.4% to the total employment in the same year (1.2% annual rate of change) (Greek Ministry of National economy, 1998). In addition banks have traditionally dominated the financial sector in Greece. As we can see from table 1 the Greek banking sector appears to be economically strong and efficient. Moreover, despite the above-mentioned characteristics, Greece has not attracted any interest in this field from researchers. Therefore, the subject of taxation of financial services is indeed a very interesting one and very challenging, especially for the tax authority.

Table 1 : Greek banking sectors' aggregate data (Amounts in million of DRS)		
Banking sector	***1998***	***1997***
Total assets	47924130	38667097
Total accreditisations	18157371	14668909
Total deposits	34699088	29840608
Total Number of branches	2662	2472
Total number of employees	56493	53208
Indicators		
Deposits/Assets	72.40%	77.17%
Total accreditisations/Assets	37.88%	37.90%
Total accreditisations/Deposits	52.32%	49.15%

Data source: Hellenic Bank Association [www.hba.gr]

On the other hand the European Union has developed several policies for promoting economic and social cohesion. Greece, Portugal and Spain are of particular interest because those countries benefit from the programmes. Although, Creedy (2001) examined for the case of Australia the question whether the different categories of indirect taxes should be uniform, there is almost no research on these taxes (i.e. indirect financial taxes) and their economic implications for European countries. Furthermore, although the Maastricht criteria do not allow for great intervention, fiscal policy is still operative at the national level. Some researchers discuss the different fiscal policy effects for OECD and EU countries (i.e. Viren, 2000). The results support the view that fiscal policy differs considerably between EU Member States. These differences need to be investigated in more detail for specific Member States (e.g. Greece, Spain and Portugal) and for current tax problems such as the relationship between indirect financial taxation and growth.

In particular our research seeks to provide empirical evidence on the three main objectives/aims of this study, which are:

1. to identify the distortions arising from the existing system of financial exemptions in Greece and EU (through study of the Greek and EU VAT legislation)
2. to estimate the economic effects of taxing financial services under the Greek VAT system including the estimation of the fiscal revenue loss of the current applied financial exemptions in Greece
3. to investigate the economic effects on total revenues, expenditures and growth of the existing indirect financial taxes in Greece, Spain and Portugal.

Principal contribution

The principal contribution of this thesis lies in extending our understanding of the taxation of financial services, especially of the indirect taxes such as VAT and the currently applied financial taxes. Empirical research has so far concentrated on direct taxes on financial services rather than indirect taxes. The theory on the other hand pays less attention to indirect taxes and the economic effects of VAT on financial services. This thesis demonstrates the significance of the above-mentioned taxes on financial services in structuring tax policies and possible tax reforms.

Theoretical contribution

Firstly this thesis, in the case of Greece, confirms the argument (Bovenmberg, 1987; Gottfried and Wiegard, 1991) that indirect tax on intermediate or investment goods cannot be neglected in formulating fiscal policy. The economic effects of this part of tax are closely linked to the exemptions applied in VAT systems. In our study these economic effects have been illustrated with the use of numerical input-output/economic tables for the financial sector over the period 1988-1998. Secondly this thesis demonstrates link between the average total tax rate of the economy and consumption and indirect financial taxes as well as between expenditures and the aforementioned taxes in the case of Greece, Spain and Portugal. Our results show that, although a long run relationship exists between consumption or indirect financial taxes and the average total tax rate of the economy, bi-directional relationships are difficult to establish. The direction of causality is from the different indirect taxes towards the total average tax rate. In addition we found that indirect financial taxes are important for spending decisions for Spain and Portugal where a long run relationship has been identified. On the other hand for Greece the decision to spend Granger causes consumption taxes while these taxes are important for spending decisions in Portugal. The findings for Greece are consistent with the findings of Anderson (1986) that government expenditures Granger causes taxes, while the findings for Spain and Portugal confirm the argument of Owoye (1995) that taxes and spending decisions are jointly made.

Finally, we find that indirect financial taxes (i.e. taxes that might fall on intermediate and investment goods) they could only affect negatively the level of the real output. This finding contributes to the argument (e.g. King and Rebello, 1990; Slermod, 1995; Karras, 1999) that taxes (as a percentage of GDP) do not have strong economic effects on growth (if any, this is minor and negative). On the other hand consumption taxes (including VAT) (i.e. taxes that fall only on final consumption) could affect permanently the level of the real output, through their impact on the main components of growth namely labour force supply and/or investment. However, this effect could be either negative or positive depending on the whole tax structure. Lastly, the findings suggest that reforms in indirect tax systems of the three countries is unlikely to have any direct long run effect on total tax rate, expenditures or growth, but rather short run effects on the amount of revenues accruing to the tax administration from the relevant taxes (i.e. consumption taxes).

Methodological contribution

Difficulties with research methodology as were experienced in this study are recognised in the literature. In applying the National Accounts approach in order to estimate the impact on total tax revenues of taxing financial services under the VAT system in Greece, modifications had to be introduced to capture the dispersions of VAT rates in financial sector's VAT base and inputs. This is because the National accounts data refer to final expenditure of the economy. These modifications were made by using the average weighted VAT rate on VAT base, instead of the statutory VAT rate, and with the breakdown of financial sector's inputs in different applied VAT rates. However we recognise that this method does not capture general equilibrium effects, which is beyond of the scope of this thesis. Finally, another methodological contribution of this thesis is that the Johansen technique is used to assess the impact of the indirect financial taxes on the average total tax rate of the economy, expenditures and growth.

Contribution to the VAT application

The practical contributions to the VAT application are as follows:

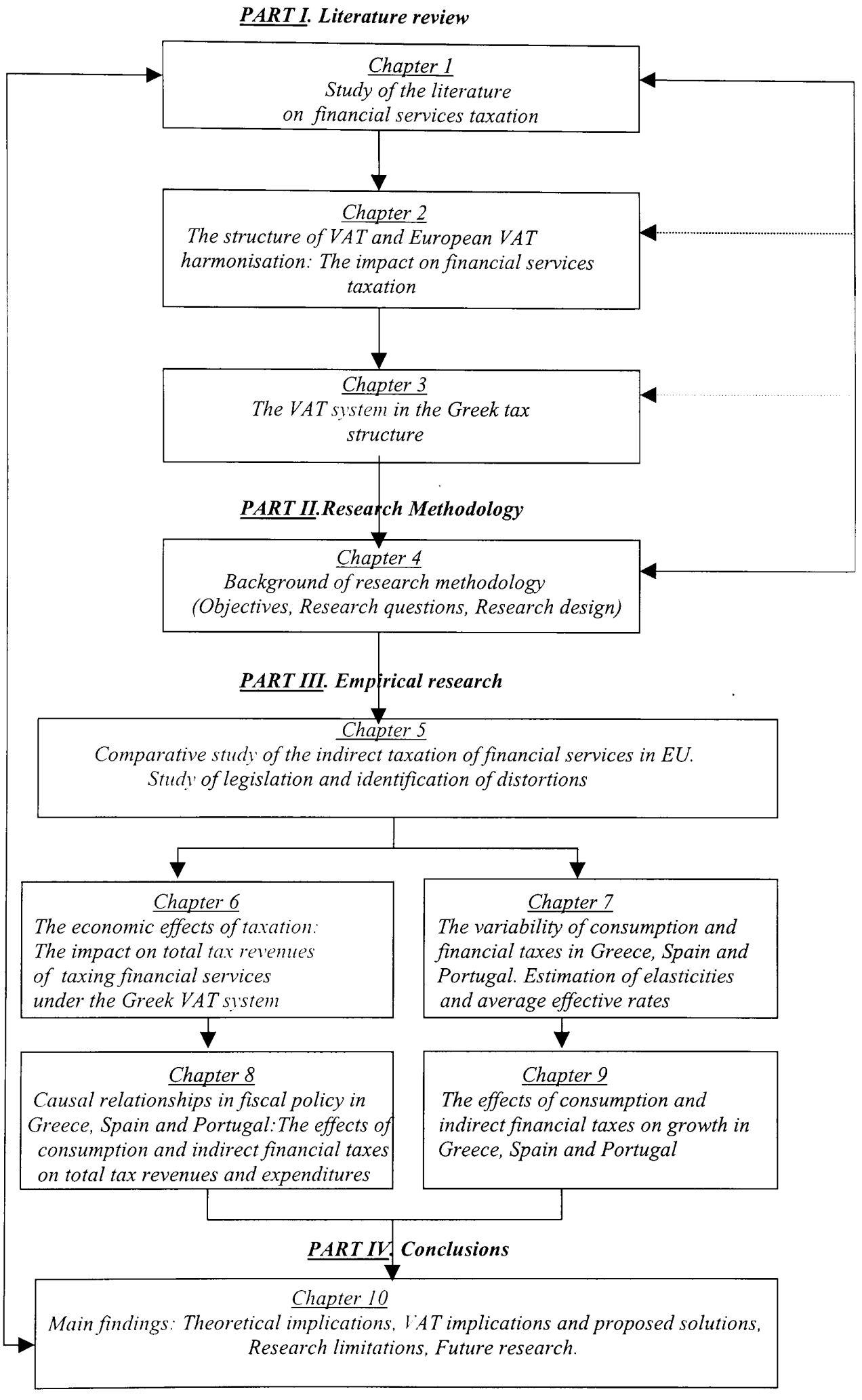
- a detailed profile of the VAT treatment of financial services in Greece and other EU Member States
- the identification of distortions arising of the above differences between Greece and the other EU Member States
- the identification of specific differences between Greece, Spain and Portugal
- a detailed analysis of practices used to tax insurance services across the EU Member States, an area totally neglected in the academic literature.

The above work contributes to the argument that in the field of indirect taxation of financial services (including insurance services) we are far away from achieving the goal of tax harmonisation, which does not serve the aims of Single Market. In addition, for fiscal policy issues we confirm that a reform of the indirect taxation of financial services (e.g. abolishing of financial exemptions and applying VAT on financial services) could contribute to total tax revenues. The final outcome here is a proposed transitional special regime for taxing financial services under the VAT system, applicable and worthy for further study.

Thesis outline

A brief outline of the structure of the thesis is shown in the Figure 1. The thesis is divided in four sections with ten chapters. The first section deals with the concept of VAT and the indirect taxation of financial services by reviewing the existing literature (both theoretical and empirical); the second section with the research methodology and research design; the third with the empirical research and data analysis, while the fourth section includes the conclusions and recommendations. An overview of chapters 1 to 10 is presented next.

Figure 1: Thesis Outline.



Overview of the chapters

Chapter 1: Study of the literature on taxation of financial services

This chapter addresses the significance and problems of financial services' taxation. It provides the theoretical background to the study based on the academic literature. In addition, the importance of the VAT treatment of financial services is also examined as well as the practical problems of the application of VAT on financial services. A critical review of these theoretical and empirical studies contribute to the formulation of research questions and guide the research methodology.

Chapter 2: The structure of VAT and European VAT harmonisation: The impact on financial services taxation

In this chapter we identify the principles of the VAT system applied in EU Member States, and the methods of computation including the new approaches developed. Our aim here is to explain relevant developments in the EU VAT systems and the need for VAT harmonisation in the Single Market. This allows us to investigate at a later stage the implication of VAT harmonisation on the taxation of financial services.

Chapter 3: The VAT system in the Greek tax structure

This chapter provides the necessary background to understand the main features of the Greek tax system. It begins with the special characteristics and components (categories of taxes) of the Greek tax system justifying the choice of Greece as a focus in our research as well. Then the chapter describes briefly the taxes applied in Spain and Portugal in order to facilitate our comparisons by identifying the similarities in their indirect tax system. Finally we describe the functional structure of taxation in Greece, with a preliminary review of the data (relation between direct and indirect taxes, evolution and recent developments etc.).

Chapter 4: Research methodology

This chapter presents the methodological considerations to be taken into account for this research. It depicts the most appropriate methods of data collection and analysis as being the National Accounts method, econometric analysis and secondary research for the study of the applied legislation in Greece and EU. Finally this chapter states the research focus, objectives, research questions and theoretical concepts of this study.

Chapter 5: Comparative study of the indirect taxation of financial services in EU. Study of legislation and identification of distortions

In this chapter we study the applied legislation in order to evaluate the current indirect tax system used to tax a wide range of financial services (including insurance services) in Greece and to compare it with those used in other Member States (including Spain and Portugal). Our aim in this part of the study is to identify the main differences between the Greek and other EU tax systems as well as the major distortions within and across those systems. The data have been "content" analysed in order to study the selected areas such as the scope and the liability of taxation of financial services (including insurance) and instruments.

Chapter 6: The economic effects of taxation: The impact on total tax revenues of taxing financial services under the Greek VAT system

This chapter analyses the total revenue effect of removing the financial exemptions in the Greek VAT system. The analysis of the data has been carried out by using an input-output method ("National Accounts approach") modified as necessary to reflect the special characteristics of the Greek VAT system and data availability. Our aim in this chapter is to compare the present VAT exemption of financial services with a hypothetical benchmark case of taxing them as well as the estimation of the total fiscal revenue loss, including the estimation of the inputs of financial institutions in Greece.

Chapter 7: The variability of consumption and financial taxes in Greece, Spain and Portugal. Estimation of elasticities and average effective rates

Our focus in this chapter is to empirically examine with special reference to Greece, but comparing the results with those derived in the case of Spain and Portugal, the revenue productiveness and the elasticity of VAT, consumption and indirect financial taxes on Net National Income. In addition our results have been enriched with the calculation of the average effective rates of consumption and indirect financial taxes as well. The period of estimation is from 1965 to 1998 for consumption and indirect financial taxes and from 1986 to 1998 for VAT. Finally, the key features of VAT (VAT base and VAT rates) and the impact of exemptions have also been examined. The main method for data analysis in this chapter is the use of econometrics (time-series analysis by using the OLS technique).

Chapter 8: Causal relationships in fiscal policy in Greece, Spain and Portugal: The effects of consumption and indirect financial taxes on total tax revenues and expenditures

In this chapter we examine the impact on total tax revenues and expenditures of indirect taxes applied in Greece over the period 1965-1998 and over 1965-1999 for Spain and Portugal. We examine the causal relationships among the average total tax rate of the economy, and consumption and financial taxes as well as between expenditures and the aforementioned taxes and how they interact in a system. We employ a multivariate time-series methodology (Johansen methodology) to test for long run trends and causality between the above variables. Finally we investigate the long run stability of the indirect tax system by examining the impact of the introduction of VAT in the tax systems of the above mentioned countries.

Chapter 9: The effects of consumption and indirect financial taxes on growth in Greece, Spain and Portugal

In this chapter we provide empirical evidence on the relationship between indirect taxes (consumption and indirect financial taxes) and economic growth over the period 1965-1999 in Greece, Spain and Portugal (for Greece over the 1965-1998 period) in order to assess not only the validity of previous conclusions but also to investigate the direction of causality between indirect taxes and growth. Our approach here is to consider, in a cointegrating VAR framework, the effects of these taxes on growth and its micro-components such as investment and employment.

Chapter 10: Conclusions and recommendations

The concluding chapter 10 brings together the issues, concepts, and findings of chapters 1 to 9. The findings are linked to the already existing knowledge, which allows conclusions to be formulated on the indirect taxation of financial services as well as implications for the existing tax system. It proposes a new special regime for taxing financial services under the VAT system in Greece and provides recommendations for the existing implications on competition from the indirect financial taxes. Finally, this chapter also outlines the limitations of this thesis and suggests further concrete steps for future research.

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CHAPTER 1: LITERATURE STUDY ON THE TOPIC.

1.1 Introduction

A logical starting point in looking at the issue of VAT and financial services is to consider first the reasons for and the merits of a value-added tax (VAT) and then to identify and describe the nature of financial services' taxation issues.

This chapter considers some of the approaches used and the conclusions reached in the literature (empirical and theoretical) on this topic. We start with a general overview of the theories on optimal taxation and VAT justification, and then we look at the specific issues of financial services taxation isolating the relevant problems. This will help us to prepare the ground for the empirical analysis, which will follow.

1.2 The optimal commodity taxation

1.2.1 The basic framework

The research on optimal taxation is based on some basic ideas that deal mainly with the criteria for optimality, the specification for social welfare, the modelling of disincentives and the problems of application. However the level of abstraction of much of the research together with the extensive use of mathematical models cast many doubts on its practical value (Heady, 1993).

Many economists since the time of Adam Smith have discussed the effects of taxation on the economy. They often tried to describe and define what they regarded as desirable characteristics of a tax system. Smith (1776) mentioned four qualities with regard to taxes in general:

- Equality: Peoples' tax payments should be in proportion to their income
- Certainty: Tax liabilities should be clear and certain rather than arbitrary
- Convenience of payment: Taxes should be collected at a time and in a manner that is convenient for the tax payer, and

- Economy in collection: Those taxes should not be expensive to collect from the administrative point of view, and should not discourage business by creating disadvantages and distortions.

In the economic literature the first and and last assumptions have absorbed the main attention of the researchers. However Smith's criteria of equality was the basis of a history of differing views of what constitutes a fair and equal distribution of tax burden (Musgrave, 1959).

In general the taxation proposals in the literature have been analysed in terms of the following criteria:

- the need for taxes to be fair (although fairness is interpreted differently by different researchers)
- the need to minimise the administrative and compliance cost and
- the need to minimise disincentive effects (Heady, 1993).

The approach of the optimal taxation literature is to use economic analysis to combine the above criteria into one, implicitly deriving the relative weights that should be applied to each criterion. Diamond and Mirrless, (1971) have done this by using the concepts of individual utility and social welfare (which depends on individual utility). It is typically assumed that social welfare decreases as inequality of utility increases. By this, the concept of social welfare reflects one idea of fairness in the tax system. **This means that taxes are fair if they reduce the degree of inequality.** All of the above-mentioned criteria have been incorporated in optimal taxation literature because they affect peoples' utility, and hence social welfare, and so the policy that should be chosen is the one that gives the highest level of social welfare. Therefore, researchers have been trying to determine the tax system that will provide the best compromise between equality and efficiency. However they neglect to discuss the administrative costs of tax systems (second criterion above) which is recognised as a major shortcoming of much of the literature on taxation (Heady, 1993).

The optimal tax system is seen in the literature as the one in which there are no possible reforms that will increase welfare (Ahmad and Stern, 1991; Kay, 1990).

In other words the optimal tax system will be the one where it is impossible to increase social welfare without reducing overall tax revenues.

The requirement to raise a specific amount of tax revenues is obviously fundamental. This has implications. First it means that the solution to the optimal tax problem will depend on the size of the revenue requirement. Second it means that all tax reforms should be neutral. The importance of this point is that the optimal taxation literature divides the effect of a tax change into an "income effect" (after tax income) and a "substitution effect" (change in marginal return to work). These two effects go in opposite directions regarding the labour supply. The majority of authors in the optimal taxation literature discuss the optimal income taxation (linear and non-linear) (Diamond and Mirrless, 1971). **However, there is less interest in optimal commodity taxation (indirect taxation) in the literature which, is mainly concerned with the design of final sales taxes, such as value-added tax and excise duties, as well as the taxation of intermediate goods (Kay, 1990).**

1.2.2 Taxing income versus taxing consumption in optimal tax theory

It is conventional to distinguish direct from indirect taxation. The Oxford English Dictionary defines an indirect tax as "one which is not levied directly on the person on whom it ultimately falls". In common usage, the distinction between direct and indirect taxes reflects two different aspects of tax structures, which, though related, are themselves distinct. These are the choice between taxes on income and taxes on consumption. The first analysis of an optimal sales tax was undertaken by Ramsey (1927). Ramsey analysed the problem of designing sales taxes to raise a given amount of revenue at the least possible distortionary cost to the economy. Ramsey showed that when only a very small amount of revenues had to be raised, the taxes should produce equal proportional reductions in the consumption of each good. Thus, the change in the income compensated demand for each commodity should be such that if the derivatives of these compensated demand functions were constant, the proportionate reductions in demand would be the same for all commodities (Kay, 1990). **This has been formulated as an inverse elasticity rule: impose higher taxes on goods for which the own-price elasticity of demand is low.** Ramsey's analysis illustrates that if there were no distribution issues for the government, it would be appropriate to raise taxes principally by direct methods, and it is

largely because there are such distributional questions that the need for commodity taxation arises. Diamond and Mirrless, (1971) suggested that in two-goods case, optimal commodity taxation involve the imposing of a heavier tax on the good that is most complementary to leisure. In addition this showed that the introduction of distributional considerations alters the equal proportion reductions substantially. The goods which are consumed particularly by the low-income groups should face a lower than average proportional reduction. In the case of independent demands Diamond and Mirrless, (1971) suggested that the optimal tax rate on a good should depend not only on the inverse of its price elasticity of demand but also on its income elasticity, which indicates how the budget share of a good changes as the income rises.

In addition introducing distributional considerations into the theory of optimal commodity taxation, Diamond and Mirrless (1971) demonstrated an important result about the desirability of production efficiency. They showed that even considerations of income distribution might justify the use of distortionary taxes on the supply of factors of production or the consumption of final goods. However, they did not justify any distortion to the way in which production is organised. **It follows from this that the case against indirect taxes on intermediate goods (other than those implied on externality or other market failure considerations) is strong, and that commodity taxes should, as far as possible, fall only on final consumption.**

Indirect taxes, whether imposed on particular commodities or on consumption in general, may be implemented in various ways. Broad commodity categories may be taxed at either wholesale or retail level. But as traditional patterns of distribution have broken down and services have come to take a larger share of consumer expenditure, wholesale taxes have encountered increasing problems of administration (they do not satisfy the second criterion laid down by the optimal taxation literature). Retail sales taxes have always proved more difficult to operate than those collected at earlier stages of the production process. **Thus an invoice based VAT seems to be in accordance to the general principles of the optimal commodity taxation (taxing the final consumption and not the intermediate goods), having a positive impact on the efficiency of tax system (expressed as a direct function of total tax revenues), (Nava, 1996).** However, Davis and Kay, (1997) measuring the impact of taxation on income distribution, showed that what matters is not

the progressivity of each individual tax, but the progressivity of the tax system taken as a whole. They suggested that the contribution of VAT to the overall progressivity is small relative to that of income tax. **This observation is often used to support the argument that a shift from direct to indirect taxes is regressive.** However according to their study the correct inference is not that income tax is to be preferred to VAT, but that income tax is a more effective means of achieving progressivity than VAT (more effective in pursuing distributional goals). Finally they have shown that an extension of the VAT base combined with substantial increases in the income tax threshold and in social security benefits, would actually achieve the distributional goals in accordance to the optimal commodity taxation more effectively.

In conclusion, the above arguments do not question the basic principles of optimal commodity tax theory; an invoice credit VAT still satisfies the above principles by taxing final consumption and not intermediate or investment goods.

1.2.3 The economic effects of consumption taxes

We can summarise the economic effects of consumption taxes in the following four broad categories:

- *The effects on prices and inflation*

According to the proponents of consumption taxes, the conventional doctrine is that a general ad volorem tax on sales, and hence the VAT, is assured to be shifted forward to the ultimate consumer through a rise in prices of consumption goods (Sullivan, 1966). Assuming full employment and the collection of the tax by the government, the procedure of financing government expenditures through such taxation is apparently supposed to operate in the following manner: under a purely competitive economic system, the tax will raise the marginal costs of businesses making some production unprofitable at current prices. To restore profits, the businesses reduce output thus freeing resources for government use. Given the employment of these resources by the government and, therefore, probably the same aggregate demand for consumer's goods despite a smaller output, the average price level of consumer's goods will rise by the amount of the tax. Under imperfect competition, similar results are achieved through direct action by taxable

persons who, with the use of average cost techniques, are expected to raise the prices by the amount of the tax. In the absence of full employment, the tax is expected to aggravate the situation by freeing private factors payments for governmental use when many factors are already not used (Musgrave, 1953). Although it seems reasonable to assume that a tax on consumption goods will be largely shifted forward to consumers through a rise in product prices and that a tax on investment goods will be similarly shifted forward to purchasers of investment goods, some economists (Zacharopoulos, 1980; James and Nobe, 1987; Cnossen and Shoup, 1987) have contended that, when the government imposes a sales tax, it may actually obtain its revenues from reductions in factors incomes or backward shifting rather than increases in product prices. Whether a tax is imposed directly on factor incomes or indirectly through increases in product prices it will have further repercussions on factor incomes and employment. However, some temporary unemployment is presumably to be expected with any taxes, which reduce private spending or cause shifts in relative demands for various products.

In general, to curb inflation, a tax must reduce aggregate demand to a greater extent than the aggregate supply of goods and services, and do so within a fairly short period of time. A consumption tax may be more deflationary than an income tax if it impedes consumption expenditures more than the income tax, and, in short run, even control investment spending to a greater degree because of its indirect discouragement to investment. On the other hand, income taxes may be more deflationary on the grounds that there is little difference between an income tax, even a progressive one, and a regressive tax in their short-run effect on consumer spending, while income taxes, especially highly progressive ones, may reduce investment expenditures to a much greater extent than consumption taxes. Taxes levied on commodities and services are not equivalent to inflation though, in contrast to direct income taxes, they raise prices. They resemble inflation only to the extent that they have secondary repercussions on factor incomes, or if they do not succeed in adequately reducing the quantity of products demanded relative to the supply. If inflationary pressures are so great that prices rise by the amount of the tax and the same quantities are sold as before while supply has not increased to any extent, then the tax has failed to curb the inflation. Finally, if a tax is to be an anti-inflationary device, it must not seriously reduce the supply of labour (by decreasing the ability or willingness of workers to produce). Taxes which reduce the labour supply may be

inflationary because the drop in production is likely to be immediate, while the marginal prospenity to spend being less than one, demand will fall off less than supply. In other words the decline in spending will be less than the reduction in disposable incomes resulting from reduced labour supply to the extent that purchases are made out of past savings. The appraisal of alternative tax measures on the basis of this criterion is even more difficult than determining their effects on aggregate demand. This suggests that if two taxes are capable of raising the same amount of revenue, the more equitable one is preferable even if less deflationary (Cnossen and Shoup, 1987).

- *The effects on allocation of resources*

A neutral tax may be defined as one which has no effect on the allocation of an economy's resources. A completely neutral levy has yet to be discovered, even hypothetically. One way in which a tax modifies the allocation of resources is through its effects on the incentive to work or, in other words, its influence on the taxpayer's choice between work and leisure. This influence, as we stated before, operates through the "income" effect on one hand and the "substitution" (relative price) effect on the other. The "income" effect increases the incentive to work by lowering the marginal utility of "leisure". The "substitution" or relative price effect operates through a reduction in the reward for each marginal unit of work. This works in the direction of reducing the incentive to work by lowering the marginal utility of additional income. A regressive tax, and hence a consumption type sales tax must by definition have a regressive income effect. The stimulus to work will be greater, the lower the income level. Meanwhile the substitution effect will depress work to a smaller degree at all income levels than in the case of a proportional income tax and especially a progressive income tax (Sullivan, 1966). In summary a regressive redistribution of the tax burden is inescapable with the consumption taxes. Greater regressivity, nevertheless, cannot itself provide the basis for claiming higher tax revenues, as the average indirect tax burden of the economy stands unaffected. Another mechanism should be devised to mitigate any injustices created by the consumption tax. Income redistribution through more progressive direct personal taxation, increased transfer and social insurance payments and so on, can effectively work towards restoring the balance (Dalamagas, 1978).

Finally, Bleaney, Gemmel and Kneller, (2001), examining alternative classifications and desegregation of taxes and expenditures, classified consumption taxes as non-distortionary if the utility function does not contain leisure as an argument. With leisure as an argument in the utility function, consumption taxes will have some impact by distorting the labour-leisure choice. In addition since the income and substitution effects operate in opposite directions in the choice between labour and leisure, the impact of consumption taxation on labour input may in practice be small.

- *The effects on savings*

Under normal circumstances the volume of savings will depend on the size of income, the interest rate, the general price level, individuals' time preferences and random variables. The size of the interest rate determines to some extent the volume of savings to be attracted. The higher it is the stronger is the incentive to forgo present consumption for accumulation or future consumption at a given income. The economic literature suggests (Dalamagas, 1978; Tait, 1991) that, in theory, the savings of middle income groups will tend to rise upon the introduction of a sales tax. There are reasons, however for doubting whether this would occur in reality. There have been very few empirical studies. First of all it is doubtful whether the prices of the goods bought mainly by the middle-income earners would actually fall, as they suggested, because of the lighter tax burden or whether the latter would be neutralised in the form of higher prices net of tax. Secondly the price changes might work in the opposite direction, i.e. towards dissaving. Actually, price falls may become a powerful stimulus for consumers to turn their preferences to higher quality, higher-priced manufactured goods (consumer durables). Thirdly, second-order effects may interfere. For example, any deflationary effect of the price level may be outweighed by a strong inflationary tendency (or by money illusion), so that the savers might eventually be met with smaller surpluses. In addition rises in the price level, with money (nominal) income fixed, may tend to reduce the saving capacity of the taxpayers. This tendency may be counter balanced however, as inflation is reflected in interest rates and rates of return on investment.

- *The monetary effects of consumption taxes*

Quite aside from growth effects, a consumption tax can have destabilising short-run effects on aggregate demand and the monetary sector. An increase in such a tax reduces the real

amount of goods which a consumer can purchase and hence reduces their real expenditures. In this respect, a VAT or a sales tax has a similar effect on disposable income and hence consumption and aggregate demand, as does an income tax via its effect on expenditures.

There are, however, two opposing monetary effects of a consumption tax of either form. First, it drives a wedge between the price consumer's pay and the price producers receive for a consumer good. Holding producer prices constant a consumption tax, as we mentioned above, directly increases consumer's prices and hence reduces the purchasing power of the money balances that consumers hold. This can be viewed as decreasing the real money supplied in the economy. This tends to increase interest rates, decrease investment and hence aggregate demand (Holmes, Smyth and Hutton, 2000). Yet there also exists a tendency for the demand for transactions balances to decrease as the tax increases via its effect on expenditures. This tends to reduce disposable income and hence consumption expenditures, transactions demand and liquidity preference. This second monetary channel per se, leads to a lower interest rate and hence increased investment expenditures and aggregate demand. The question then is which monetary effect is dominant: the decrease in transaction demand or the decrease in the supply of real money balances? This is an empirical issue. However, it should be of particular concern to policy makers because, if an increase in a consumption tax decreases real money supply more than transactions demand in addition to directly reducing consumer expenditures via its effect on real disposable income, this will be highly contractionary either when considered in isolation or in conjunction with a decrease in income tax.

1.3 The theoretical justification of the tax on value added

There is more than one concept of value added, and the theories or, rather, hypotheses used to justify that the tax should be related to the type of measure employed. Hence it is logical to suppose that the incidence and the effects of the levy will vary with the nature of the tax base. The first proponents of the tax and their followers have recommended types of value added taxation which may be classified as "production taxes" in the sense of levies on the total value of a business's product, with deductions limited to purchases on current account from outside businesses and possibly depreciation. The tax would apply to the final output of both producers' and consumers' goods or, in other words, to items

purchased by investors or savers as well as ultimate consumers (Colm, 1939; Groves, 1948; Studenski, 1941). On the other hand, a consumption type tax or strictly speaking "a sales tax" has been recommended so that the levy is imposed only on sales for ultimate consumption or, in other words, items purchased by ultimate consumers.

The hypotheses used to justify the production-type measures may be classified as follows (Studenski, 1941; Sullivan, 1966):

- The cost-of-service variant of the general-benefit theory
- The social-expediency theory
- The general-welfare theory

In justifying consumption-type measures, emphasis has generally been placed on the stimulation of investment and the neutrality of the tax with respect to various methods of production, especially the absence of discrimination against capital expenditures, sometimes as compared with net profits taxation and sometimes as compared with no tax situation. Under the older hypotheses for taxation, the neutrality criterion represents a subdivision of the social expediency theory (Sullivan, 1966).

The first of the above hypotheses may be explained as follows:
In rendering services of general benefit to business, the government functions in the same way as private producers, and should recover the cost of these services through business taxes. Value added by the individual firm provides an objective index of the concern's relative utilisation of these services. Therefore, it is fair to recoup such governmental costs according to the value added.

The second hypothesis is based on the earlier proponents of the VAT who invoked considerations of expediency in support of their proposed measures (Studenski, 1941). Studenski subdivides the "social expediency theory" into: a) "fiscal" b) "political" and c) "economic" expediency. The "fiscal principle" emphasises the facility with which a tax produces revenue and its administrative convenience. The "political principle" supports taxes, which seem least unpopular, such as hidden taxes. The "economic principle" is concerned with the neutrality of a tax measure in terms of the incidence of factors of production or the distribution of income and wealth.

The third hypothesis may be summarised as follows:

Most public expenditures represent an inseparable mixture of benefits to producers and consumers. However, there is a good reason to believe that the benefits may be allocated among individuals in proportion to their respective incomes. Hence, the cost of such services should be covered by a proportional tax on individual incomes. However, this hypothesis does not exclude recourse to indirect taxation to contribute to cost recovery for public services.

Finally according to the above-mentioned theories of justification, in principle, the general turnover tax and the value added tax should also be imposed on services.

It should be recalled here that even the early proponents of the tax considered clearly that the exemption of services discriminates in favour of labour rendered in conjunction with such services as compared with labour rendered in the production of commodities (Due, 1950).

A substantial reason for the exemption of services is, according to the above mentioned justifications, the administrative difficulty of taxing them (identification of the tax liable person, the place of supply, taxation of professional services etc) and the use of the measure to remove the regressivity of VAT for those countries that want to maintain progressive tax systems.

1.4 The general theory of VAT application and the concept of financial services

Indirect taxes- whether imposed on particular commodities or on consumption in general- may be implemented in various ways. An invoice based VAT-the common model used by the EU Member States as well-is charged on gross output. Tax levied on inputs, which are purchased from other registered traders, may be deducted on computing liability. **VAT[1] thus provides a systematic mechanism for taxing final consumption while relieving transactions in intermediate goods. A comprehensive framework, which has formed**

[1] Historically the European VAT system was pioneered in France, which introduced a value added type of consumption tax on goods in 1954, levied at the production stage. In 1968, this tax was merged with the existing turnover tax on services and a local tax on retail sales into a single, comprehensive levy extending through the retail stage. In the following decade, the other original Member States of the EU adopted the VAT. Since the tax was made a condition for membership, the new entrants to the EU introduced it as well.

the basis of subsequent analysis of the above issues, is that of Diamond and Mirrlees, (1971). An important conclusion of their analysis is that there is a strong case against indirect taxes on intermediate goods (other than those implied by externality or other market failure considerations), and that commodity taxes and especially VAT should, as far as possible, fall only on final consumption. In addition to being neutral with respect to foreign trade, the VAT does not distort domestic production and distribution. In particular, in analysing the effects of taxation in open economies, there is an important distinction between source or origin-based taxes and those which have a destination base. A broad-based tax may be charged by reference to the place of consumption (destination principle) or the location of production (the origin principle). Although it is typically the case that income taxes are levied on the origin principle and consumption taxes on a destination basis, there is nothing inherent in the structure of these taxes that requires this result. The practical equivalence of indirect taxes, consumption taxes and destination basis taxes is, however, reinforced by GATT/WTO rules, which seek to restrict the degree to which direct taxes may be refunded on exports. The opportunity to shift the tax system from an origin to a destination basis, thus stimulating exports and discouraging imports, has been put forward as an argument for the adoption of VAT in many of the countries, which have introduced this tax (Kay, 1990).

A perceived merit of the VAT, as we mentioned above, is that the zero-rating of exports fulfils the requirements of the destination principle, in a simple and systematic way, while other indirect taxes tend to fall at least in part on exported commodities. The question of whether intra-community traded products should be taxed according to the origin or the destination principle has been much debated in the literature over the last forty years. A number of authors (Dosser, 1967; Shibata, 1967; Shoup, 1969; Whalley, 1979; Grossman, 1980; Berglas, 1981; Georgakopoulos and Hitiris, 1992; Lockwood, Meza and Myles, 1995) drawing on recent theoretical results concerning the equivalence of destination and origin principle have presented different findings. **Although the above theoretical results are sufficient they do not eliminate the problem of the taxation of services (i.e. financial services) in intra-community trade.** However, the academic literature has emphasised all the underlying theoretical principles in order for tax administrations to design a VAT structure that includes services and especially financial services. This is mainly driven by considerations of equity and tax neutrality (influenced by the optimal

taxation theory). As defined by Gillis (1987) neutrality in the value added taxation of financial institutions has four components:

- Neutral treatment of financial services, relative to other goods and services
- Neutrality among all types of financial institutions
- Neutrality among businesses that specialise in financial services and other businesses which provide financial and other services, and
- Neutral treatment between foreign and domestic financial institutions.

Henderson (1988) on the other hand argues that the base for VAT should be as broad as possible. **According to her, the general theory of VAT application is in favour of a broad base because that improves the neutrality of the tax.** If some goods and services are exempt from the tax while others are taxed, the tax tends to change the relative prices of these two categories of goods and services. This would distort household and business purchasing decisions. Also, a broad-based tax tends to raise more revenues for a given tax rate both because it has wide statutory coverage and because it closes off opportunities for taxpayers to restructure transactions so as to minimise tax payments. Under these principles, Henderson argues that VAT should cover financial intermediaries. However she recognises the administrative difficulties, the conceptual confusion in the literature in identifying these services, and the concern that taxation would inadvertently discourage saving. On the other hand, Garber and Raboy (1989) argue that financial institutions serve as intermediaries to the actual parties of financial transaction. This intermediation service has definitely value, which an institution's customers are willing to pay for, either directly or indirectly. According to the general theory of VAT application it is this value which must be isolated for consumption tax purposes.

The main conclusion of this section is that the general theory of VAT application is in favour of a broadly applied VAT base including financial services (researchers are influenced by the optimal commodity tax theory).

1.5 The economics of applying VAT on financial services

In general term the value-added tax is levied on the following base:

$Y=C+S$, where Y is capital and non-capital income, C is current consumer expenditures on goods and services, and S is savings, as in the traditional national income accounting

relationship. Tax on value added as expressed in the equation may be one of two types. It may be the gross product type, where firms are liable to pay tax on sales, but capital purchases and economic depreciation are not deductible. In this sense, the gross product type of VAT taxes both consumption and savings, given that in capital markets equilibrium, investment equals savings. Alternatively, VAT as a consumption type tax, is applied only on consumption of goods and services, and not on investment (savings).

To show how the above equation differs under these two types of taxation, the above equation may be restated as follows (Hoffman, 1988):
Y=wages+returns to capital, or *Y=wages+interest+dividends+net capital gains*. If there is no growth in the economy, then national income will simply consist of payments to labour and capital, and capital gains will be zero. In the longer term however, assuming perfect competition, with free entry and exit into industries, economic profits will in theory be driven to zero by competitive forces and capital will earn only its "normal" return (Hoffman, 1988). Since the difference between a firm's sales and purchases will equal its payments to the factors of production it employs, the basic equation may also be restated to show value added as: *VA=revenues-expenses-true economic depreciation,* if savings are removed from the base. Summing this relationship across all transactions in the economy gives the total value of consumer expenditures (capital goods are exempted from the tax). This formula as a tax base of a consumption type VAT will capture the real transactions in the economy but the financial services would be excluded. To include them, the cash-flow base must be expanded to encompass the value added on both the financial services and on real transactions as follows:
VA=revenues-non wage expenditures-capital expenditures+financial income (dividends, interest, and capital gains)-financial costs (dividends paid, interest expense, capital losses)-purchases of financial assets (net of sales of financial assets).

Conceptually this treatment could be applied to all financial institutions in the economy. In theory, this treatment would be correct, since many firms, while not usually thought of as financial institutions, in fact create value added in the economy by producing financial services. **The above-mentioned basic theoretical concepts were the underlying principles which formed the Canadian view (Canadian proposal, 1987) for taxing financial services under a consumption type VAT. This view appears to be also a**

turning point for the European VAT literature (EC proposals and studies, 1996b). The Canadian view is that since financial services add value to the economy they should be taxed following the above equations, and that to do otherwise under a comprehensive VAT would be to deny neutral tax treatment to various types of services (Thompson, 1988).

Furthermore many theoretical studies have looked at the issue of the nature of value added in financial services, adopting a number of approaches and viewpoints. Examples of studies which consider various aspects of this basic conceptual issue are: Meade, (1978); Barham, Poddar, and Whalley, (1987); Hoffman, Poddar, and Whalley, (1987); Hoffman, (1988); Henderson, (1988); New Zealand, (1988); EC, (1996b); OECD, (1998). Some studies have been theoretical in nature, proceeding for example, by assessing how changes in assumptions in general equilibrium models can lead to the appearance of value added in financial transactions (Henderson, 1988; EC, 1996b). Other studies have been more descriptive and institutional in nature, concentrating on the identification of value added in particular transactions or by particular types of financial institutions (Canadian proposal, 1987). However, all of these studies are designed (a) to show that financial flows do in fact include elements of value added and (b) to derive ways of identifying or defining this value added (Kimbrough, 1989). **In the process, the studies invariably result in the identification of conceptual and measurement problems. It is of course the existence of such problems which is the underlying rationale for exemption for financial services in most currently applied VAT systems (i.e. EU VAT system).**

At the most general level, it can be argued that in markets incorporating perfect knowledge and no transaction costs, there would be a place for financial securities as claims on the cash-flows of various projects. However, there would be no value added in the creation of these instruments. One study which summarises this argument is New Zealand's (Ministry of Finance, 1988). Under the assumption of perfect markets in such equilibrium models, only real activities create consumable goods and services and hence value added. Under such conditions, there would be no argument for general consumption taxes to apply to any element of financial flows, because there would be no element of value added incorporated in them. **However, once transaction costs are included in such general equilibrium models, there is value added from the provision of financial services.** This can be

described in the following fashion "... institutions which operate in financial markets create additional value, because they control the costs of transacting in financial markets and also because they help to reduce transactions costs in other markets" (Ministry of Finance New Zealand, 1988).

In the literature, (Henderson, 1988) this function is generally referred to as financial intermediation and is considered to be the element in financial margins that gives rise to value added and which should be subject to a general consumption tax. Several studies discuss the nature of intermediation in more general terms: New Zealand, (1988); Hoffman, (1988); Henderson, (1988). They identify four main components of financial flows: the initial deposit, pure interest payments, the pure risk premiums and any form of compensation to the financial institution for the costs incurred in accepting deposits and making loans. It is only those components of the flows that represent intermediation services that should be taxable. Other parts of the flows that represent more transfers do not represent value added and should not be part of the tax base.

1.6 The theory of incidence and the impact of VAT exemptions

As we mentioned above, the economic effects of value added tax seem to be well understood by now in the academic literature. However, in the relevant literature the impact of VAT exemptions (i.e. the financial exemptions applied in EU) on incidence (i.e. VAT base) is not adequately investigated (Mc Lure, 1987; Gottfried and Wiegard 1991). **In most theoretical studies VAT remaining on intermediate or investment goods is simply neglected, mainly because nothing has been said about the economic effects of this part of VAT.** Bovenmberg (1987) seems to be the only theoretical study to assess the efficiency effects of VAT exemptions in a general equilibrium context, by relocating the VAT remaining on the use of intermediate products under exemption to the final demand categories. In all theoretical work the rationale for these exemptions is justified on the grounds of either of administrative expediency or equity.

In addition, according to the theory of VAT incidence, VAT exemptions have to be taken into account in the procedure used to estimate the base of the tax. It is not enough to rely on data on final sales of exempt goods and services, as it would be for a retail sales tax. Additional information on the economy's productive structure is necessary to take account

of the use of taxed inputs by exempt sectors. As a result the procedure to estimate the base of VAT when there are significant exemptions can be quite complicated. A VAT without exemptions, with zero-rating limited to exports and purchasers of capital goods allowed a credit on their tax liability, is a tax on consumption, so that the base of the tax is given by the value of final sales of consumer goods and services. The theoretical base of the VAT in this case may be derived from the following formula (Mackenzie, 1991):

$$VAT\ base=GDP+Imports-Exports-Gross\ capital\ formation \quad (1)$$

Analysing now the total value of sales in an economy in both intermediate and final we get the following expression:

$$VAT\ base=C_d+I_d+X+IS_d+IS_m+I_m+C_m \quad (2)$$

Where C stands for the value of final sales of consumer goods and services, I for the final sales of capital goods, IS for intermediate sales, and the subscripts d and m for domestically produced and imported. A VAT without exemptions is levied on all sales, both intermediate and final. However, when they are no exemptions, the tax liability generated by an intermediate sale is offset by the credit received by the purchaser. When purchases of capital goods are treated, as they are in consumption type VAT, as intermediate purchases, and exports are zero-rated, the only sales that generate a net tax liability are sales to consumers just as in the case of broad-based retail sales tax. Using the above way of expressing the VAT base the formula in this case would be:

$$VAT\ base=C_d+C_m=C \quad (3)$$

Once some industries are exempt, however, it is no longer the case that intermediate sales cannot generate a net tax liability. To explore the consequences of exemptions further the above formula (2) can be restated as:

$$VAT\ base=C_d+I_d+X+\sum_{i=1}^{n}\sum_{j=1}^{n}a_{ji}Q_j+I_m+C_m\ , \quad (4)$$

where Q denotes the value of gross output of industry i, which produces good j and a_{ji} is the input coefficient (the amount of input necessary to produce good j). This formula is

derived from the identity of the sum of the intermediate sales of each industry and imports of intermediate goods with the value of goods used up in the production process. In this new formula the important impact of the exemptions lies in the factor $a_{ji}Q_j$. Tamaoka, (1994) introduced a price determination model using input-output analysis in order to study further the impact of exemptions on the above mentioned factor. According to Tamaoka (1994) the following relationship holds for each industry in the economy where there is no VAT:

$$p_i = \sum_{j=1}^{n} a_{ji} p_j + v_i \qquad (i, j = 1, \ldots, n) \qquad (5)$$

where p_i is the unit price of the product of the ith industry, a_{ji} is the input coefficient per unit of output and v_i is the rate of value added per unit of product. In the case of VAT under the tax credit method, the tax liability of each industry is the tax on sales excluding exports minus the tax on purchases including capital goods. Then we get the following expression instead of the equation (5)

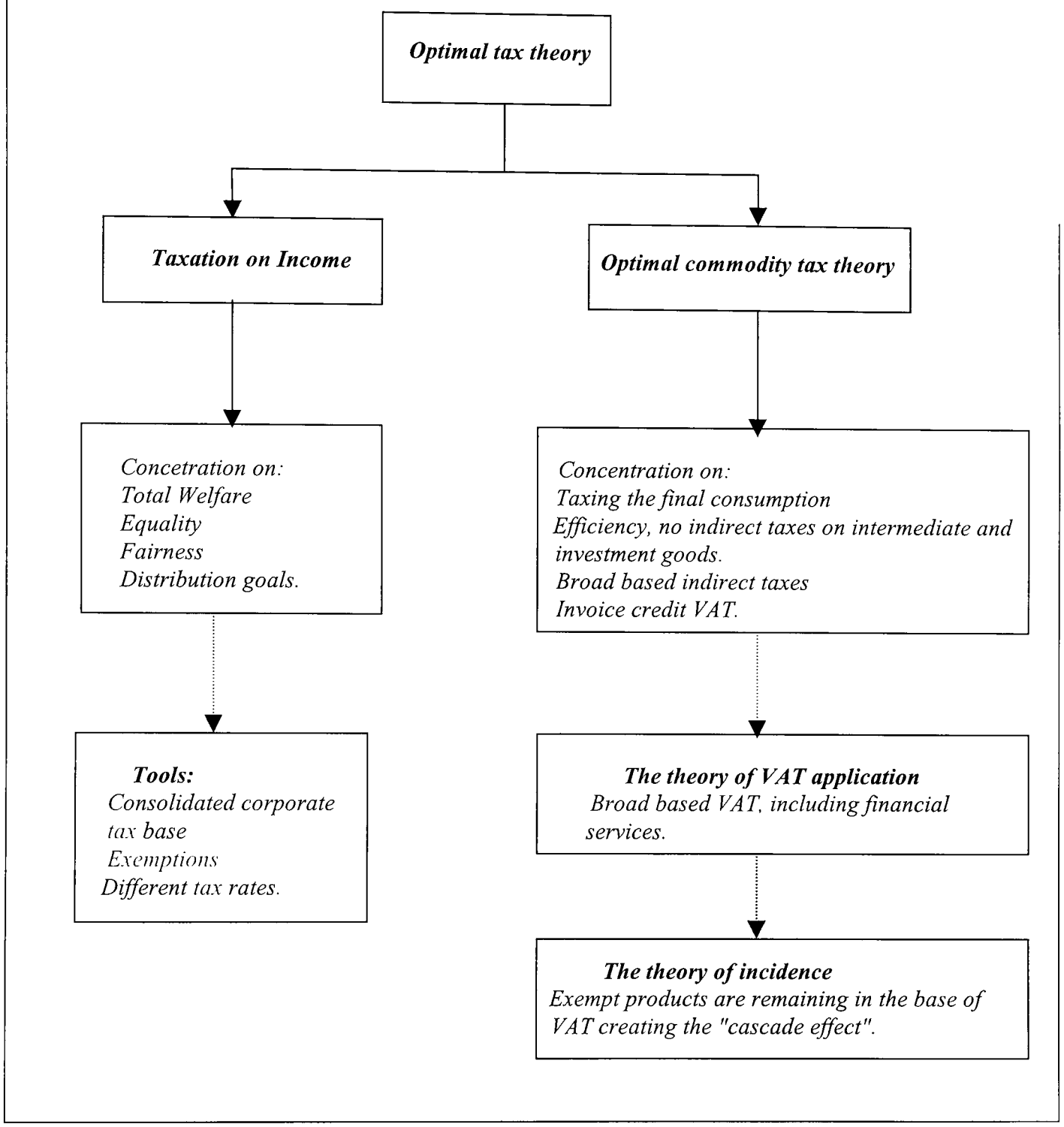
$$p_i = \sum_{j=1}^{n} a_{ji} p_j + v_i + \tau_i p_i (1 - e_i) - \tau_j \left(\sum_{j=1}^{n} a_{ji} + \sum_{j=1}^{n} k_{ji} \right) p_j \qquad (i, j = 1, \ldots, n) \qquad (6)$$

Where τ_i is the tax rate for the ith industry, e_i is the export per unit of output and k_{ji} is the investment coefficient per unit of output. For exemption under the tax credit method, equation (5) still holds for a tax-exempt industry because it has no VAT liability. For a VAT-liable industry however, since it can obtain no credits on inputs purchased from a tax exempt industry, (i.e. financial services from a financial institution) the last term on the right hand side of equation (6) for a corresponding tax-exempt industry becomes zero changing the whole value of the VAT base (equation 4) through changes of the factor $a_{ji}Q_j$ (the basis for cascading the tax to consumers). In general the base of VAT with exemptions will be greater than the value added of the taxed sector, and the reduction to the base that results from exempting part of the economy is less than the value added of the exempt sector. This follows from the relationship that the value added of the exempt sector minus intermediate sales to the taxed sector will equal final sales of the exempt sector minus intermediate purchases from the taxed sector. As long as intermediate sales to

the taxed sector are positive, the reduction to the base entailed by exemptions will be less than the value added of the exempt sector.

The argument of this section has confirmed the view that exempt products (i.e. financial services) remain in the base of VAT to the extent that they are sold as intermediate inputs (through higher prices) to the taxed sector. This proposition is sometimes used as an excuse to limit the base of the VAT which contradicts the basic principles of the optimal commodity tax theory (Mackenzie, 1991) (see also the following Figure 1.1).

Figure 1.1 Aspects of the Optimal Tax Theory



1.7 Distortions created by exempting financial institutions from VAT

There are considerable numbers of problems and distortions that can be identified under the current approach to tax financial services (exemption of financial services from VAT). The problems can be broken into three broad categories. These are:

- Economic effects
- Definition of exempt financial services

- Taxation of imported services as inputs to financial institutions/International competition (Hoffman, Poddar and Whalley, 1987; EC, 1996b).

1.7.1. Economic effects

In general, these arise, as described in the literature, because the current exemption system gives rise to non-neutralities which reduce the efficiency of the economic system (EC, 1996b; Barham, Poddar, and Whalley, 1987; Hoffman, Poddar, and Whalley, 1987; Tamaoka, 1994).

- *The cascading of tax on financial services to consumers and the impact on efficiency of the VAT system.*

When financial services are provided directly to consumers, under the current tax system in EU, tax is not applied on the actual sale to consumers. However, there is no credit for any tax on inputs. The exemption thus means that financial services are taxed less heavily than other goods and services, because the effective tax rate [2] is determined by the value of inputs to financial institutions rather than the value of the final product. In this case there will be a tendency to over-consumption of financial services by households with attendant welfare losses (Hoffman, Poddar, and Whalley, 1987).

Jack, (1996) examined the impact of VAT exemptions on the efficiency of VAT system and VAT base. **He argued that the exemption of certain goods and services from the tax (VAT) base has an effect on the average statutory rate, which is difficult to measure without detailed information on the tax rates levied at the earlier stages of production, and on the share of consumption purchased from exempt businesses.** In addition he pointed out the "input coefficient" is the important factor to determine the average statutory rate for the exempt sector. **Therefore, the exempt goods and services are taxed less heavily than other goods and services because the effective tax rate as well as the average statutory rate is determined by the value of inputs to the exempt sector rather than to the value of the final products.**

[2] The effective VAT rate (EVR) is defined as the VAT paid on capital expenditure as a proportion of total capital expenditure by the sector or more simply the (EVR) can be defined as VAT revenues VAT base.

According to Jack (1996) a method to measure the efficiency with which VAT laws are implemented is to compare the effective VAT rate, t_e, with the average statutory rate, t_s. Specifically, in his study the efficiency is defined as: $e=t_e/t_s$. As we mentioned above in the case of exempted sectors, the value of inputs rather than the value of the final products determine the effective VAT rate. In this case the effective VAT rate can be calculated from the following formula:

$$t_e = \frac{total\ capital\ expenditures}{VAT\ base\ of\ the\ sector} \quad \text{instead of } t_e = \frac{VAT\ revenues\ from\ the\ sector}{VAT\ base\ of\ the\ sector},$$

which is relevant for the taxable sectors.

Furthermore when taxes are imposed on **intermediate** goods, trade distortions and production inefficiencies will occur. Taxes on business property and motor fuel may have this effect and so may exemptions within the VAT structure (as a result of the inability of business purchasers to reclaim VAT charged on the production of exempt goods or exempt financial services) (Kay, 1990). When a financial service is supplied as an intermediate step in the production process, that is as business inputs, the claiming of input tax credits earlier in the production chain is blocked by the exempt status of the financial service. However, the non-creditable tax of the financial institution, as we have already mentioned above, will be included in the selling price of non-financial goods and services (Tamaoka, 1994) which will be subject to VAT on the full sale price. The tax in this case is cascading in that it applies on both inputs and the final selling price. Thus, for sales of other goods and services, which include financial services as inputs, there is over taxation relative to other goods and services. This will tend to lead to under-consumption of goods and services incorporating financial services.

- *Self-supply bias*

The exemption for financial services creates an incentive for financial institutions to self-supply inputs. This provides a means by which input taxes can be avoided in the production of financial services. The self-supply bias is not limited to an in- house supply of certain inputs. It is, in fact, much broader and includes any substitution of employee labour (and other inputs that are exempt of the tax) for other taxable factors of production

that are acquired from third parties. The exemption system creates a wedge between the pre-and post-tax price of labour relative to the price of non-labour inputs. This, in turn, results in inefficiencies in the production and delivery of financial services (Hoffman, 1988).

- *Government revenue implications*

By exempting financial services, government tax revenues are altered from what they would otherwise be. However, in a theoretical sense, it is not clear whether revenues will be higher or lower as this depends on the relative importance of tax cascading in respect of business inputs of financial institutions compared with the failure to tax household consumption of financial services. The exemption system results in a net increase in tax on financial services provided to businesses (equal to the non-creditable tax on the associated inputs of the financial institution) and a net decrease in tax on the services provided to households (equal to tax rate times that portion of the consideration for the services that represents value added by the financial institution). Overall impact will vary from country to country, depending upon the relative weight of the two factors. Even where the overall result is a net reduction in tax or loss in government revenues, the impact will vary significantly across institutions and types of services. There are several other factors, which could have an impact on the overall revenue loss or gain from the exemption system. First, to the extent that financial institutions adopt successful tax planning strategies in respect of minimising taxable business inputs, the extent of tax cascading will be limited. Second, rules such as options to allow financial services to be taxable may lead to self-selection effects, which reduce the extent of cascading while the level of tax on non-taxable consumer intermediation services is unchanged. Third, international cross-trading may increase the level of zero-rated services as a proportion of activity in all countries. Finally, innovative ways may be found to provide non-financial services as incidental or mixed supplies with the financial services or even to substitute financial services for non-financial ones (EC, 1996b).

In conclusion the academic literature is not clear whether the net effect of imposing a consumption tax (VAT) on financial services will be positive for government budget.

- *Allocation of input tax credit*

Because input tax credits are not available in respect of exempt activities, any financial institution that carries on either taxable or zero-rated activities will need to allocate their sales in some fashion between those that earn input tax credits and those that do not. The potential methods of allocation are, in themselves, a significant source of complexity in the operation of the exemption system. The problem of a general nature arising from the need to allocate input tax credits between taxable and exempt uses will be touched upon also in the following chapter about the structure of VAT. Generally speaking the diversity of methods for allocating credits may create opportunities for choosing methods which allocate more activities to taxable transactions and this may lead to disputes between taxpayers and administrators on the appropriateness of the method used. While statutory rules or regulations specifying the approach to use can increase certainty, in some cases, they can lead to inappropriate results.

1.7.2 Definition of financial services

In order for the exemption system to work, there must be a definition of what constitutes a financial service. In practice, there are significant number of areas where there are complexities and ambiguities in developing and applying such definitions.

These main areas are (EC, 1996b):

- The identification of financial services
- The financial services supplied by non-financial businesses
- The services incidental or supplementary to financial services
- The mixed supplies
- The exempt versus zero-rated supplies, and
- The sale of used assets by financial institutions.

Taking into account the above-mentioned problems it is important to mention the existing definitions in the literature of financial services. Generally speaking the many services that financial systems provide can be grouped into five categories: they mobilise an economy's resources, they facilitate the transactions necessary to carry on economic exchange and trade, they improve risk management by pooling and diversifying the risks faced by the providers and the users of funds, they collect and evaluate the information needed to make

productive investment decisions, and they monitor the behaviour of corporate managers, evaluating their performance and compelling them to act in the best interests of the firm. Financial institutions are considered to specialise in collecting funds from savers, evaluating potentially risky borrowers, and allocating the funds they collect to those uses that promise the highest rates of return (Dobson and Jacquet, 1998). A detailed definition can be found in the article 13(B)(d) of the Sixth Directive (EC VAT legislation) which specifies what is considered as financial service for VAT purposes. The EC VAT legislation typically sweeps in all commercial activity, defined on a broad basis, and then allows for certain exemptions. **Under the Sixth Directive, the above mentioned provision/definition was made for exemption of certain transactions of financial nature. Only these transactions are included in the above-mentioned definition. However, there is not any generic definition of what constitutes a financial service.**

Furthermore the most common definition in the literature is the following in the GATS/WTO/FSA Annex on financial services:

"A financial service is any service of financial nature offered by a financial service supplier of a Member. Financial services include all insurance and insurance-related services, and all banking and other financial services (excluding insurance)". **However, this definition has not been in use for other purposes than WTO's agreements on international trade.**

The Canadian legislation on the other hand defines a set of financial instruments and specifies that services related to such instruments and to money are exempt. However actual operation of the above rules lead to the need for more detailed interpretation. For example, Revenue Canada, the Canadian tax administrator, has released its interpretation of what constitutes financial activities. For trust companies alone, this consists of a list of some 240-transaction types with specification as to whether they are considered as taxable or exempt (Finance Canada, 1987). This is, in itself, probably indicative of the difficulties of drawing precise borders between financial and other activities.

In the existing literature financial services can be categorised in a variety of ways, e.g. by the type of financial instruments or by the type of service provided. The actual services that are available in the market generally involve a mix of two or more of these functions.

They are rarely identified in the market place by the functions performed by the financial institutions (Meade, 1978). The tax treatment of financial services is also generally defined in the taxes statutes by reference to the nature of services actually provided in the market place, as opposed to the functional classification (EU study, 1996b).

The EC study (1996b) and the Sixth VAT Directive categorise the financial services, on the basis of how they are packaged and presented in the market place. Five main categories are identified:

- Deposits, borrowing and lending
- Purchases, sale and issuance of financial securities
- Insurance
- Brokerage and other agents services
- Advisory, management and data processing services.

On the contrary, the WTO/GATS and the OECD/CFA[3] categorise the financial services by the underlying functions and activities performed by the financial institutions (16 and 27 activities respectively).

1.7.3 International competition

Financial services supplied by offshore financial institutions have a tax advantage over those supplied by domestic institutions. In the case of both households and business firms, the services supplied by foreign institutions are free of VAT (either because of zero-rating or the absence of VAT in the foreign jurisdiction), while domestic supplies include the VAT on the inputs of financial institutions. This creates incentives for foreign supply of financial services, which is obviously undesirable from the domestic perspective (Poddar and English, 1997). It might be noted that in the case of trading partners where both have VAT systems (exempting domestic financial services, zero rating financial services exports), there would be an equivalent tax advantage to the domestic financial institutions making supplies to the households and business firms in the other country. This is similar to the situation where export subsidies create incentives for cross trading internationally.

[3] OECD/ Committee on Fiscal Affairs.

where foreign suppliers supply each country. This is obviously an inefficient solution from the perspective of both countries.

The EU system of exemption between Member States places all the financial institutions on the same footing insofar as there is no rate or structural differences in the tax systems among Member States. It is thus more neutral between competing institutions. However, this is at the expense of greater cascading tax. Moreover, because of the differences in the input tax allocation rules, the deductible proportion of input tax is far from uniform for financial institutions located in different Member States (EC, 1996b).

In conclusion after discussing the distortions created by exempting the financial services from VAT, we could argue that exemption goes against the basic principles of optimal commodity tax theory which advocates no indirect tax on intermediate and investment goods. Exemption gives rise to non-neutralities, inefficiencies, and administrative problems besides having revenue implications.

1.8 The existing international evidence of the VAT treatment of financial services

- *European Union*

After three decades of experience with VAT in most EU Member States, satisfactory methods for full taxation of financial services have yet to be developed. Rather, practical problems in including banking services in the base of VAT have led all EU Member States to exempt rather than zero rate, the "core activities" of banks. No EU country attempts to apply VAT to such intermediation activities as loans, deposits or security transactions. While financial services are, in general, exempt in almost all countries from VAT, there are variations in the definition of exempt financial services. Certain services provided by financial institutions are explicitly excluded from the scope of the exemption in virtually all countries, but not all. An important common characteristic of those services of financial nature that are taxable is that they are typically charged on a fee-for-service basis. The list of taxable financial services in particular countries may also reflect particular institutional arrangements in the countries or the structure of predecessor taxes that were replaced by the VAT (EC, 1996b).

The scope of the exemption for financial services in EU countries is set out in the Sixth Directive (article 13(B)(d) of the Directive 77/388/EEC). The Sixth Directive permits Member States to allow financial institutions an option to treat financial services as taxable supplies. The exercise of this option allows the financial institution to recover the tax on inputs. The tax charged by the financial institution on its supplies of financial services is recoverable by its business customers where they use the services as inputs to other taxable supplies.

Insurance services are also exempted from the VAT but without any options to tax. The use of this option system has been limited in the EU, either because Member States do not allow it, or allow it only for a restricted range of financial services. Denmark, Spain, Greece, Ireland, Italy, Luxembourg, the Netherlands and the United Kingdom do not allow the option at all. In Belgium and France, the option is not available in respect of credit operations. Germany allows the greater flexibility in the use of the option but many banks have chosen not to take it up (EC, 1996b).

The current EU approach is to exempt financial services supplied to other EU countries. For countries outside the EC, zero-rating is applied, with certain exceptions. The rationale for zero rating is to place domestic financial institutions on a competitive footing with foreign financial institutions, such as those in the United States, which may not be subject to any sales taxes on their inputs. However, the major difficulty that arises with respect to supplies of financial services to non-residents is to determine the place of supply. In the case of financial services, the primary criterion for defining an exported financial service is the residence of the person to whom the service is rendered. If the customer is established (resident) outside the country, the supply of the service is zero- rated, regardless of where the service is rendered. If the customer is a resident of the country, the supply is exempt (EC, 1996b).

Finally it is worth noting here that although EU Member States do not generally attempt to apply VAT to financial services, many do impose other forms of indirect taxes on such services. In particular all EU Member States have special indirect taxes (other than VAT) on insurance sometimes expressed as a percentage of the premium, sometimes as a percent

of the value of the policy (Gillis, 1987). **However, the structure of these taxes and their effects on the revenues and economy has not been addressed in the literature.**

- *Non-EU countries*

Israel has been the only country to attempt to apply VAT to a wide variety of financial services. However, the VAT imposed on financial institutions in Israel was not of the tax-credit type where tax liability is computed by subtracting taxes paid on purchases from taxes due on sales. Initially a 12% VAT rate applied to the sum of payrolls and profits of financial institutions. No offsets were allowed for ordinary VAT paid by financial institutions on their purchases (inputs), nor could customers of banking businesses credit the "special VAT" against the ordinary VAT due on their sales. But the special VAT on financial institutions proved unpractical (Gillis, 1987). The taxable customers could not credit the "special VAT" against taxes due on their sales, and financial institutions could not use ordinary VAT paid on their purchases as a credit against the special VAT applied to their supply of financial services. This addition type of VAT has been abolished in 1981, and replaced with a separate indirect tax (15% rate), but completely different from VAT and is clearly non-creditable by taxable customers. **According to Gillis (1987) the primary lesson from the Israeli experience seems to be that efforts to apply VAT with a different method to financial services while other sectors employ the credit type VAT leads to complications with the deduction of input VAT.** As we said before the solution to the problem in Israel was to ignore the credit problem and to apply a cascade indirect financial tax, as many EU Member States.

Furthermore the VAT treatment of financial Institutions in New Zealand has been a very interesting issue when the country introduced VAT in 1986. Although the Government's special advisory panel, which included experts from financial sector, proposed that VAT be fully applied to all financial services apart from certain insurance services (or alternatively to zero rate all financial services) the Government rejected the panel's recommendations and introduced exemption of all insurance services. The main variation is the treatment of property and casualty insurers, who under the N. Zealand's VAT (GST) are taxable on the excess of premiums over claims. Other financial transactions of a general insurer are excluded however, in line with the general exemption of financial services. In that sense therefore, no new ground was broken. Although the inclusion of

financial institutions under the N. Zealand's VAT is not a dead issue there appear to be no immediate prospect of change.

The United States has also put forward various consumption tax proposals in recent years, and some consideration was soon given to applying VAT on gross interest charges of banks and other lending institutions. However, difficulties were noted in application, and none have been implemented so far (Thompson, 1988).

Finally as we mentioned before, the Canadian proposal (Ministry of Finance, 1987) is an important step forward addressing directly the objective of including financial services within the scope of credit type VAT. In taking the financial margin as the best measure of the value added by financial institutions, the proposal isolates what appears to be the proper amount for the services provided, and yet at the same time manages to prevent taxation of the return on capital. In the Canadian proposal the tax base is derived from the overall results of financial institutions for a year. Accordingly, for many financial services it would be difficult to determine the exact amounts of tax applicable to specific transactions and to pass these amounts to taxable customers. As a consequence it would also be difficult to provide an appropriate credit to taxable customers of financial institutions. However, the problem of cascading of tax to the taxable customer has not been properly addressed. As the proposal states "it may be that these effects will not have a significant economic impact". Aside from these practical considerations, which prevented the system to be operational, the Canadian proposal influenced the European Commission and OECD in dealing with the problem. Many elements of the Canadian proposal can be found in the EU study on financial services (EC, 1996b) and OECD work on financial services (OECD, 1998) (i.e. taxing the margin with the development of the cash-flow method).

1.9 The empirical work on indirect taxation of financial services

1.9.1 Empirical evidence on the feasibility of taxation

As we have already stated, the special characteristics of financial services make it difficult to apply the tax to them under the traditional credit invoice system (consumption type VAT). The principal alternatives that have been considered and proposed in the literature

(American Bar, 1977; Meade, 1978; Finance Canada, 1987; Hoffman, 1988; EC, 1996b; Poddar and English, 1997) are as follows:

- The traditional credit-invoice method
- The addition method
- The cash-flow method
- The cash-flow method with tax calculation account (TCA)
- The subtraction method and,
- The ad-hoc methods

The credit invoice-method would involve the extension of the general system used for other goods and services in almost all-current VAT systems to financial services. The addition and subtraction methods refer to alternative methods of calculating value added tax, which give identical results to the credit invoice method under certain conditions. The former method measures value added by adding up its components, while the latter determines it as the difference between purchases and sales. Tax is then applied directly to the value-added of each business. The cash-flow method retains most of the characteristics of the credit- invoice system, but incorporates special features to recognise the financial payments, which are involved in financial transactions. The tax calculation account (TCA) is a tax suspense account created to obviate the payment of tax by taxpayers and of credits by government in the period cash-inflows and outflows of a capital nature occur. Tax that would otherwise be payable/creditable is instead debited/credited to the TCA account and carried forward to the period where the capital transaction is reversed. The TCA mechanism thus allows deferral of tax on cash inflows and of tax credits for cash outflows. However, these deferrals are subject to interest charges at the government-borrowing rate. Ad-hoc methods apply taxes to exempt services on a different basis, almost entirely as an attempt to offset revenue losses associated with exemption. They make no attempt to bring financial services fully into the VAT system.

What is clear here is that a decision to apply VAT to currently exempt financial services cannot be taken simply on the basis of the feasibility of taxation or on the desire to reduce exemption to improve the neutrality of VAT. **Issues such as the tax revenue implications of taxation in a particular tax structure (e.g. a case study of a country), the cost of compliance with tax requirements for business and the true potential for competitive**

distortion in the macroeconomy must also be examined. However, none of these issues are examined in any of the above-mentioned studies.

Furthermore the financial services sector is a growth industry whose structure is changing through institutional consolidation, new forms of alliances and outsourcing. To accommodate these growth and structural changes in the financial services sector, many countries have taken steps to improve market access to international financial institutions by lowering regulatory barriers. Measures that may restrict trade and investment in the financial sector and which retard its innovation and adoption of the best production methods impose real costs on domestic economies (Sauve', 1999). Conversely, the efficiency of providing financial services and the institutional development of the financial sector were shown to be positively related to openness. As a result, global trading presents a number of challenges to traditional tax principles applied on financial services. **In the literature, the globalisation of trade and the global trading of financial instruments are seen as the main causes for the intensified efforts to identify the best feasible methods of taxation of financial services (OECD, 1997a).** The OECD, adopting a global perspective, has recently issued a report (OECD/CFA, 1998) on the study of the indirect tax treatment of financial services. The report is factual and provides information about the tax treatment of financial services in OECD member countries, methods of calculation tax recovery by institutions, which make both taxable and exempt supplies and a brief commentary on findings. **The report provides some indications on differences of tax treatment of financial services even in EU Member States, although further research is necessary to establish evidence on the need for harmonisation of legislation. On the other hand in the report there is no firm information available to help determine whether any potential advantages from a change to the tax treatment would outweigh the costs of making such a change. It might be noted also here that the OECD study did not consider the taxation of insurance services and the various taxes that already applied on insurance services in EU indicating clearly a lack of a European perspective in its aims and design.**

Similarly the European Commission (DG XXI) is now in the process of studying the issue, trying to identify feasible methods of taxation of financial services (EC, 1996b). As we said before, the existing option to tax financial services has been exercised, in varying

degrees, by only three Member States (Germany, France and Belgium) and has given rise to some distortion of competition. In 1987 the Commission (VAT Committee) proposed the removal of the option to tax and to make the exemption compulsory. Parliament opposed this, and in a resolution in November 1990 proposed to extent the right of option to all taxable persons, removing Member States' discretion in the matter. As a result the Commission withdrew its original proposal and undertook before the end of the transitional period, to submit a report on the conditions of taxation or exemption of these transactions. In that context the EC (DG XXI) has launched a series of studies to consider other possible methods of taxing such services under VAT system, and finally to test one such alternative method in the business environment (EC, 1999a).

The first study was a general investigation of a number of possible methods, which might be suitable for applying VAT to financial and insurance services. The conclusion of that study was that the "cash-flow" method was the most promising avenue for further detailed research. The two subsequent studies investigated, in considerable detail, the feasibility of applying the "cash-flow" method first to financial services and then to insurance services and supplies of gold bullion. The reports of these three studies were published by the Commission in 1996, the so called "Blue-Book". The Commission has now carried the work on the cash-flow method a stage further in order to test its practicability within various business environments and to gain information about its potential effects on providers of financial and insurance services, on their customers, and, to some extent, on markets and revenues. The work in first stage of the pilot testing was of two types: Further research and development of theoretical aspects of the earlier studies and the design and implementation of a system of pilot testing to be carried out with two volunteer institutions, one large bank and one large insurance company, both in the UK. Given that no major conceptual problems were identified in the first stage and that the methodology of the pilot testing was proved effective[4], it was decided to proceed with the next stage involving testing of the cash-flow system in a variety of different organisations and under the conditions existing in other Member States. Thus a total number of ten pilot tests, three of which involved large insurance companies, have now been carried out in six different Member States: Germany, France, Ireland, Italy, the Netherlands and the UK. The

[4] XXI/99/1075-Working Paper No 284/1999

Commission had the final reports on the pilot testing towards the end of 1998, and is now in the process of evaluating the results about the feasibility of taxation of financial services. **However, even if the testing so far has not identified any major obstacles to the basic concepts of the cash-flow mechanism there are a number of practical and other issues that have arisen and have still to be considered. One is the revenue implications of a possible tax reform in the field of indirect taxation of financial services in a particular context as we mentioned above. There is also a need to study the current system of taxing the financial services in each Member State, including the VAT treatment of financial services and analysis of the existing indirect financial taxes.**

1.9.2 Empirical work on modelling and measuring the economic effects of financial exemptions

In tax literature there are mainly two approaches to analyse the effects of exemptions on VAT base and VAT revenues. The first approach, the so-called "National accounts approach", is based on the construction of input-output/economic tables by using aggregate data from National accounts, in order to identify the VAT base, the value added of the particular exempted sector and finally the impact of exemptions on the efficiency of the tax system. The second approach is based on disaggregated data from the particular exempted sector; it aims at developing methods for measuring the value added on transaction-by-transaction basis. Such method, therefore, has to be based on an economic theory of the particular exempted sector (e.g. theories of the banking firm), which does not always exist.

Following the first approach (National accounts approach), one can examine the effects of VAT on prices of different industries, or measure the fiscal revenue loss when multiple rates and measures of exemption are used. In fact these are models of estimating value-added taxes (VAT base) when there are a number of exempt goods and services in the VAT system, by adjusting the GDP for imports, exports and exempt goods or services. Most of these models are multisectoral, based on aggregate data. However, this method can only be used for forecasting as long as there is no change in VAT rates or goods and services affected, since it calculates the economy-wide average rate. This approach (National accounts approach) is well known in the VAT literature, and was adopted by

many researchers in the field of indirect taxation as well (Aguirre and Shome, 1988; Mackenzie, 1991; Jack, 1996; Kodrzycki, 1998; Tesche, 1998). Generally speaking the advantage of this approach is that allows the calculation of an estimate of value added solely on the basis of aggregate volume data. However, in applying the method to financial sector the split of value added between depositors and deptors is ad hoc and not based on economic factors.

An input-output table method (following the principles of the National accounts approach) was developed also by the OECD/CFA (1998) for analysing the effects of VAT exemptions existing in member countries. This method is based on the calculation of the total blocked VAT (i.e. the irrecoverable cost incurred by financial institutions) and the total yield from the exemption by using National Current Account outputs and National Capital Account inputs, and finally a sample survey to estimate the proportion of exempt outputs to total outputs of the sector. The calculation is split up into two sections: the first is the revenue collected at present by denying the recovery of input tax in respect of exempt supplies, and the second is the additional VAT that would be collected by taxing financial services at the standard rate of VAT. The first section has three main components:

- Blocked VAT on current expenditure
- Blocked VAT on capital expenditure and
- VAT on VAT, the so-called cascade effect.

Whilst the second has one:

- VAT on the output (including margins on interest payments) of the financial sector

The above-mentioned method takes into account the assumption that the effect of jointly removing the two exemptions (banking and insurance) is not the sum of removing them individually. If for example, insurance only become taxable under the VAT system, then there would be some revenue yield from standard rated expenditure by finance on insurance. If both exemptions were removed, there would be any yield from this expenditure. However, the method in order to be operational, requires a sample survey of financial institutions to estimate the proportion of exempt outputs to total outputs or by using the average national recovery rates for financial institutions to establish input tax

relating to exempt outputs which are not always available or when they do exist the reliability of these figures is uncertain. This method so far has been applied in only one case (HM Customs and Excise, 1998). According to the findings of the study, the cost of financial exemptions was put for United Kingdom at £104 millions based on 1994 data. However, it is important to note that in the estimate of the revenue effect of abolishing the financial exemptions the study did not take into account the cascade indirect taxes applied on banking and insurance services in United Kingdom, since these taxes would have to be abolished and replaced by VAT.

The alternative approach (use of disaggregated data and identification of value added on a transaction by transaction basis) has been developed by Genser and Winker (1997) to examine the issue of VAT exemption of banking services in Germany. Using this approach it was possible to approximate the fiscal revenue loss of VAT exemption in commercial banking based on bank balance sheet and interest rate data. Based on a "real resource model" derived from the theories of the banking firm, which regards a bank as a firm which maximises its profit for given output and input prices, the authors identified banks' outputs and, with the introduction of a benchmark rate, estimated the value added for particular financial services. In contrast to the National accounts approach, the value added in this study has been explicitly assigned to two relevant sectors i.e. the VAT registered firms and VAT exempt private and public households. The fiscal revenue effect has been then calculated on a ceteris paribus basis ignoring changes of the input-output structure based on the choice of the benchmark interest rate. The focus of the study has been deposit and loan services. It split the interest spread into taxable service components rendered to lenders and borrowers. A further desegregation was made in respect to taxable customers, which are entitled to VAT credits, and public and private households, which are not, entitled to any credit. Disregarding other sources of exempt margin services (e.g. foreign exchange), the study estimated a net revenue loss of exempting these banking services in Germany around 4% of the VAT revenues for the year 1994. The main limitation of this study is clearly the concentration on just two main categories of banking services (e.g. the credit card, auxiliary services or insurance have been ignored). In addition, the existing cascade financial taxes or the revenues from applying the option to tax under the VAT system by some financial institutions in Germany have been neglected.

Moreover, a number of econometric and mathematical (often-general equilibrium but based on National accounts as well) models have been used in order to estimate the general impact of exemptions on VAT base. For example Bogetic and Hasssan, (1993) used a very simple econometric model to identify the determinants of value added tax revenue in a cross-country analysis, relating the increases in VAT revenues with the increases in VAT rates and the coverage and the size of the VAT base. They estimated linear versions of the following general model using the Ordinary-Least Squares (OLS) technique. The model was based in the following simple relation, that is:

$$REV = f(RATE, BASE, RANGE),$$

where *REV* variable is defined as VAT revenue as percentage of country's GDP; *RATE* is defined as VAT rate (in percent); *BASE is* defined as a VAT base variable; and *RANGE* is a measure of rate dispersion, defined as the difference between highest and lowest VAT rate. Based on the above model they empirically analysed, using data for the year 1988, determinants of VAT revenue on a sample of 20 single rate countries, a full sample of 34 countries and a small sample of multiple rate countries. The results of the regressions conformed to the conventional views on the key variables influencing the VAT revenue performance: the rate, the base, and the rate dispersion. Similarly Jahnke (1998) in a macroeconometric model for Germany in the tax equations linked the changes in VAT revenues with changes in VAT rate, private consumption, Government non-wage expenditure, gross investment of Government in machinery and equipment, gross investment of Government in construction, and the investment in residential construction. The estimated period extends from the first quarter of 1975 to the fourth quarter of 1993.

The mathematical models are based on the assumption that tax bases never correspond exactly to macroeconomic aggregates. For this reason the models must include the necessary adjustments. Especially from the value added tax some types of production are excluded, either because they are viewed as merit goods, or because levying the tax would be difficult from administrative viewpoint. The simplest approach derived from these models is to start with adjustments to produce consumption base and to continue with adjustments for exemptions and for reduced rates. Finally, VAT revenues are obtained by multiplying the adjusted base first by the VAT rate and then by an efficiency factor.

Unfortunately, the assumption about the efficiency factor is likely to swamp many of the finer adjustments and mathematical procedures needed to produce the estimate of the base (Kodrzycki, 1998). In addition, Gottfried and Wiegard (1991), using a mathematical general equilibrium model, examined the difference between exemptions and zero rating under a consumption type based VAT in the case study of Germany. To allow for a better understanding of the accruing efficiency effects, they first developed a method to convert the nominal VAT rates into effective tax rates on categories only of final demand (not on intermediate demand). Then these effective VAT rates are used to perform a gradual transition from exemption to zero rating. According to their study for 1984, 19.6 percent of total VAT revenues remain on intermediate production of the total tax-exempt sectors in Germany. Furthermore the VAT load remaining on investment amounts to 5 percent of total investment expenditures. These numbers correspond to their actual values in 1984. However, the model requires a sufficient number of extraneous estimates of elasticities or other parameter values to be borrowed from the literature.

Finally, econometric and mathematical models have been used in a number of cases to analyse the general economic effects of VAT or to calculate the whole VAT base in a specific context with VAT exemptions. However, as we can see from Table 1.1, where we summarise the empirical work on the economic effects of exemptions on VAT base, none of them is used to measure the particular fiscal revenue loss of VAT exemptions in financial sector.

Table 1.1: Contemporary research on economic effects of VAT exemptions (impact on VAT base).

Study/Year	*Method/Model*	*Results*
Aquirre and Shome (1988)	National accounts approach.	Case Study: Mexico. Estimation of the VAT base for Mexico for 1980 and 1983. No indication about the impact of financial exemptions.
Bogetic and Hassan (1993)	Econometrics OLS (annual time series), and panel data.	Case study: Sample of 34 countries. Exemptions are linked to economic performance of VAT revenues.
Genser and Winker (1997)	Desegregated data. Identification of VAT on a transaction by transaction basis "real resource model".	Case study: Germany. Estimation of a fiscal revenue loss from financial exemptions of around 4% of the VAT revenues for the year 1994.
Gottfried and Wiegard (1991)	Mathematical Model (General equilibrium model).	Case study: Germany. For 1984 19.6% of total VAT revenue remains on intermediate production of the total tax-exempt sectors. No indication about the financial sector.
Jack (1996)	National accounts approach.	Case study: Not applied. Measuring the efficiency of VAT collection. Suggested some proximate causes of inefficiency.
Jahnke (1998)	Econometrics OLS (Quarterly data).	Case study: Germany. Macroeconometric model. No consideration of the impact of exemptions.
Kodrzycki (1998)	National accounts approach.	Case study: Economies in Transition. Modeling of forecasting the VAT revenues. Estimating of VAT revenues resulting from law changes Analyzing economic effects of exemptions.
Mackenzie (1991)	National accounts approach.	Case study: Developing countries. Estimating the Base of VAT in Developing counties. The problem of exemption is considered but not the financial exemptions.
OECD/HM customs and Excise (1995, 1998)	National accounts Approach.	Case study: UK. £ 104 million revenue loss of financial exemptions Indirect financial taxes, not taken into account for the year 1994.
Tesche(1998)	National accounts approach Mathematical Model (Multisectoral applied general equilibrium model).	Case study: Hungary. The model uses data from 21 sector input-output table to calculate the VAT revenue base. The exempted financial services are included in the total exempted services. (14.1% of total VAT revenues are purchases of exempted services for 1992).

1.10 Conclusions from the literature study

In this chapter we examined the existing literature on the taxation (i.e. VAT and indirect taxes) of financial services. The review of the literature brought out that there are extensive studies on technical, economic, and distributional dimensions of VAT. In addition there is a growing consensus on the best practice and desirable features required for a good (efficient) VAT system. Likewise, there is sufficient literature on the theoretical aspects of financial services taxation. Most of it identifies a number of problems that arise in applying the tax to financial services. While some of these problems are relatively easy to solve, there are others for which no workable solutions have been identified to date. However, very few of the above studies, none in the specific case of Greece, have empirically tested some basic hypotheses about key features and the performance of VAT as a revenue-raising instrument when exemptions (i.e. financial exemptions) are granted. In addition it is clear that most of the above literature lacks a European perspective which is more evident in the proposed methods for taxing financial services.

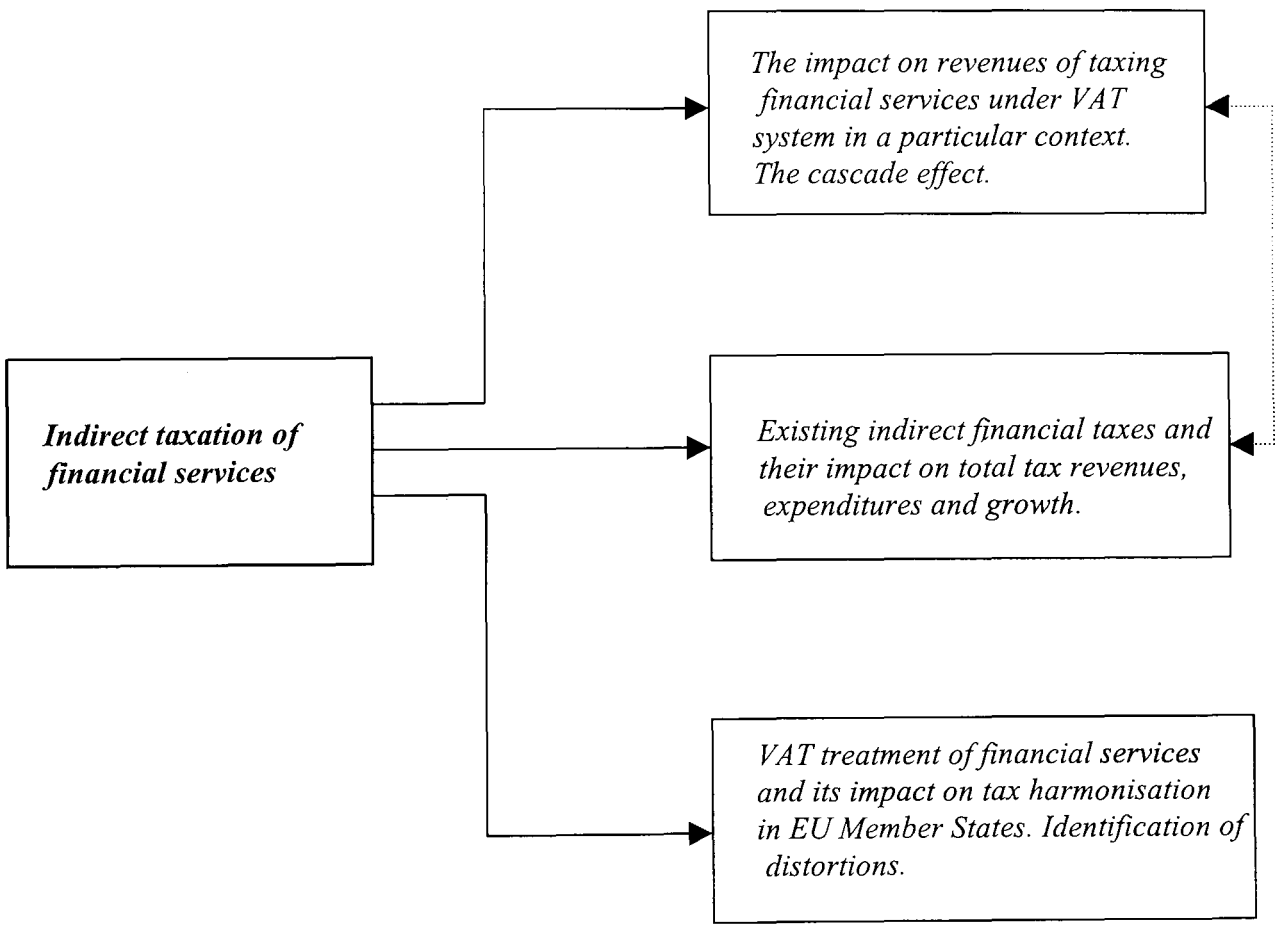
Moreover, although the impact of financial exemptions on VAT base and revenues has been an issue of special relevance for tax authorities, it has not been thoroughly investigated. In general the empirical results suggest that there is still no consensus on the indirect taxation of financial services and the economic effects of these taxes. **It is only through further multi-disciplinary research that one would be able to form an opinion about the viability and the revenue implications of applying the VAT (or other indirect taxes) on financial services.**

Analytically, following the above mentioned studies, in this chapter we set out the debate about taxing financial services, explaining the argument behind exempting from VAT the financial services, the theoretical reasons for treating financial services differently from any other sector and the practical problems in trying to tax financial services. Then we continued by referring to the distortions created by the exempted sector, and discussed how in theory the incidence is affected by exemptions and how could these effects be modelled and measured. We also described the evidence from other countries of the effect of exempting financial institutions from VAT and how these effects have been measured in the empirical studies.

Moreover with the survey of the theoretical and empirical work on the issue of taxing financial services, we were able to identify three main areas where there is a clear need for a thoroughly investigation. These areas, as we also illustrate in figure 1.2, are as follows:

- The impact of the existing VAT treatment of financial services on tax harmonisation in EU Member States
- The economic effects of taxing financial services under the VAT system (effect on total tax revenues) and
- The economic effects of the existing indirect taxes on financial services.

Figure 1.2: Emerging areas from the literature review for further research



To summarise, from the literature survey on financial services, we conclude that most of the existing studies are trying to solve the feasibility problem of taxing financial services rather than to investigate any effect on the efficiency of tax system and economy of a specific country. The foregoing conclusion suggests that further empirical work is necessary to determine the potential advantages in changing the tax treatment of financial

services. These studies would focus on the economic effects, the feasibility of such taxation in a specific context (EU VAT system) and the likely effects of tax on competitiveness and efficiency of financial sector.

CHAPTER 2: THE STRUCTURE OF VAT AND EUROPEAN VAT HARMONISATION: THE IMPACT ON FINANCIAL SERVICES TAXATION.

2.1 Introduction

In the literature review we discussed the theoretical and empirical work regarding the VAT and indirect taxation of financial services. In the following analysis we examine the principles of the VAT, including new approaches, in order to understand the relevant developments in the EU VAT system. **The motivation is to explain the reasons for VAT harmonisation in EU VAT system, and thus to investigate the implications of VAT harmonisation on the taxation of financial services.**

2.2 Types of VAT

VAT is a sales tax that is collected at each stage of the process of production and distribution of goods and services. The base of the tax is the value that a business adds to the various items that it purchases from other businesses, specifically the payments made by the business to the factors of production employed in turning out the product, such as wages, interest, rent, royalties and profits. The base of the tax in this case can be expressed as the difference between the sales proceeds and the cost of the materials, semi-manufactured goods, services etc., that the business has purchased from other business and uses in the production and distribution process.

There are basically three types of VAT which can be distinguished on the basis of the tax treatment accorded to the goods. First, assuming a closed economy for simplicity, if instead of seeking to tax the consumption outlay of individuals a government decides to tax individual income receipts, it may do so by imposing a uniform income tax which reaches the savings and the investments of individuals as well as their consumption. However, rather than assess the individual's income directly, the government may decide to use an indirect approach; that is, to impose a uniform sales rate which is expected to

result in an analogous increase in the prices of goods which the individual purchases, thereby reducing his real income.

Under the indirect approach, it is necessary for the sales tax to apply to sales of investment goods destined for final business use as well as to sales of products destined for ultimate consumption. In other words, the tax applies to business purchases of goods customarily capitalised and depreciated rather than expensed. Thus the savings of individuals are reached indirectly through their use by business in purchasing investment goods. The tax on a given asset becomes incorporated in the asset's value, and is thus included in the amounts that a firm charges to depreciation as the value of the asset is used up in producing goods. On this basis, a multi-stage VAT, being a general sales tax, can be implemented as follows:

- gross product VAT levied on the value-added to both consumer and capital goods, without allowance for capital depreciation. In a hypothetical closed economy the aggregate base of the tax is equivalent to Gross National Product,
- net income type of VAT covering the value added to both consumer and capital goods, after deduction of capital depreciation. The same result may also be accomplished by a uniform income tax, since the bases of a net product and an income tax are in fact the same.

In a closed economy with two factors, the aggregate base of the income type of VAT is wages and profits, or consumption and net investment. The value of additions to inventory should also be included in the income-type base if the principles of national income accounting are to be observed since an increment in inventory for the economy as a whole represents a value added that must take into account (Shoup, 1969). However, in practice it may be generally assumed that excess of year-end inventory over year-beginning inventory may be included in next year's higher sales (Sullivan, 1966), otherwise inventory accounting for VAT purposes would be quite troublesome for businesses with fluctuating annual inventories.

Apart from the above two types of VAT in which capital goods are taxed, there is a third type, namely the consumption-type VAT, levied on the value-added to consumer goods, and allowing deductions of all business outlays on capital investment. In a closed economy

(with two factors) it has the same aggregate base, for any one year, as a tax on income which exempts private saving, that is a general expenditure tax. Only this type of VAT exempts capital goods in the period of purchase instead of delaying such deduction until depreciation occurs period by period and thus it taxes consumption proper. The EU chose this type of VAT on the ground that, relative to other types, it stimulates investment and is more attractive from the point of view of economic growth (Neumark Report, 1963).

On balance it appears that the consumption version has the most significant advantages. It provides the most neutral treatment between consumption and savings, and between the use of labour and capital services in production as the tax does not alter the relative cost, to any particular class of individuals, of consumption and savings, nor the relative cost to any producer of using labour or capital production. In contrast the net income type is biased against savings and capital, and the gross product type increases this bias since the input tax on both the purchase and the depreciation of capital goods are not deductible (Sullivan, 1966). In addition the consumption type has administrative advantages since there is no need to be concerned with arbitrary depreciation allowances or to distinguish between capital and intermediate goods unlike under the income type.

Finally there is actually a fourth type of VAT that exempts capital goods, namely the "wage" type VAT, the base of which can be obtained, in a two factor economy, by modification of the base of income type VAT. A deduction from this base is allowed, in an amount equal to the net earnings from the business's capital for that year. In a two-factor economy, this leaves an amount corresponding to wages paid in the tax base for any given year, as, in this economy, wages plus profit (including interest) equals Net National Income (Shoup, 1969).

2.3 Methods of computation

Basically, there are two main methods of computing the VAT, namely the "addition" and the "subtraction" method. However, the former is more appropriate to the net income type of VAT that includes in its base the rewards to all factors, including interest and profit. Profit is net after depreciation as under the income tax; inventory accounting is the same as under the income tax. The addition method can easily be implemented in practice on an annual basis as most businesses draw up their profit and loss accounts once a year, and

therefore only know their profit after the end of their financial year (Tait, 1972). On the other hand, the subtraction method is more suitable for the consumption type VAT: it would be quite difficult to use the addition method since depreciation and any excess inventory have to be added to the net profit figure. Moreover, the subtraction method can easily be used in practice in quarterly, or even monthly, tax periods. Furthermore, the subtraction method may be implemented in one or two ways. The first is the "tax credit" or "invoice" method, according to which the trader is required to subtract from the total tax shown on the invoices which he issued to his customers during the period, the total tax shown on the invoices he received from his suppliers during the same period, and to pay the difference to the tax authorities. The second method is known as the "accounts" method and requires the tax to be levied on the difference between business's total sales in a period and the value of its purchases in the same period. This method implies tax-inclusive values, so that VAT will be levied at a tax-inclusive rate on the sales-less-purchase's difference that is on a tax-inclusive value added by the business. These methods are examined below.

2.3.1 The tax credit method

The tax credit method is the one adopted by the EU for the implementation of a consumption type VAT. This method has the great advantage of self-enforcement in tax collection. It is to the advantage of the trader to invoice no more than the right amount of VAT on his sales to the taxable customer; and it is to the advantage of the taxable customer to receive the invoice from the trader showing no less VAT than the actually paid. This self-enforcement element discourages evasion through the built-in cross-checking of the invoices issued by the traders.

Moreover, the tax credit method emphasises the tax content of the sale and ties the tax to sales, thereby making it clear that the tax is an indirect tax destined to be passed on the customer, thus avoiding "cascade effects". On the other hand, the tax credit method does not make it possible to vary the overall burden of tax on a product by reducing or enhancing the rate of tax at some early stage in the manufacturing or distribution process of the product. The reason for this is that it is necessarily the rate of tax applying at the last stage that sets the ratio of total VAT to total value added at all stages. This is quite useful if, for administrative reasons, it is wished that a product be

lightly taxed without reducing the total tax on the total value-added. Finally, it is quite useful in safeguarding the revenue; for example in transactions between traders liable to VAT, an undercharge of tax by a supplier would be offset by a corresponding reduction in the amount of input tax deduction which may be claimed by the taxable customer (this is the so called "catching-up" effect of the tax credit method).

One more point, which should be made in this context, is that the "tax-credit method" may give rise to a net tax credit in a given period. This may happen if a trader`s sales are subject to a rate lower than the applicable to his purchases and his value added is relatively small. Furthermore, substantial capital purchases or exports, which under the consumption type of VAT are exempt, could create a large tax claim on the part of the trader, which in some cases may result in an excess far above the current VAT liability.

Serious practical problems arise if we consider the concept of exemptions with the above analysis. In the first place, as we have already mentioned, exemption means that the taxable trader is not liable to VAT on the sale of any exempted good or service, nor is he entitled to recover the VAT invoiced to him on his purchases which are related to this good or service. This differs from a zero-rating provision, in the sense that although a trader is not liable to VAT on the zero-rated good or service, he is, however, entitled to recover any VAT incurred on purchases related to this sale. In the first place an exemption leads to over-taxation goods or services. The overtaxation refers to the non-deductible VAT levied on the purchases of the exempt business from other taxable business at prior stages. This occurs on the assumption that the exempt business does not pass the non-deductible VAT on to his taxable customer; otherwise, the good or the service will be burdened even further under the double taxation effects which will take place as they pass through the next taxable stages ("cascade effect"). However, if the exempt stage is the last stage in the production and distribution process, the problems are different. The exempt traders are in the favourable position compared to their taxable competitors, as they will be able to pass any tax incurred on their purchases to their customers, thus charging a price attracting less tax than it would have done had they been taxable. On the other hand, the exemption of the stage in question results in foregone revenue equal to the tax rate times the value added at this stage.

If, on the other hand, exemption is granted for certain classes of transactions, the "partial exemption" problem arises in cases where a trader supplies exempt and taxable products. In this case, the tax credit is restricted accordingly to goods or services purchased which are strictly related to the taxable supplies. However, the problem arises where traders indiscriminately use taxable goods or services in the transaction chain of both exempt and taxable supplies. In these cases, the apportionment of inputs (and, therefore the tax on them) between those attributable to exempt supplies and those attributable to taxable supplies, is difficult to calculate. In practice, the so called "Pro-rata mechanism" is widely used in carrying out such an apportionment; the idea is to calculate the taxable proportion of the total value of outputs and the same proportion of the total input tax to be treated as attributable to taxable outputs, and therefore credited with the help of the following formula:

$$\frac{Taxable\ \ outputs}{Total\ \ outputs} = \frac{Deductible\ \ input\ \ tax}{Total\ \ input\ \ tax}$$

In practice, the value of the taxable outputs is expressed as a percentage of the total outputs, and this percentage is applied to the total input tax. The result is the deductible input tax, which is to be claimed in the trader's tax return. The calculations that the partly exempt person undertakes under the method mentioned above at the end of each tax period are provisional and are subject to review and to any necessary adjustment on the basis of the relevant figures for the year as a whole. It should be noted that only the calculations involving the "Pro-rata mechanism" comes under review, and not those involving "direct attribution".

The tax credit method can satisfactorily implement the "destination principle" (taxation at the place of consumption). It provides precise information as to the cumulated tax paid for the particular good or service, and thus precisely calculates the export refund, i.e. the amount of VAT shown on the invoice issued to the exporter by his supplier. This holds if the tax credit chain is not broken by granting exemptions at earlier stages; otherwise a "hidden tax" is included in the export price to the extent to which the exempt trader passes the irrecoverable (non-deductible) tax thus giving rise to double taxation ("cascade effect"). As for imports, under the "tax credit method" they do not present any difficulty;

they are taxed at the same rates as similar domestically produced goods. Provided that the imported goods of the exporting country are free of any "cascade tax" no discrimination arises between home made and imported goods. On this basis, as the EU countries apply the consumption type VAT under the tax credit method, with different rates they can do without compensation tax upon importation, but with a careful computation of the export refund so long as they retain the "destination principle" (i.e. taxation at the place of consumption). On the other hand, the "origin principle" VAT (i.e. taxation at the place of "origin") does not allow the importing country to tax the value added in the exporting country. In the case of uniform rates and exemptions in the member countries, the tax credit method does not present any difficulty in implementing the "origin principle": exports are taxed in the exporting country, and the importer, if he is a taxable person, is entitled to credit the tax paid to the exporter for these products. **Certain problems arise, however, where different rates and exemptions are allowed among member countries (i.e. financial exemptions).**

2.3.2 The "Accounts" method

Unlike the "tax credit method", the "accounts method" may differentiate the overall burden of tax on goods or on services by varying the rate of tax applied at various stages. The reason for this is that the proportions of value added at the different tax stages, and not the rate of VAT at the final stage alone, determine the total amount of VAT imposed on a given good or service.

A consequence of this method is that exemption of an intermediate stage in the production and distribution process (i.e. financial exemptions) does not give rise to overtaxation, as is the case with the tax credit method. However, revenue is always lost by the exemption as there is no "catching up" effect at a later taxable stage as there is with the "tax credit method". The amount of revenue, which is not regained at a later stage, equals the product of the tax rate times the value added in the exempt stage. Of course the application of more than one rate of VAT raises serious problems for this method wherever a business sells goods in two or more different tax categories.

Regarding the EU intra-community trade, the "destination principle" can be easily implemented under the "accounts" method if VAT applies at a single rate and is

comprehensive, so that no problem of identifying goods belonging to various tax categories arises. However, under a multi rate VAT, the "accounts" method does not provide the information needed to precisely compute the export refund and the import compensating tax.

In the case of the "origin principle" with a common single rate for all Member States, the "accounts" methods is as equally applicable as the tax credit method. With a multi-stage VAT applied at equal rates to all Member States, the "tax credit" method is superior to the "accounts" method, since the "accounts" method cannot easily differentiate between products in different tax categories. Generally, the "tax credit" method seems to have certain advantages over the "accounts" method. It allows the identification of VAT being levied at different rates on value added arising in the production of different commodities; it has built-in cross-checking; and finally, it operates as an indirect spending tax, unlike the "accounts method" which may seem to traders like a direct business tax since it requires tax-inclusive rates applied on value added. **These advantages of the "tax credit" method over the "accounts" method, despite its disadvantage in dealing with exemptions at intermediate stage, were the principal reasons for its adoption as a common European consumption type VAT system by the EU.**

To summarise, we could mention here that the discussion so far has focused on two traditional categories of VAT computation:

- the first category is a "direct method" (accounts method) which can be divided in two ways of calculation :

The addition method, where $V=W+I+P$, with V we denote the value added, W wages, and with I, P the interest and profits respectively; and the subtraction method, where $V=R-C$, with R we denote the value of outputs and with C the inputs used of the business. Then the tax liability can be calculated in the first case from the formula:

$T=t\ (W+I+P)$, with T we denote the tax liability and with t the statutory VAT rate, and for the second case from the formula: $T=t\ (R-C)$. We would like to clarify here that this formula represents a method for computation of value added and that the difference $(R-C)$ is not equal to the profit P in the addition method.

- the second category is the "indirect method" of computing the VAT. The tax liability here is calculated indirectly. This method can be divided in two ways of calculation:

The indirect additive method, where the tax liability is expressed as a sum of tax liabilities for each component of value added, thus $T=tW+tI+tP$, and the indirect subtractive method, where the tax liability is expressed applying the statutory VAT rate to the total sales and subtracting the tax made on purchases, thus $T=tR-tC$ ("the tax credit method").

2.3.3 New Approaches

One of the main appeals of the VAT has been the elegance with which it enables tax to be removed from commodities entering international trade. In this way VAT has done much to foster closer economic integration. As that integration proceeds, however, and trading partners seek to establish a more complete economic union with one another, so difficulties arise when VAT powers are allocated to the members of a federation. While VAT is widely considered as a good tax for countries trading with one other, it is also generally regarded as a bad tax to give to lower-level jurisdictions in a federation. This is most obviously the case in the European Union (EU), where the development of the VAT has been the central tax accomplishment of the Member States but has now reached an impasse, with those Member States unable to agree on how to design a VAT for the Single Market that they seek to deepen.

- *The clearing mechanism*

An alternative approach to the "tax credit" method, which the European Commission first proposed in the early 1990s and has recently revised (1996), is to remove the zero-rating of exports, so that exports would be taxed at the same rate as domestic sales, with a credit then available against output tax in the importing country. With this approach it is necessary to introduce a "clearing house" system by which revenues would effectively be reallocated across States/provinces so as to preserve the same allocation of revenues as under zero-rating. The plus-side of this method is that it fixes the break in the VAT chain. Goods now move between States/provinces tax-laden, and establish compliance symmetry. The difficulty is in finding a way of clearing mechanism that preserves proper incentives for tax collection.

An alternative approach, suggested for the EU in the Commission's most recent proposal (EC, 1996)[5], is to reallocate revenues on the basis of aggregate consumption statistics. This reduces the administrative burden, but at the cost of creating a different disincentive to collection: if the net VAT that a country receives depends only on its level of consumption and the rate of tax, it has no incentive to put any effort into collection at all. Even if the tax it receives is based on some sharing of total revenues collected, the sharing with other states will be blunt collection incentives.

- *The compensating VAT (CVAT)*

Varsano (1999), Mc Lure (1999) and Bird (1999) originally propose this method. The essential idea is to preserve the zero-rating of inter-provincial sales in respect of national VATs but to superimpose on this a "compensating VAT" levied on sales between States/provinces (including in McLure's version, inter-province sales to households and non-registered traders). This means that exports to the rest of the world would be zero-rated under both provincial and any federal VAT, and would not be subject to the compensating VAT. The innovation of the CVAT is that the compensation VAT on the inter-provincial exports is charged to the exporting business and recovered by the importing business (Keen, 2000).

One key question is the rate at which the CVAT should be charged. With a low CVAT rate, there is an artificial incentive for final consumers to import; with a high CVAT rate, the incentive is to make false refund claims or, for final consumers, to buy within the province rather than to import. McLure (1999) concludes that it would be best to pitch the CVAT rate at broadly the average of the rates of provincial tax. A clear disadvantage however, beyond the administration of the tax, is that CVAT violates compliance symmetry, since inter-provincial trade (bearing CVAT plus any federal VAT) is treated differently from intra-provincial trade (bearing provincial and any federal VAT).

- *The Viable Integrated VAT (VIVAT)*

Keen and Smith (1996) propose this new scheme. This requires all States/ provinces to set the same tax rate on all sales to registered traders anywhere in the federation (Community).

[5] "A common system of VAT-a programme for the single Market, COM (96) 328 final 22/07/1996".

But the rates applied to final sales -to consumers and other non-registered traders- remain entirely at the discretion of the States/provinces. Actually this tax gives revenues equivalent to a common withholding tax at an intermediate rate, charged and credited at each stage (and so raising no net revenue) combined with a final sales tax at the rate of the country of destination.

The weakest point of this method is that VIVAT introduces a new kind of compliance asymmetry: businesses must treat their customers differently according to whether they are registered for VAT or not. For the European VAT system of course this not a severe problem. In the EU, taxpayers are already required to verify the VAT status of customers located in other Member States (in order to determine whether the sale can be zero-rated). The change here is that this principle has to be applied in the inter-provincial trade as well (in each Member State).

It is especially important to note, moreover, that there is no intrinsic difference between VIVAT and CVAT in terms of collection incentives and clearing: both require that tax levied on exports from one province be credited/refunded against tax due in another. The distinct nature of this -separable from other parts of the VAT system- may in each case mean that there are in principle ways of implementing this clearing other than through provincial tax administrations, thereby avoiding some of the problems we mentioned above (Keen 2000).

In conclusion all the above methods of VAT computations (including the new approaches) require a VAT system that is broadly based. In addition, despite the application of the Single Market in EU, there can be different ways for computing VAT. The one chosen by the EU (i.e. indirect tax credit method) could satisfy many aspects of the Single Market (i.e. destination principle) as well as of the optimal commodity tax theory. However, in the case of an application of the origin principle in the EU VAT system, a number of changes are necessary in order to preserve the level of revenues in Member States.

2.4 The Evolution of the EU VAT harmonisation and the Single Market

As we mentioned before, if "the country of destination principle" is maintained and at the same time tax frontiers among the Member States are abolished, a common consumption

type VAT applied under the "tax credit" method would be a suitable option with little border control; as was seen earlier, the "tax credit" method does not in effect require a compensatory tax upon imports unless importation is by the ultimate consumer (Shoup, 1969). However, elimination of the tax frontiers is more consistent with the "origin principle" as than the "destination principle". Under the "origin principle" no exports refunds and compensatory tax on imports at least by non-taxable persons are necessary thus ensuring in inter-member trade conditions similar to those of a single market.

On this ground the "origin principle" constitutes the ultimate goal which the EU VAT harmonisation programme wants to achieve. **However a general sales tax like VAT applying to all Member States under the "origin principle" would require, unlike under the "destination principle", a common coverage and something like a common rate structure if distortion of competition were to be avoided among the Member States.**

Generally speaking the adoption of the "origin principle" means that Member States experiencing favourable trade balances with other members will gain revenue. Revenues are also affected by the adoption of "the origin principle" to the extent that the proportionate values of exports and imports, represented by tax- exempt goods or services or those taxed at different rates under the European Union's common rates and coverage, vary among Member States. If goods exempted or taxed at a reduced rate represent a higher proportion of exports than imports, revenue losses will be experienced.

Definitely, the changeover from the "destination" to the "origin principle" can only be achieved in the longer-run after a stage-by-stage harmonisation programme, in order to avoid economic upheavals and abrupt changes in the sources of government revenue, and in the social and traditional attitudes regarding the treatment of goods and services under the existing systems. **Article 99 of the Treaty establishing the European Community clearly stipulates that "turnover taxes" shall be harmonised. In accordance thereto, the Council is to adopt, upon a proposal of the European Commission and after consulting the European Parliament and the Economic and Social Committee, provisions on the harmonisation of the laws relating to turnover taxes in so far as this harmonisation is necessary for the establishing and the functioning of an Internal**

Market. On this basis the Commission geared its policy towards a slow harmonisation programme which has proceeded up to now in the following way:

When the First and the Second VAT Directives were adopted in April 1967, following the recommendations of the Neumark report (1963), the Community undertook a legal and political commitment (as part of its objective to create the most efficient possible common market) to establish a common VAT system under which taxation of imports and the non-taxation of exports in the intra-Community trade would be abolished. This commitment underpinned the objective to design a VAT system, which was tailored to the Single Market and operated within the European Union in the same way as it would within a single country. The two basic principles of VAT had to be observed in designing such a system:

- the mechanism of fractionated payments, which ensures that the tax system is to some extent self-policing (i.e. sales between registered traders may be carried out under suspension of tax, provided that the seller has checked the status of the purchaser and the end use of the goods and services he is supplying) and
- a clear division of responsibilities between sellers (correct invoicing of the tax due) and buyers (detailed proof of the tax deducted).

The Commission first put forward proposals for such a system in 1977 with the adoption of the Sixth Directive. This Directive was designed to achieve a uniform tax base in order to enable the EU to begin full operation of its "own resources" budget plan, and so the "Community levy" applied equitably to its Member States. In the first place, although the Directive included certain revisions, it primarily amplified and defined in greater detail the terms of the second Directive. On the other hand, it aimed at a uniform tax base by explicitly restricting the exemptions provisions to certain classes of activities and by providing standardised rules concerning the calculation of the deductible tax paid on inputs used for the production and supply of taxable goods and services. However, with respect to exempt activities, it allowed the Member States certain derogations whereas, with respect to the deductible tax on purchases, it gave the discretion to the Member States to decide what expenditure should not eligible for tax deduction.

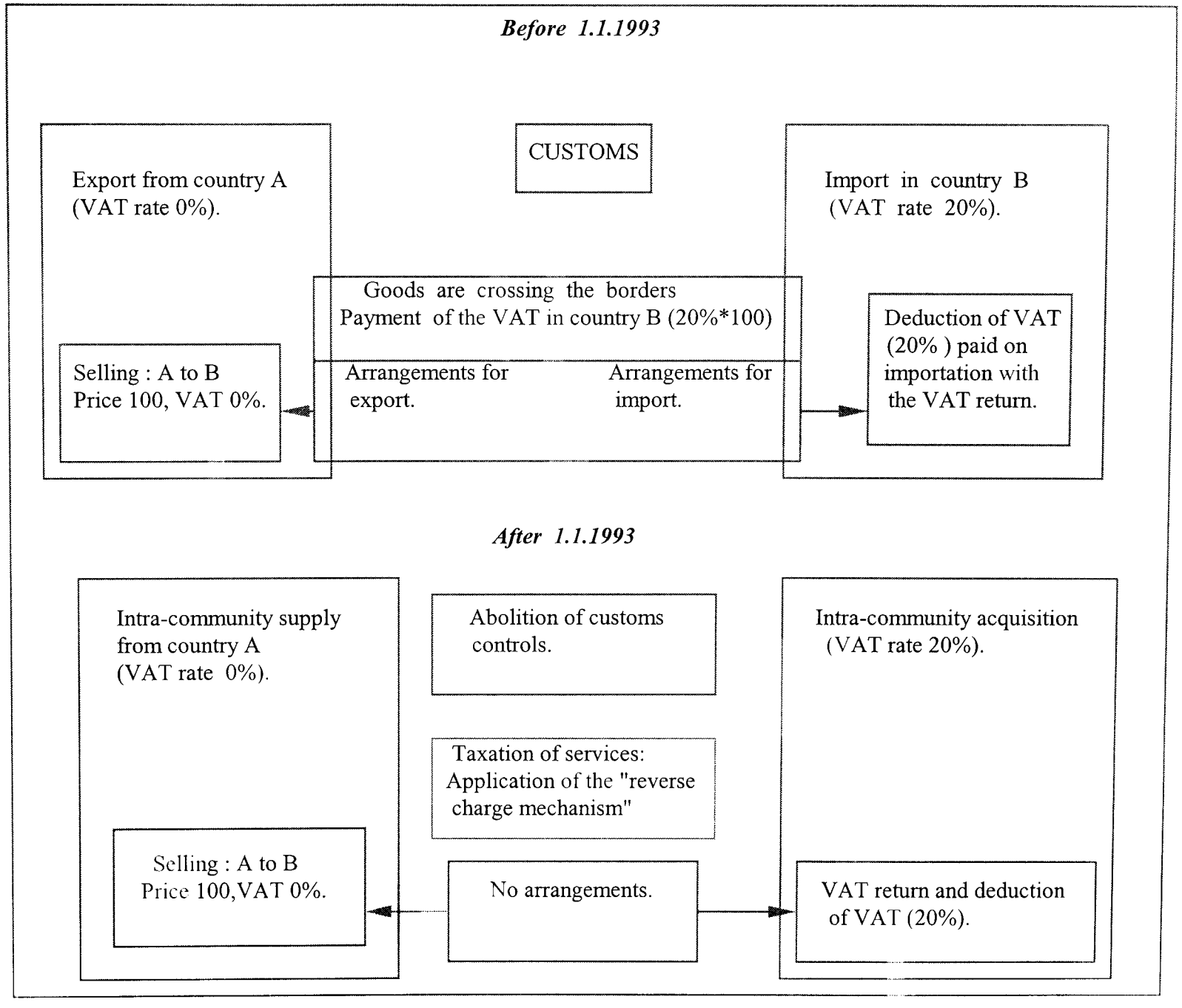
Finally, the Directive was quite general and flexible with regards to the measures necessary to apply for the traders' bookkeeping and accounting procedures of the tax. The Sixth Directive constituted a positive step towards gradually narrowing the disparities in the VAT coverage and administration between the Member States, and in preparing the ground for the application of a common rate structure on a uniform base among the Member States.

After the implementation of the Sixth VAT Directive the Commission put forward new proposals in 1987 under the work programme to establish the Single Market by January 1993. The key elements of these proposals, which were designed to achieve a genuine Single Market by means of taxation in the country of origin, were:

- a harmonised tax structure with two rates of VAT;
- harmonisation, within a defined band, of the rates applied by Member States; and
- a clearing mechanism for the redistribution of VAT receipts.

By 1989, it had become clear that it would be impossible to adopt the Commission's proposals by 1 January 1993, and the ECOFIN Council therefore decided to adopt "a transitional VAT system" (see also table 2.1) which could enable controls at the Community's internal borders to be abolished whilst allowing tax to continue to be collected in the Member State of destination under certain well defined circumstances (transactions between taxable persons and large-scale "distance selling" to individuals).

Table 2.1. The function of the European VAT system for intra-community transactions.



The main characteristics of this scheme were as follows:

- the terms "export" and "import" were abolished with reference to trade between Member States (thus achieving one of the objectives of the first Directive) and, in practice, replaced by an equivalent system: "intra-Community supplies of goods" (formerly "exports"); "intra-Community acquisitions of goods" (formerly "imports"). In order to compensate for the elimination of customs formalities and checks and avoid losses of tax revenue, a computerised system for the automatic exchange of information on the value of Intra-Community deliveries was set up among the national authorities (VAT information exchange system or VIES).
- consumers could henceforth pay VAT at the point of origin on goods purchased in another Member State without any further formalities.
- under three special schemes (distance sales, new means of transport, Intra-Community purchases by flat-rate farmers, exempted persons and legal entities that are not liable for VAT), transactions were generally subject to taxation in the country of consumption.

At the same time however, the Council reaffirmed both legally and politically the commitment it had made in April 1967 to introduce a "definitive VAT system" of taxation where the goods and services would be taxed in the Member State of "origin" by the new target date of 31 December 1996. It therefore fell to the Commission, once again, to put forward new proposals. Before doing so, the Commission carried out a thorough evaluation of the operation of the "transitional VAT regime"[6] and polled the Member States on their views, concluding that different approach to that proposed in 1987 would have to be taken to achieve a VAT system tailored to the Single Market. The programme put forward in 1996 differed in two main respects from the 1987 proposals[7].

Firstly, the 1987 proposals were based on the "big bang" approach, i.e. an immediate switchover to the definitive system, whereas the 1996 programme envisaged a gradual changeover to the definitive system ("origin principle"). The first stage in this gradual approach was to modernise and more uniformly apply the existing system introducing changes which would shape it into a definitive system. Secondly, the 1987 proposals were

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[6] Report by the Commission to the Council and the European Parliament on the operation of the transitional arrangements for charging VAT on intra-Community trade (COM (94) 515 final -23/11/1994).
[7] A common system of VAT -a programme for the Single Market (COM (96) 328 final 22/07/1996).

based on the principle that taxation should take at the place of supply and the clearing mechanism would operate on the basis of returns by taxable persons. On the contrary, the 1996 programme put forward the idea that taxation should be based on a trader's "tax domicile" so that there would be one single place of registration with a redistribution mechanism based on official statistics ("macroeconomic approach") to ensure that VAT receipts accrue to the Member State where consumption takes place.

The choice of a "macroeconomic method" implies the availability of uniform or equivalent sources, methods, funds and statistical procedures. This choice is likely to bring about disagreements between the Member States in their individual calculations of statistical taxable consumption, in particular as regards the reduction in each Member State's assessment base via the subtraction of the underground economy. In actual fact, this has been the subject of study of many years, inter alia, in connection with drawing up of national accounts. The estimates put forward vary considerably, as a result, in particular, of the sources and methods used. It is true that the Member States already have had to comply, by the end of 1988, with certain exhaustiveness obligations in respect of their national accounts[8]. Nevertheless, in the current situation, it should be stressed that exhaustive national accounts will involve a conflict of interests for the Member States, in so far as they would lead to an increase in the Gross National Product at market prices (GNP)[9]. This is because any increase in the GNP requires the States to provide additional resources for the EU budget via the GNP resource. Under the proposed VAT system Member States would have an objective interest in limiting the size of the underground economy in their national accounts, or even underestimating taxable consumption, so as to maximise their share of the redistribution of overall VAT income.

On the other hand, it is accepted that the current transitional arrangements have a number of shortcomings, because they are complicated, susceptible to fraud and are out of date (exemptions and derogations). There is a need to modernise, simplify, strengthen and more uniformly apply the VAT system (i.e. financial exemptions) in order to bring it up to date and to ensure it encourages legitimate commercial transactions within the internal market

[8] Commission's Decision 97/19/EU, 3/11/1997, OJ L252.
[9] Special report No 9/98, concerning the protection of the financial interests of the EU in the field of VAT on intra-community trade together with the commission's replies, OJ C356, 20/11/1998.

without providing greater scope for fraud and less efficiency of the tax systems[10]. In its report on the operation of the transitional VAT regime[11] the Commission clearly underscored the constraints and limitations of the present system, most of which do not -or do not only - result from the rules set in place for governing intra-community trade during the transitional period, but are intimately linked to the pre-existing tax rules and to the insufficient harmonisation of Member States' legislation. The simplification procedures, which were adopted in an attempt to remedy the most flagrant difficulties encountered in the operation of the common VAT system, provided only partial solutions that remain unsatisfactory. **It is clear, however, that this approach has reached its limits, since it's not possible to continue seeking simplifications without tackling the root causes of existing problems. In fact businesses and consumers still do not enjoy all the benefits expected from the Single Market in that the existing arrangements in no way ensure uniform treatment of all transactions carried out in the Community, thereby giving rise to costs that are incompatible with a genuine Single Market.** However, the Commission has drawn up an action programme to implement a new VAT strategy based on four objectives: simplification and modernisation of current rules, more uniform application of current rules and a new approach to administrative co-operation. These procedures are expected to start and probably finish in three "Phases" during the year's 2000/2001 (as stated in Commission's relevant communication paper).[12] During the Phase one, the European Council will adopt the following proposals:

- changes in the status of the VAT Committee (COM (1997) 325),
- improving mutual assistance on recovery (COM(1988)364),
- proposal on the right to deduction and the Eighth Directive (COM(1988)377),

and

- proposal on the person liable for VAT (COM (1988) 377).

In Phase two, the Commission will table proposals for Directives in the following areas:

- e-commerce and electronic invoicing,

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[10] Communication from the Commission to the Council and the European Parliament-A strategy to improve the operation of the VAT system within the context of the Internal Market (COM (2000) 348 final, 7/06/2000).

[11] Report from the Commission to the council and the European Parliament on the operation of the transitional arrangements for charging VAT in intra-community trade (COM (94) 515 final 23.11.1994).

[12] "Communication from the Commission to the Council and the European Parliament. A strategy to improve the operation of the VAT system within the context of the internal market" (COM (2000) 348 final 07/06/2000).

- revision of rules on administrative co-operation and mutual assistance, and
- a minimum standard rate of VAT.

In Phase three, the future priorities will largely depend on the progress made by the Council in adopting the proposals mentioned above.

Furthermore, in the above mentioned communication paper (COM (2000) 348 final 7/06/2000-Annex), the Commission recognises the treatment of financial services as "a key potential future priority" mentioning that "the financial services sector has increased both in size and complexity and its structures and operating methods have changed creating growing problems for current VAT rules", and concluding that "other measures are required to bring the VAT system into line with the developments in this sector, which include greater opportunities for gross-border shopping".

Finally, the Lisbon European Council's deadline of 2005 to establish an integrated European Market in financial services is central to the Community's employment and growth agenda (EC, 2001). Clearly this target for a Single Market for financial services in EU, cannot be developed without solving the above-mentioned problems in order to proceed in further harmonisation of the indirect taxation of financial services throughout the EU Member States (EU, 1997; London Economics, 2002).

In conclusion, in this section we discussed all efforts made by the Commission in order to harmonise the VAT in the EU Member States. Despite the general problems of VAT application which still exist in EU, the Commission has clearly recognised that the taxation of financial services is a problematic area, though very important in order to progress in harmonising VAT and to achieve the target for a Single Market for financial services.

2.5 Concluding remarks

In this chapter we have analysed the potential and the structure of VAT in EU, in order to gain an understanding of the latest developments in the European VAT harmonisation process. We have seen that the logic of the invoice-credit VAT has been the choice of the

European Commission. In addition this method may be more powerful, than has yet been fully understood, in taxing the financial services under the VAT system. Moreover, in terms of the potential applicability of the VAT to lower levels of government, new conceptual advances suggest that the prospects for implementing the VAT as a State/provincial tax within a federation are brighter than previously thought. The ideas of VIVAT and CVAT both provide ways of implementing the "destination principle" without breaking the VAT chain on inter-state exports or inducing game-playing. However in the absence of an over-arching federal administration (or the willingness to create one), which is the case in the EU, however, both schemes run into difficulty in securing appropriate clearing, ensuring that revenue collected on exports from one State/province is available to finance credits/refunds claimed in another.

Regarding the European VAT system, with few exceptions and without overlooking the essential contribution made by the Single Market in promoting growth and employment, little progress has been made in the process of harmonising the EU VAT system. Since the introduction of the Commission's initial Proposals on the Internal Market in 1987, all efforts have been concentrated on the realisation, at all costs, of the current hybrid of Single Internal Market, by beginning of 1993. Because Member States had neither the willingness to face the problems posed by the necessity to harmonise rates and relinquish derogation's and exemptions (i.e. financial exemptions), nor were they ready to accept any compensation mechanism for VAT revenues, the radically different "origin" based VAT system, envisaged in the Cockfield, (1987) package, was not adopted. Instead, over the years up to 1993, the focus moved away from this approach towards a compromise based on what was achievable at that time.

The argument of this chapter has confirmed the view that the procedures towards the VAT harmonisation in EU have enabled the implementation of the "Single Market". However, the existing VAT system does not ensure uniform treatment to all transactions (i.e. financial transactions) carried out in European Union. These shortcomings have already been identified by the Commission. Therefore, there is clearly a need to adjust the EU VAT system to meet changing economic conditions.

CHAPTER 3: THE VAT SYSTEM IN THE GREEK TAX STRUCTURE.

3.1 Introduction

In the previous chapter we discussed the developments in EU VAT system and their implications for financial services taxation. In this chapter we discuss briefly the main features of the Greek tax system with emphasis on the structure of the Greek indirect system (VAT). The discussion is considered necessary as a basis for deepening, at a later stage, our analysis of the taxation of financial services in the specific context of Greece. However, in order to facilitate our comparisons with Spain and Portugal, we are looking at the various categories of taxes applied in these countries as well. Our focus in this chapter will be on the functional structure of taxation in Greece, (taxes applied, relation between direct and indirect taxation, evolution and recent developments) under the period 1965-1998 and on the general review of the Greek VAT system as it has been applied in Greece since 1987 (the year of introduction of VAT).

3.2 The Direct taxes applied in Greece

3.2.1 Income taxes on Corporations

- Rates and basis of assessment

Greek companies are liable for corporate income tax on income from all sources. The tax is levied on net taxable profit at a flat rate of 40% for limited liability partnerships and corporations with registered shares. Banks and corporations with non-registered shares and branches are taxed at 40%. There are no state or provincial (Local) income taxes in Greece. Capital gains are treated as income from commercial activity and taxed at source at a rate of 30%, 20%, or 25%. Any gain resulting from the sale of fixed assets, including immovable property, belonging to an enterprise is treated as income from commercial activity and taxed under the income tax laws. The gain from the sale of plant and machinery may avoid taxation if used as additional depreciation of existing plant and machinery or of plant and machinery to be acquired in the following two years. In the case of immovable property, the taxable gain is determined on the basis of the "objective" valuation coefficients used by the tax authorities. Foreign business organisations trading in

Greece are subject to Greek corporate tax (40%) on their total net income derived from Greek sources and/or from their permanent establishments in Greece. Relief from double taxation is governed by tax treaties that Greece has concluded with other countries. Tax credit is generally allowed for foreign-source income. However, the credit cannot exceed the Greek tax attributable to the foreign-source income. Corporations are required to pay income tax on their preceding year's profit in five equal instalments, with the first one payable by the fifteenth day of the fifth month after the year-end. In addition, 50% is payable in advance in five equal instalments on the account of the current year. For banks established in Greece, the rate of advance tax is 60%, instead of 50%. If the total amount of the tax due is paid within the period of the first instalment due, there is a discount of 5%. Limited liability companies, joint ventures, and partnerships are also subject to 1.2% stamp duty on the profits of the partnerships.

- Exemptions

There are the following exemptions: The Greek State, including decentralised Public services operating as special funds, and urban and rural municipalities, in respect of income of all kinds; Profits from the operation of ships under the Greek flag by Greek companies, co-operatives or unions, where such profits are subject to the specific taxation on ship owners' profits; Income from immovable property belonging to recognised religious group's etc; Profits made in Greece by foreign businesses from the operation of ships, under foreign flags and aircraft.

3.2.2 Income taxes on individuals (Personal Income Tax-PIT)

- Rates and basis of assessment

Both employees and self-employed pay the PIT that applies a progressive schedule to all earned income, net of social security contributions and of deductible expenses. The schedule comprises six income brackets with rates ranging from 0 to 45 per cent. The tax is calculated using these rates, on an individual's total income, which is the aggregate of net income from all sources, classified as follows:

a) Income from leasing or use of buildings and land;
b) Income from securities, interest, dividends, and directors' fees (as distinct from directors' salaries);
c) Profits of industrial and commercial enterprises;

d) Income from agricultural enterprises;
e) Income from salaries, wages, pensions, and other forms of remuneration;
f) Income from professional fees and all other sources that cannot be classified in any of the above categories.

Different rules apply, and different deductions are made in the computation of net income of each category. There is also a tax at 3%, which is computed on the gross income from real estate. This tax increases to 6% if the real estate is used for residential purposes and exceeds 300 square meters in size. This tax cannot exceed the primary tax due on such income.

- Special features

Every individual, irrespective of nationality, domicile, or country of residence, is subject to income tax in Greece on income arising in Greece. In addition, every individual domiciled in Greece is subject to income tax on income arising abroad. A wife's income is assessed separately, although married couples are required to file joint returns. Partnerships and limited liability companies are subject to a flat 35% tax rate. However, up to 50% of a partnership's profits are treated as "deemed" salary for up to three of the partners, in which case the tax rates applicable to individuals will apply.

Interest earned from funds deposited with banks operating in Greece generally is subject to 15% withholding tax. A new withholding tax of 7.5% was introduced for interest income derived from all government securities issued after January 1, 1997. The tax applies at source, irrespective of the country of residence, nationality, or citizenship of the beneficiary. Nevertheless, for tax treaty residents entitled to a lower withholding tax or to a tax exemption on interest income, a new tax refund procedure for that purpose has been established. Both the 15% withholding tax on resident bank deposits in Drachmas/euro or in foreign currency and the new 7.5% tax on government securities are final taxes in the case of individuals.

Individuals may be taxed according to deemed or imputed income in cases where this income is higher than the actual income declared and the taxpayer cannot substantiate the difference. Imputed or deemed income is determined on the basis of living expenses and the acquisition of assets. Living expenses are again determined on the basis of "objective"

criteria. Living expenses or the acquisition of assets that cannot be covered by declared income of the current or prior years may be justified by loans contracted, the sale of property, or the importation of foreign exchange by persons who can justify the acquisition of such foreign exchange abroad. Finally personal income tax is always based on the calendar year.

- Exemptions

Exemption exists if no liability for tax arises from the application of the taxation scale. The tax due is reduced in respect of the dependent children. Relief from double taxation is granted either in accordance with tax treaties or on the basis of domestic credit rules. This credit may not exceed the amount of Greek tax that would have been payable had the income been earned in Greece.

3.2.3 Income taxes on non-residents

Non-resident individuals are, in general terms, taxed on their total Greek source income, including income obtained from a permanent establishment in Greece. A non-resident is any person whose domicile or principal residence is not located in Greece. Non-residents are not entitled to tax deductions. Some of the double taxation agreements entered into by Greece provide that income from employment earned by foreigners resident in Greece for a period of less than six months, subject to certain conditions, is exempt from tax. Business organisations that are considered as having a permanent establishment in Greece are liable to tax on their income from Greek sources only. Income of non-residents is taxed at rates similar to those for residents (5%-45%). Royalties paid to foreign enterprises and organisations that do not have permanent establishments in Greece are generally subject to a 20% withholding tax. This tax is withheld at the earlier of when the royalties are paid or credited. Tax treaties may provide for tax withholding at a lower or zero rate.

Agreements for the avoidance of double taxation exist between Greece and the following countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Holland, Hungary, Italy, India, Luxembourg, Norway, Poland, Romania, Slovakia, Sweden, Switzerland, United Kingdom, and United States.

3.2.4 Other significant direct taxes[13]

- *Tax on savings/capital*

The taxation of income from savings is uneven, with different forms of capital income taxed at substantially different rates. With the exception of rents from land and buildings and of income from private pension funds, which are subject to the PIT, income from savings is taxed under a separate flat-rate regime at rates ranging between 0 and 15 percent depending on the manner in which the income is invested and distributed. Such gaps tend to affect the allocation of savings and firms financing decisions (OECD, 2001). Capital contributed to an enterprise of whatever legal form and for whatever purpose is subject to tax at 1%. Capital remittances by foreign legal entities from countries other than EU Member States to their Greek branches also are subject to this tax.

Effective June 30, 1992, dividends are distributed out of net after-tax profits and are not subject to any further tax. An amount equal to 5% of the year's after-tax profit must be transferred annually to a statutory reserve until the reserve is equal to one-third of the share capital. Of the remaining profits, a dividend of at least 6% of the paid-up capital or 35% of the net profit reduced by the amount transferred to the statutory reserve, whichever is greater, must be paid.

- *Inheritance tax*

Inheritance tax is imposed on all property, movable or immovable, that passes on death if the property is situated in Greece. In addition, movable property situated abroad may be subject to inheritance tax if the deceased was a Greek citizen or a person domiciled in Greece. Gift taxes, which are imposed at the same rates as inheritance taxes, apply to all property, movable or immovable, that is donated if the property is situated in Greece. In addition, movable property situated abroad is subject to gift tax if the donor is a Greek citizen or the donee is a person domiciled in Greece.

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[13] It is worth noting here that apart from direct taxes to encourage the decentralisation of industry away from the Capital area, various regional tax incentives (related to direct taxes) have been introduced mainly through Law 1892/1990. The incentives provided by this law apply to "productive investments," as defined, and consist primarily of outright grants, deductions from taxable profits, different tax rates, interest subsidies, and additional depreciation allowances. For the purposes of the above-mentioned law, the country has been divided into four areas: A, B, C, and D. Area A is the most developed and area D the least developed. Progressively higher incentives (regarding personal income tax and company tax) are provided for less developed areas.

- *Payroll Tax and Social Security Contributions*

This is a tax on wages, salaries and in general, on any remuneration of labour employed by industrial and handicraft enterprises, which are responsible for its payment to authorities. There are dissenting views on the distributional effects of the tax but in so far as the firm concerned shifts it on the prices, the tax increases the price of domestically produced goods relative to the prices of imports and also weakens export competitiveness[14]. Small firms and firms located in provinces are exempted from the tax, and the basic rate of the tax is reduced according to the amount of the firms annual labour costs or the status of the firm.

Social security coverage is compulsory for all employees. Foreign citizens may claim exemptions in certain cases and for limited periods of time. Social security contributions are calculated on monthly salaries at the following rates:

a) Employer 15.90%

b) Employee 27.96%

Social security contributions apply to the 14 salaries defined by law and the two extra salaries, corresponding to Christmas, Easter, and vacation bonuses, which are obligatory under Greek labour law. Stamp duty of 1.2% is levied on gross salaries and wages. The employer and the employee share the stamp duty equally.

- *Tax on Property*

Effective January 1, 1997, "large" immovable property located in Greece has become subject to an annual capital tax, irrespective of citizenship, nationality, place of residence, or registered office of the owner. The tax rate is 0.7% for legal entities, and ranges from 0.3% to 0.8% for individuals, based on a progressive tax scale. For spouses, the tax is computed separately, although a joint tax return is required. A variety of exemptions exist, particularly for legal entities (e.g., for self-used buildings of commercial or industrial enterprises). The usual tax rate for property transferred is 9% on the first Drs 4 million and 11% on the excess. This is increased by 2% in urban areas to cover the cost of fire protection. In addition, there is a surtax of 3% on the assessed tax. Lower taxes may be levied in certain cases; e.g., on the merger of companies. The tax is computed according to the amount mentioned in the contract or resulting from the objective value system,

[14] Greek Ministry of Finance and Greek Centre for Planning and Economic Research "A survey of the compliance cost in the Greek Tax System" (1998).

whichever of the two amounts is higher. If no objective value exists, the tax authorities determine the value.

- *Shipping Tax*

Profits from shipping are subject to a shipping tax in lieu of income tax. The tax applies only to ships operating under the Greek flag. These are classified into two categories: Category I includes freighters, tankers, and refrigerated ships of gross tonnage of 3,000 koros (8,460 tons) or more, and passenger vessels plying routes from Greece to foreign ports or between foreign ports, with the rest belonging to category II.

3.3 Indirect Taxes applied in Greece

3.3.1 Value-added Tax (VAT)

- General background

VAT was introduced in Greece with effect from 1 January 1987 (Law 1642/86), adopting the sixth VAT Directive (77/388/EEC) as the agreement for the Greek accession to the EEC, and replaced a number of indirect taxes the most important of which were the turnover tax and stamp tax. The older system of indirect taxation was very complicated, as the nominal tax rates varied widely among different sorts of transactions and were subject to numerous exemptions, rate reductions, and cumulative effects. Accordingly, it was difficult to estimate the actual burden levied on final products. This led to a very complicated tax structure with high administrative costs, and it enforced vertical integration of economic activity, which involved many inefficiencies. Moreover, the system was very protective. The replacement of the old taxes by VAT, a neutral tax, was expected to have a strong impact on the economy. In addition this tax reform took place during a period of strong inflationary pressure. All previous EU members had made their changes twenty years earlier, before the inflationary pressure had accelerated. The tax reform proceeded quite smoothly. The impact of the new tax on the overall level of economic activity was rather mild and beneficial. **More specifically, the impact on prices was very low (2%) owing to a price-freezing policy implemented when VAT was introduced. VAT resulted in a better redistribution of tax burdens, since this tax is less regressive than the ones that preceded it. Thus, it improved the tax structure's flexibility and stabilising effects. Finally, VAT did not have a considerable impact on trade (imports and exports) (Agapitos, 1999).**

There is no monetary limit below which VAT is not chargeable. Any person supplying goods or services in the course of business, whether on a regular or occasional basis is taxable. VAT is a tax on goods or services supplied in the course of independently carrying on a business or other economic activity in Greece. Supplies that do not take place in Greece are referred to as being "outside the scope" of the tax. VAT is also due on goods imported into Greece from a country that is outside the EU and on goods that have been "acquired" (i.e., imported) from other EU Member States under the EU Single Market procedures.

The principal mechanism for collecting the tax requires the supplier (called a taxable person) to charge VAT on the goods or services supplied, to take credit for VAT paid on business expenditure, and to pay the net tax over to the authorities (i.e. indirect tax-credit method). However, for some transactions, e.g., the intra-Community supply of goods, the recipient of the supply of goods is required to account for the VAT due, rather than the supplier. Special rules allow the recovery of VAT incurred by foreign enterprises in Greece if the VAT is referable to the making of supplies outside Greece. The Greek State, municipalities, communities and other organisations governed by public law are not considered taxable persons in respect of activities in which they engage in pursuance of their objectives, even where they collect dues, fees or contributions. These bodies, however, are considered as taxable persons when they engage in such activities as telecommunications, supply of gas, electricity and thermic energy, transport of goods, port and airport services, passenger transport, running of trade fairs and exhibitions, etc.

Entrepreneurs with no establishment in Greece but delivering goods in Greece or supplying services, which are taxable in Greece, are subject to VAT. A foreign entrepreneur is regarded as delivering goods in Greece when he acts as the importer of the goods. Generally, a non-resident entrepreneur is considered as having an establishment for VAT purposes if he keeps a regular place of activity such as an office, shop, factory or a fixed domicile from the activity is exercised. Foreign entrepreneurs making transactions in Greece are required to appoint a VAT representative who will be responsible for fulfilling the administrative obligations and for payment of the tax due.

- Taxable transactions and place of taxation

In general subject to tax are the following transactions:

a) Supply of goods. The term includes the transfer of the right to dispose of tangible movable goods as well as immovable properties
b) Supply of services. This is defined as any transaction which does not constitute a supply of goods. This wide definition allows a large number of transactions to be classified as "services"
c) Self-supplies of goods and services (private use of goods or services)
d) Intra-Community acquisitions. The threshold in national currency for intra-Community acquisitions is 2500000 Drs (10000 euro)[15], and for intra-Community distance selling 8200000 Drs (35000 euro)[16].
e) Intra-Community acquisitions of new means of transport
f) Intra-Community acquisitions of goods subject to excise duties
g) Imports of goods

The place of supply of goods is deemed to be in Greece if at the time the tax becomes chargeable the goods are within the Greek territory. The place of supply of services is considered to be Greece if, at the time the tax becomes chargeable, Greece is the country where the supplier has established his business, or has a fixed establishment from which the service is supplied or, in the absence of such a place of business or fixed establishment, he has a permanent address or habitual residence. When a foreign entrepreneur provides the following services to a Greek entrepreneur, he will not have to account for Greek VAT since the tax will be due by the Greek recipient. This special rule referred to as the "reverse charge mechanism" applies to the importation of:

a) transfers and assignments of copyrights, patents, licences, trademarks and similar rights
b) advertising services
c) services of consultants, engineers, consultancy bureaux, lawyers, accountants and other similar services, data processing and provision of information (but excluding any services relating to land)
d) banking, financial and insurance services (including reinsurance, but not including the provision of safe deposit facilities)
e) the supply of staff

[15] Article 28a-(1) (a) of Directive 91/680/EEC.
[16] Article 28b-(B) (2) of Directive 91/680/EEC.

f) the letting or hire of goods other than means of transport

g) the services rendered by one person to another in procuring for the other any of the services mentioned in the preceding paragraphs

In all above cases, the liability for the tax is shifted to the recipient of the services.

- The basis for taxation

The taxable amount in respect of supplies of goods and services is the consideration which has been or is to be obtained by the supplier of goods and services. On that basis, incidental expenses, such as commissions, packing, insurance, transport and Customs duties are part of the taxable basis. VAT due on the importation of goods is assessed on the value paid by the importer to the supplier. The taxable amount also includes all taxes, dues; levies and contributions paid to the State by other third parties, and also commission, transport and insurance costs, with the exception of VAT. VAT becomes due when the goods have been supplied and the services performed.

- VAT rates

The current VAT rates are:

a) 0 % (Zero rate), for exemptions with credit for input tax

b) 4% (reduced rate), applicable to books and magazines, printed materials in general and tickets for performances

c) 8% (reduced rate), applicable to products regarded as basic necessities and

d) 18% (standard rate), applicable when the goods or services are not subject to any other specific rate

- Exemptions

The following are examples of exemptions with credit:

a) export of goods from Greece provided that the tax authorities are satisfied that the goods have in fact been exported

b) insurance and reinsurance services rendered to non-EU residents including related services performed by insurance brokers and insurance agents

c) supply and importation of goods and services under diplomatic and consular arrangements

d) supply and importation of vessels and aircrafts intended for commercial use.

A number of exemptions are granted from VAT (exemptions without credit for input tax) including:

a) services supplied by lawyers, doctors, dentists, veterinarians, nurses and physiotherapists
b) the supply of educational services
c) the income (rent) from buildings, excluding the exploitation of hotels, furnished rooms, parking places
d) hospital and medical care
e) banking, insurance and reinsurance services provided in the territory of Greece or to a recipient established in other EU Member State
f) delivery of gold to the Bank of Greece.

There is no right to recover VAT on the purchases of the above exempted transactions. Transactions are either subject to VAT or exempt. It is not possible to opt to pay VAT when an exemption normally applies.

- Tax credit for input tax

A taxable person is in principle, entitled to recover VAT paid on goods and services and on importation of goods acquired in furtherance of business. However, no credit is granted for input tax on:

a) purchase or import of tobacco products
b) purchase or import of alcoholic beverages to the extent that these have been utilised in non-taxable transactions
c) entertainment and hospitality expenses
d) accommodation, food, beverage, transport and entertainment expenses or personnel or company representative
e) purchase or import of passenger cars for private use, vessels and aeroplanes for private use or sports, as well as the related fuel, repair, maintenance, rental and circulation expenses generally.

Taxable persons making both taxable and exempt supplies are entitled to recover input tax related only to their taxable supplies. When goods and services are used for both taxable and non-taxable activities, the creditable input tax is calculated based on the ratio between taxable supplies and total supplies (pro-rata mechanism).

- Special VAT regimes

In Greece special arrangements are applied for "special VAT regimes":

a) The special arrangements for farmers provide for the return of tax charged on their purchases of goods and services. The VAT rate applied to sales of goods by farmers

under this special regime in Greece is zero. The goods concerned are fishery, forestry, crop and livestock products.

b) The special regime for small businesses provides special arrangements for the administration of the tax.

c) Special rules apply to travel agents who, for the purpose of providing travel facilities to their customers, use the supply of goods and services of other taxable persons. All transactions performed by a travel agent in respect of a journey are treated as a single service by the travel agent to the traveller.

d) Finally a special scheme is applicable to second-hand goods, works of art, collector's items, antiques including the sales of these goods by public auctions, and to transactions concerning gold acquired for investment purposes[17].

3.3.2 Other indirect taxes

- *Turnover Tax*[18]

This tax is a single-stage tax levied only on the insurance industry. The basis for taxation is the insurance company's turnover and the tax must be paid within 90 days of the quarter end. The rates applied are 4% for life insurance (and reinsurance) and 10% for householder (all risks) and other classes. The tax is payable on insurance premiums and all charges accruing from insurance contracts without any reduction of discounts allowed to clients and likewise without any reduction of brokerage fees and commission paid to third parties. The tax is payable to the State by insurance companies on a quarterly basis.

➢ Exemptions

The contracts over ten years are exempt as well as the marine aviation transport and the State export. Reinsurance premiums collected by insurance and reinsurance companies are also exempt.

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[17] Council Directive 98/80/EC, 12 October 1998, supplementing the common system of value added tax and amending Directive 77/388/EEC-special scheme for investment gold.

[18] The turnover tax was a broad based tax levied on both domestic production and imports, characterised by a multitude of tax rates and exemptions which were the same for domestically produced and imported goods, and which has been abolished with the introduction of VAT, as a part of Greece's accession to the EEC, with the exemption of insurance industry.

- *Stamp Duties*

These include a wide group of levies imposed at different rates on various transactions. Most of these duties constitute indirect taxes and are either proportional to the value of transaction or fixed (e.g. 3% levied on the value of insurance contracts) irrespective of the value of the transaction any document may represent. The rates vary from 0.5% (draft and promissory notes) to 3% (insurance services). The stamp duties are a significant category of indirect taxes. They also constitute the most complicated tax category in the sense that they encompass a plethora of levies, either proportional or fixed with cumulative effects.

➢ Basis of assessment

a) The total fee received for the provision of a service
b) The total rent received for the letting of buildings and land
c) The amount of the loan for which a contract is being concluded
d) The full sale price of a sale of movable goods by a natural person
e) The amount of the insurance premium or the insurance pay-out
f) The nominal value of bills of exchange and promissory notes
g) In the case of a contract between natural persons, the value of the contract

➢ Exemptions

a) Personal exemptions: In these cases, it is one of the contracting parties that is exempt and not the contract itself.
b) Exempt parties: include the State and foreign embassies.
c) Real exemptions: In these cases, the contract or document itself is exempt from stamp duty
d) Formal exemptions: Granted on contracts that have been ratified in law. These may be personal or real

- *Special Tax on Banks' Transactions (EFTE)*

This is a sales tax introduced first in 1987 replacing the formerly applied turnover tax on financial (bank) institutions, following the reform of the indirect taxation in Greece (introduction of VAT). This tax is calculated using a specific rate (3%) each time a bank transaction takes place without deduction for tax paid on inputs (multi-stage cumulative tax). The tax is payable on all form of gross bank revenues, derived from interest, commission and brokerages fees, etc., by Greek banks, the bank of Greece, foreign banks registered in Greece. The tax is payable to the State on the basis of monthly statements.

- Exemptions

a) Loan and credit contracts granted by banks to the State municipalities and legal persons governed by public law when, subject to the existing provisions, these parties enjoy exemption from stamp duties and likewise.

b) The commission charged by and the interest accruing to banks in respect of loans and credit arrangements granted to the parties.

c) Bank revenues that are exempt from stamp duties or turnover tax by virtue of specific legal provisions.

d) Bank revenues accruing from the sale or letting of real estate.

e) Bank revenues that are subject to VAT.

f) Loan and credit contracts to finance export operations.

g) Credit contracts with a bank to the extent either not taken up or covered by another bank.

- *Excise taxes*[19]

Besides the above broad-based (i.e. VAT) indirect taxes there also exists a number of taxes levied on all traditionally excised products, thus alcoholic beverages, tobacco and tobacco products, and mineral oils. In Greece before the introduction of VAT the use of excise (and the turnover tax) was the recognised mean of taxing consumption. Nowadays, the alternative philosophy, beyond the additional revenues which these taxes contribute, is of course to use excise taxes to influence consumer behaviour. These taxes are generally calculated using a combination of ad-valorem and specific rates of duty giving to the Greek tax administration a greater degree of flexibility to meet variable policy demands. The most important, from a revenue point of view, are the excise taxes on mineral oils, followed by those on tabacco products.

Finally a number of additional indirect taxes are applied in Greece, such as import duties (within the framework of the European Customs code/TARIC, TARIFF), Road Tax, Fire Brigade Tax and taxes collected by the State on behalf of third part agencies (low-yield

[19] An important step towards the harmonisation of excise taxes in European Union was the adoption of the Council Directive 92/12/EEC of 25 February 1992 "on the general arrangements for products subject to excise duty and on the holding movement and monitoring of such products". With these arrangements only five of the existing excise taxes remained in Member States, thus the tax on mineral oil, the tax on manufactured tobacco, the tax on spirits, the tax on beer, and the tax on wines.

taxes)[20]. Here we would like to add that although the Greek Tax system appears to be based on various categories of taxes, as we can see from the following table 3.1 there are many similarities with the Spanish and Portuguese tax system regarding the taxes applied. **This is one of the reasons these countries have been chosen for a comparative evaluation in the application of particular taxes (i.e. consumption and indirect financial taxes) in our empirical analysis.**

[20] The European Court of Justice has put in question the widespread practice of such levies in Greece raised in favour of several professional funds. The court in it's decision of 19.03.02 stated that such levies are illegal because they are not in line with article 10 of the Directive 69/335, which states that apart from the capital duty the Member States shall not charge with regard to companies firms associations or legal persons operating for profit, any tax whatsoever. The Court with this decision considered these taxes as indirect taxes on raising capital.

Table 3.1 : Taxes applied in Greece, Spain, Portugal		
Member State	***Direct taxes***	***Indirect taxes***
Greece	Personal Income tax Corporate Income tax Tax on inheritance Tax on gifts Income tax levy on behalf of Agricultural Insurance organization (OGA) Real estate transfer tax Tax on movement of capital Duty on the purchase of temporary residence in short-stay accommodation Tax on major real estate Taxes on payroll and workforce Recurrent tax on net wealth Taxes on financial and capital transactions Social security contributions	VAT Excise taxes Customs duties Motor vehicle Tax Special tax on television advertisements Levy in favor of ELGA Central Bank levy Special tax on bank transactions Turnover tax (insurance) Stamp duties Levy on behalf of the Merchant Marine Pension Fund Levy on private and Public good vehicle Dodecanese municipal tax Charge on heavy plant and machinery Fee for operation of recreational technical games Taxes and levies on behalf of third parties
Spain	Personal Income tax Tax on the income of non-residents Corporation tax Wealth tax Succession and gift duty Tax on construction, installation and works Tax on capital transfer and documented legal acts Local taxes Tax on capital gains Taxes on payroll and workforce Gift taxes Taxes on financial and capital transactions Social security contributions	VAT Excise taxes Custom duties Duty on intermediate products Tax on insurance premiums Excise duty on certain means of transport Tax on electricity Tax on the increase in the value of urban land Tax on economic activities Tax on mechanically powered vehicles Taxes on financial transactions (turnover tax) Taxes on motor vehicles
Portugal	Tax on Personal Income Tax on corporate Income Municipal Tax Capital gains surcharge Inheritance and gift tax Real estate transfer tax Social security contributions Taxes on wages and payroll Taxes on property Tax on capital transactions Social security contributions	VAT Excise taxes Custom duties Special levies Tax on the use, carrying and possession of weapons Motor vehicle Tax Gaming tax Entertainment tax Tax on insurance premiums Stamp duties Tax on banking operations Tax on credit Local taxes

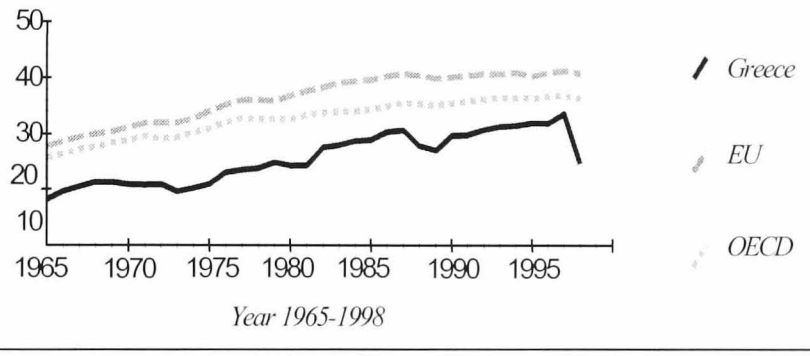
Data: OECD "Revenue Statistics", edition 2000; European Commission, "Inventory of taxes", edition, 2000 -EC, 2000a.

To summarise, this section has shown that quite different categories of taxes (both direct and indirect taxes) are applied in Greece. In addition similar categories of taxes are applied in Spain and Portugal. However, in the case of Greece many of the above categories, especially indirect taxes, appear to have a complicate structure when applied.

3.4 The functional structure of taxation in Greece (1965-1998)

During the period 1965-1998[21] the level of aggregate taxation (total tax revenues) in Greece was 25.7% (mean) of GDP, a percentage quite low by international standards. This percentage is around 10 percentage points below the European Union average (36.6%), thus one of the lowest in EU, and 7.2 percentage points below the OECD average (32,89%) (Figure 3.1).

Figure 3.1.Tax Revenues as a percentage of GDP.



Data: OECD "Revenue statistics", 2000, edition

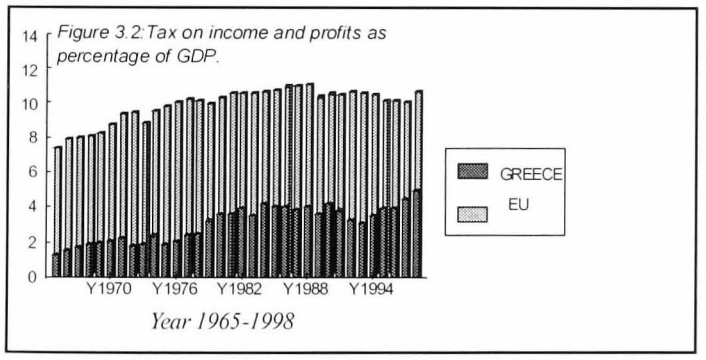
The situation has improved (from Tax administrations point of view) in the 1990's. As an indication we could mention here that in 1997 the above percentages were 7.7 points below the EU average and 3.4 points below the OECD average. During this period (1965-1998) for which data are available it appears that indirect taxes are the most important category of taxes, constituting 47% of total taxation (14.8% of GDP). In European Union no other State depends to the same extent on indirect taxation to finance its expenditures (Table 3.2; Figure 3.2-3.11).

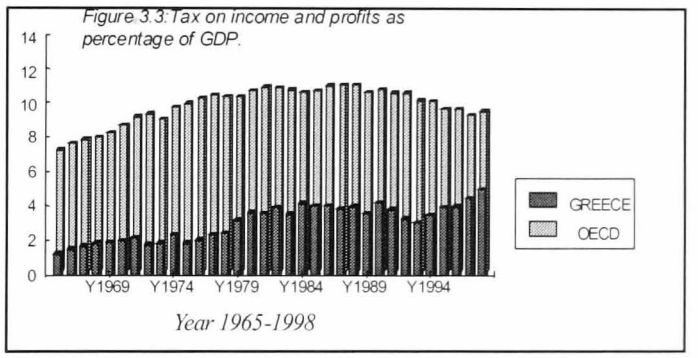
[21]The estimations are based on data taken from OECD "Revenue Statistics", edition Year 2000.

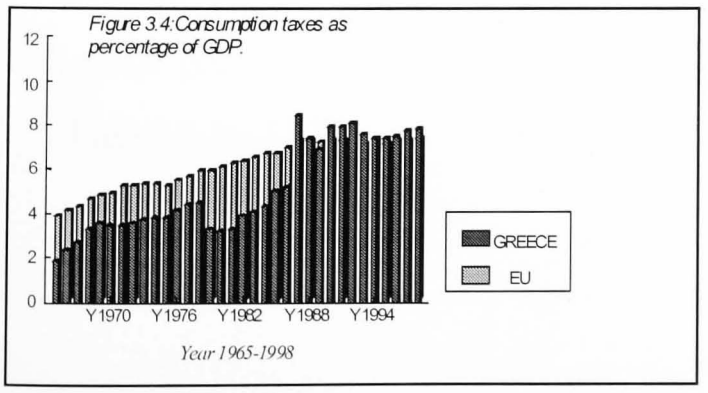
Table 3.2 Taxes linked to imports and production (indirect taxes) as a percentage of GDP.		
Year	***GR***	***EU***
1980	10.4	12.9
1985	12.5	13.4
1989	12.2	13.4
1990	13.9	13.4
1991	14.6	13.4
1992	15.3	13.3
1993	14.7	13.4
1994	14.3	13.6
1995	13.6	12.7
1996	14	12.9
1997	14.2	13.2
1998	14.3	13.7
1999	14.6	14
2000	14.8	13.9
2001	14.8	13.9

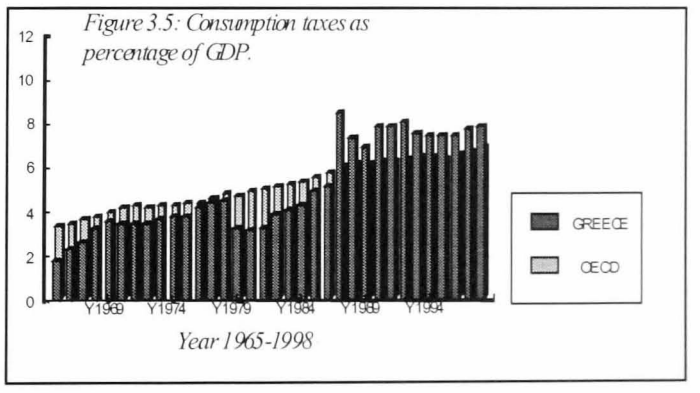
Source: European Commission (Directorate General Economic and Financial affairs).[22]

Figure 3.2-3.11: Plot of direct and indirect tax revenues in Greece, EU and OECD.

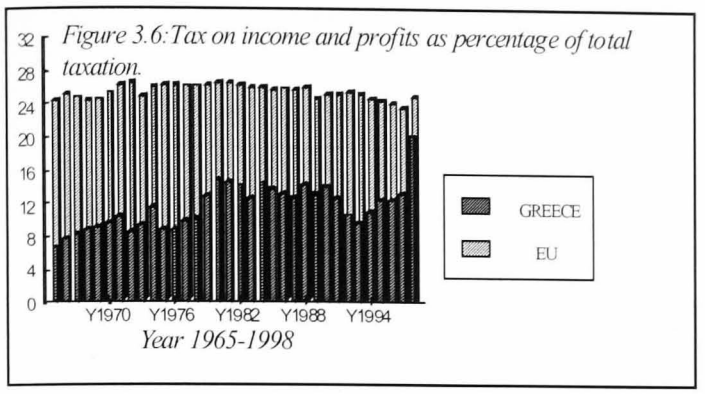


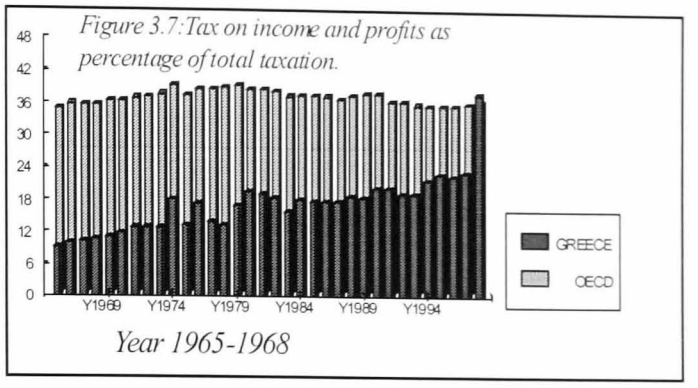


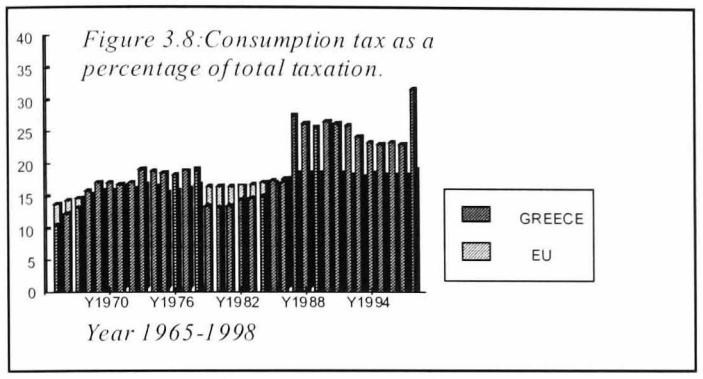


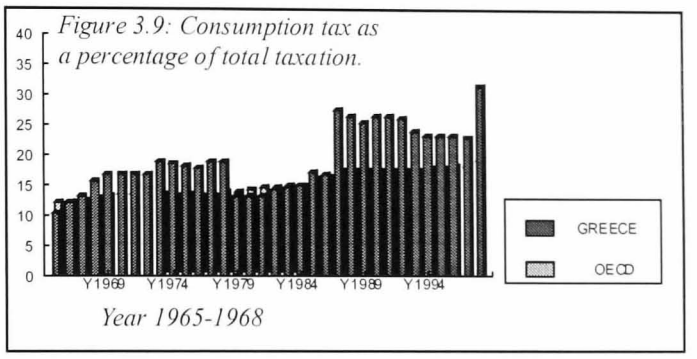


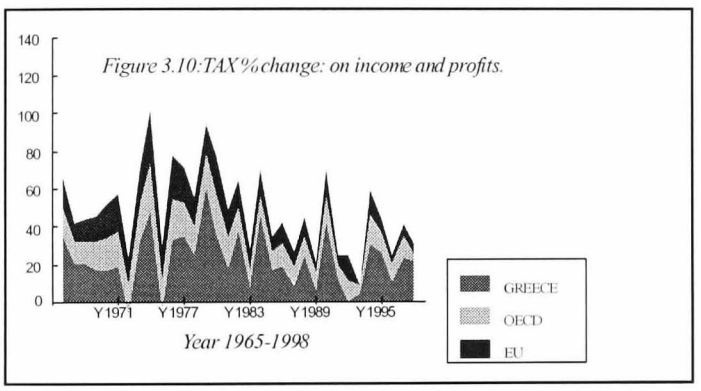
[22] EC, Directorate General and Financial affairs: Public Finances in EMU-2000, ECFIN/339/00-EN, 24.5.2000.

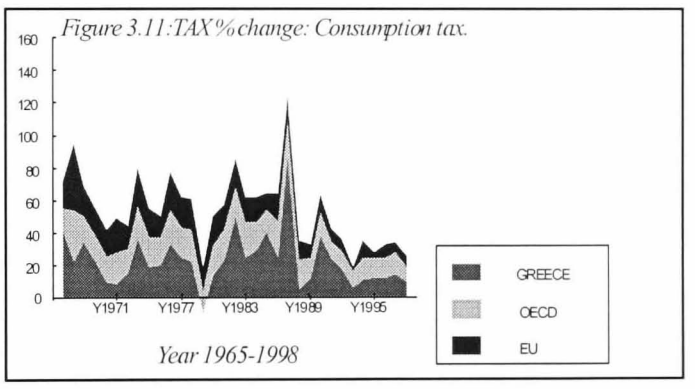












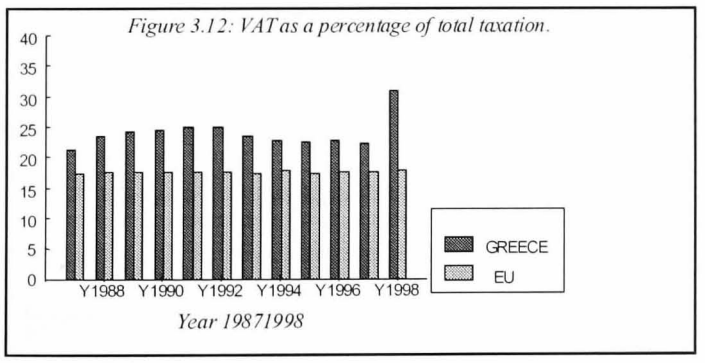
Data: OECD Revenue Statistics, 2000.

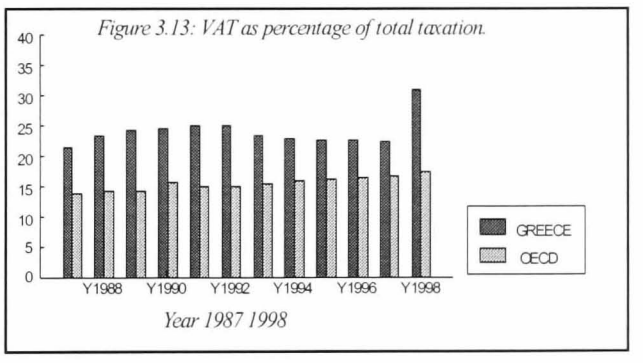
VAT accounts for around 46% (23.8% of total tax revenues) and excise duties 13.5% of the total indirect taxes over the period 1987-1998 (Table 3.2; Figure 3.12-3.15). Unlike many other countries, Greece raises a substantial part of its revenues in the form of indirect taxes other than VAT and excise duties (for example taxes on bank transactions, taxes on capital goods transactions represented 40.6% of total indirect taxation (6% of GDP) (Figure 3.16-3.17).

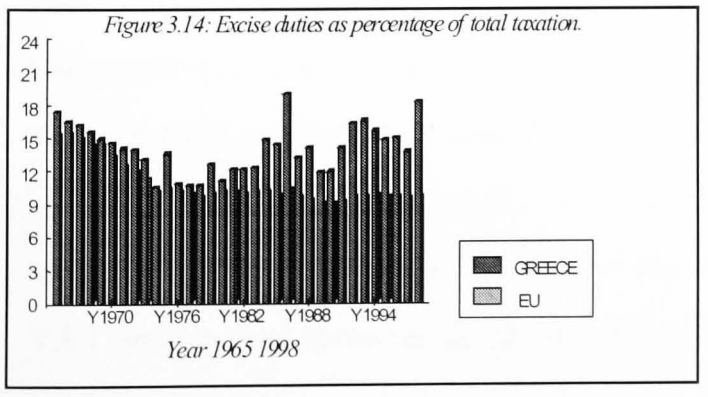
Table 3.3 VAT Revenues as percentage of GDP and Total Tax Revenues		
Year	*VAT as % of GDP*	*VAT as % of Total Tax Revenues*
1987	6.5	21.1
1988	6.5	23.2
1989	6.5	23.9
1990	7.3	24.5
1991	7.4	24.7
1992	7.6	24.6
1993	7.3	23.2
1994	7.2	22.7
1995	7.2	22.4
1996	7.2	23.7
1997	7.5	22.1
1998	7.6	30.7

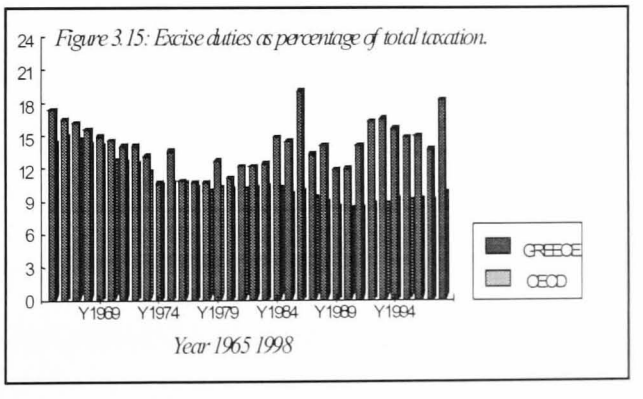
Source: OECD (Revenue Statistics, 2000 edition).

Figure 3.12-3.15: Plot of VAT revenues and Excise duties as percentage of total tax revenues in Greece, EU and OECD.



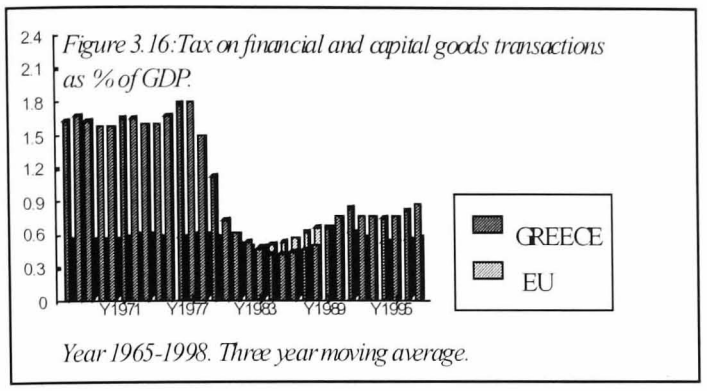


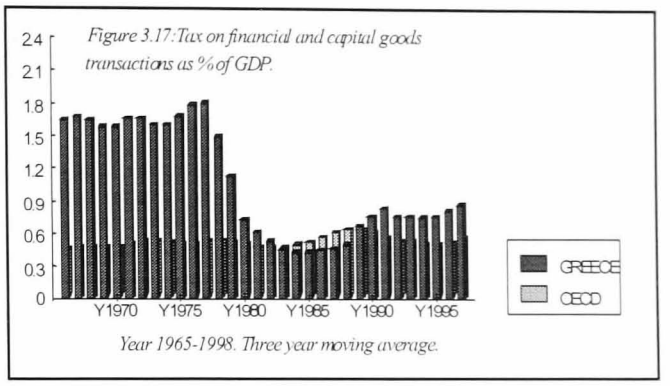




Data:OECD Revenue statistics, 2000 edition

Figure 3.16-3.17: Plot of financial and capital goods transactions tax in Greece, EU and OECD.





Data: OECD Revenue Statistics, 2000.

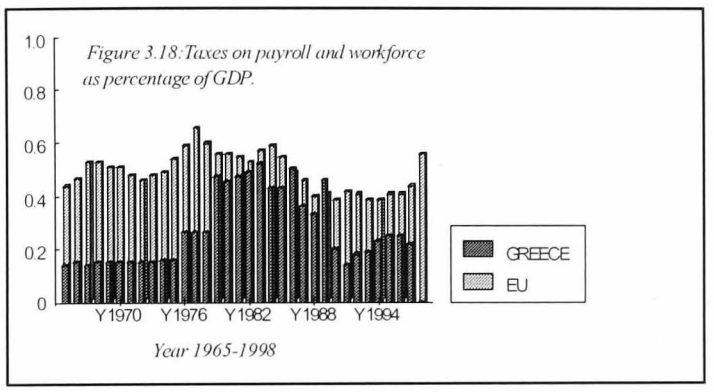
The Direct tax/GDP ratio in 1997 (7.7%) was around 5 percentage points below the Union average; it is the lowest in the Union. The most important Direct taxes are taxes on personal income raising around 66% of total direct taxes (1.7% of GDP in 1965, 7.7% in 1997). Central government receives by far the largest share of tax revenues in Greece. According to the estimates (Data: OECD Revenue Statistics) Central Government received during the period 1965-1998 almost 70% of total taxation, social security funds around 30% and local Government only 1%.

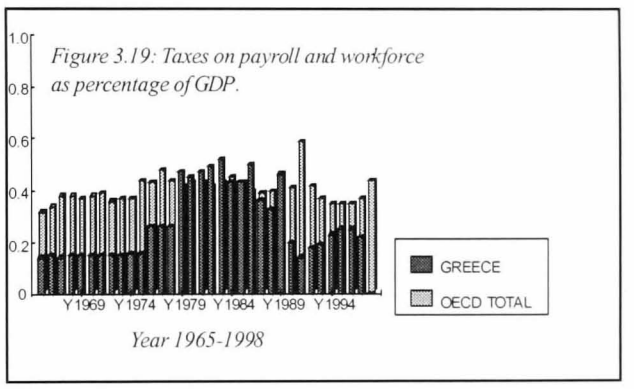
3.5 The evolution of the functional structure of taxation in 1990's

The overall tax level increased from 29.7% of GDP to 33.8% over the period 1990-1997, with no more major peaks but a relatively steady growth rate of around half of percentage point per year. The share of taxes on consumption in GDP was quite stable during this period (from 9.8% in 1990 to 9.5% in 1997) which was in general around two percentage points above the EU average (Data: OECD "Revenue statistics", 2000). Because of the comparatively low overall level of taxation however, this GDP share corresponded to a share in total taxation that was above the European Union average (26.5% in 1990, 23.3% in 1997) and the highest in EU. Taxation of consumption accounted for 17.2% of total taxation in 1985. It peaked in 1987-1988 due to the major increases in Revenues from VAT and general turnover taxes. Hereafter, the share stabilised to a level of around 24% of total taxation.

Taxation on labour-employed[23] was among the lowest in EU and OECD, even after the inclusion of social security contributions in the accounts from 1989 and onwards (Figure 3.18-3.19). Taxes on labour accounted for slightly less than 4% of GDP during the period 1985-1989. This share increased to 12% in 1989 stabilised at that level, until it increased again to 13.6% in 1993. The share on taxes on labour in total taxation was around 42% in the period 1989-1991, decreased in 1992 and increased again in 1993 to around 44% approaching the European Union average but still below it.

Figure 3.18-3.19: Plot of taxes on labour in Greece, EU and OECD.





Data: OECD Revenue Statistics, 2000.

Finally in 1990's in a number of countries attention is given to the possibilities of using tax instruments in environmental policy formulation.[24] Environmental taxation in Greece consists mainly of the motor vehicle duty and the car registration fee. Environmental taxes raised around 0.5% of GDP in 1988-1990 increased slightly in 1991 to decrease thereafter and stabilise at 0.4% (0,7% the EU average) after 1995.

The taxation of energy[25] in Greece in 1990's consisted of a tax on petroleum, petroleum products, lubricants and gas (excise taxes). Its trend over time could suggest some strong fluctuations, but in general the share of GDP seems to be slightly below the European Union average (4,6% comparing to 5.1% in EU).

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[23] Structures of the taxation systems in the European Union 1970-1996 Eurostat and DG XXI (EC, 1998) and OECD Revenue Statistics, 2000.
[24] OECD, Consumption Tax Trends, 1999 edition.
[25] Structures of the taxation systems in the European Union 1970-1996 Eurostat and DG XXI (EC, 1998).

3.6 Recent Fiscal Developments

Generally speaking Greece has made a significant progress in correcting fiscal imbalances in recent years. Having peaked at 13.8% of GDP in 1993, the general government deficit fell to 3.1% in 1998. The debt ratio peaked at 111.3% of GDP in 1996 and decreased by almost 6 percentage points in the two subsequent years to 105,4% of GDP in 1998[26]. Despite a temporary deceleration in real output growth, the general government deficit was reduced to 1.6% of GDP in 1999 while the debt ratio continued to decline for a third consecutive year. The improvement in the budgetary position in 1999 was mostly the result of budget revenues while the decline in debt servicing costs was partly offset by general government investment. The primary surplus reached 5.8% of GDP, the highest level ever achieved in the consolidation phase. **Indirect taxes and taxes on capital transactions were the main contributors, reflecting further progress achieved in combating tax evasion and strong activity in the Athens Stock Exchange.** Furthermore, social contributions increased significantly, implying the effectiveness of the 1998/99 first phase reform of the social security system. On the basis of these achievements, the Council abrogated its decision on the existence of an excessive deficit in Greece in November 1999 and accepted Greece in the final stage of the Monetary Union (June 2000).

The 1999 update of the Greek convergence programme restates the economic strategy with a view to the smooth entry of Greece into the Euro-zone. The programme projects the government balance to turn into a surplus of 0.2% of GDP in 2002, while the level of the government debt should fall to below 100% of GDP in 2001. This points to the need to tackle structural challenges if the debt ratio is to decline at a faster pace. On the revenue side, a reform of the tax system is on the agenda. The government-approved tax breaks totalling 165 billion drachmas for 2001 and 200 billion drachmas for 2002. As a result the ceiling for tax-exempted annual income in direct taxation rises to 2.4 million drachmas. The top income tax rate will be reduced from 45% to 42.5% for 2001 and 40% for 2002. Further this reform provides for the abolition of a multitude of low-yield taxes collected by the State on behalf of third party public agencies as well as the Special Banking Transactions Tax (EFTE), considered as significant burden on the cost of bank loans[27].

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[26] Public Finances in EMU-2000 (EU, ECFIN/339/00-24.5.2000)
[27] Greek Ministry of Finance, 2001 Budget.

3.7 Conclusions

In this chapter we examined the various defined (Direct and Indirect) taxes applied in Greece. The categories of taxes applied in Greece are in general similar to those applied in Spain and Portugal. However, it appears that their complex structure make the Greek tax system inefficient (i.e. Revenues raised/ Overall Tax burden) in comparison to other EU and OECD systems. Over the years, numerous tax changes have been implemented in a piecemeal fashion, leading to a complex and non-transparent tax system. As a result the tax system has performed poorly. However the introduction of VAT brought a major improvement to the tax system and successful steps in recent years to raise tax compliance have been reflected in strong revenue growth (OECD, 2001). On the other hand, the indirect taxes, which are many in numbers and are levied at numerous rates on variously "defined" bases (in some cases not in line with the EU legislation), dominate the overall tax system in Greece. However, we found that there are many similarities with Spain and Portugal regarding the categories of taxes applied. In addition as we have seen in EU no other State depends on the same extent as Greece on indirect taxation to finance its expenses. Unlike other EU countries, VAT in Greece has not the same dominant position in indirect taxation. In Greece are still in force multi-stage cumulative taxes (also known as "cascade" taxes) where tax is levied each time a transaction takes place without deduction for the tax paid on inputs (i.e. the special tax on banks' transactions, turnover tax on insurance companies). These taxes contribute to revenues (high-yield taxes) but at the same time they are inefficient from economic and administrative point of view. In general, the way of calculating the tax due (without deductions) gives rise to cumulative effects resulting in a spillover of these taxes into industrial costs and hence into exports and capital formation.

VAT in Greece has been applied within the framework of the sixth VAT Directive, following Greece's entry to EEC, concerning the taxable transactions, the exemptions provided or the calculation of the tax due (the tax-credit method of computation has been applied). However, the different structure of the Greek economy appears to be a strong factor explaining the multi-rate system and the different "special VAT regimes" applied. The large number of small businesses especially at the retail stage creates certain problems in the application of VAT which requires detailed record keeping and accounting procedures. This is the main reason for the existence of the special regime for small

businesses. Also the dominant role of the agricultural and touristic sectors in the Greek economy explains the different arrangements applied for farmers and travel agents.

Finally despite the above-mentioned problems in the tax structure of the tax system, Greece has made a significant progress in correcting fiscal imbalances in recent years. However, the strategy for a smooth entry to Euro-zone and the consequences of the Economic and Monetary Union for the co-ordination of Tax Systems in EU indicates the need for further structural changes and reforms in the Greek tax system.

CHAPTER 4: METHODOLOGY AND DATA ANALYSIS.

4.1 Introduction

In the previous chapter we reviewed the theoretical and empirical research on the issues we examined concerning the VAT and the taxation of financial services. We found that that there are certain gaps in the literature which we shall attempt to fill. The paucity of empirical results may be attributed to the lack of attention paid by researchers to indirect taxation in a particular national context. A country case study represents an ideal means of bridging this knowledge gap, as it allows all the characteristics that are unique to each country to be taken into account. This chapter presents the methodological consideration to be taken into account when studying the indirect taxation of financial services. Methodology for a study specifies what information is to be gathered, from where and what methods of data collection and analysis are to be employed. Subsequently, the selection and development of the research instruments will be considered and the methods of analysis and approaches employed by this study will be discussed.

4.2 Research focus and research questions

Before discussing the methodologies adopted in our research we would like to recall the objectives of our research. The basic aim, subsequent to a better understanding of the current system of taxing financial services, is to design new VAT structures including the financial services within the framework and in the light of the EU Member States experience. In particular our research methodology will serve to achieve the three main objectives/aims of this study, which are:

1. to identify the distortions arising from the existing system of financial exemptions in Greece and EU (through study of the Greek and EU VAT legislation) [*aim 1*]
2. to estimate the economic effects of taxing financial services under the Greek VAT system, including the estimation of the fiscal revenue loss of the current applied financial exemptions in Greece [*aim 2*]

3. to investigate the economic effects on total tax revenues, expenditures and growth of the existing indirect financial taxes [*aim 3*].

Our research will focus on the case of Greece (special reference) but we will compare and evaluate our results with those derived for selected EU countries (Spain and Portugal). The special features of its indirect taxation of financial services motivate the choice of Greece. Specifically, as we have seen in the previous chapter, Greece continues to apply cascade indirect taxes on banking services and a turnover tax on insurance services. In addition the whole tax system in Greece is dominated by indirect taxes other than VAT. During the period 1965-1998, for which data are available, indirect taxes are the most important category constituting for the whole period 47% of total taxation (14.8% of GDP). No other EU State depends to the same extent on indirect taxation to finance its expenses. Moreover the tax system in Greece seems to be rather complicated and inefficient. The level of aggregate taxation in Greece for the period 1965-1998 was 25.7% of GDP, quite below the international (OECD) and European (EU) standards. It is also recognised that any future tax reform of the Greek tax system should cover a broad range of measures that aim, among others, to broaden the tax base (i.e. abolishing of exemptions) (OECD, 2001). Furthermore, despite the overwhelming importance of indirect taxes (including the indirect financial taxes) in total Greek revenue, there are very few systematic up-to-date studies available. These studies are either outdated (Karageorgas, 1973; Provopulos, 1979) or fragmentary (Georgakopoulos, 1989; Andrikopoulos, Brox and Georgakopoulos, 1992; Alogoskoufis, Misoulis and Karavitis, 1996). Finally, none of the aforesaid studies is investigating two important categories of indirect taxes; taxes that fall only on final consumption through the deduction of input tax (i.e. consumption taxes) and taxes that may fall on intermediate and investment goods (indirect financial taxes).

As we have already mentioned in our literature survey, the unique characteristics of financial services make it difficult to apply the VAT to them under the credit invoice (Consumption type) system. We discussed several problems arising from the taxation of financial services (the feasibility of taxation, the cascade problem, the efficiency of financial sector, the indirect financial taxes etc.) identifying several gaps especially on the economic effects of tax (VAT and indirect financial taxes). We show that in most theoretical and empirical studies VAT remaining on intermediate goods (especially in

financial sectors) is simply neglected and nothing has been said about the economic effects of this part of VAT. On the aforesaid basis and taking into account the fact that the overall tax system of financial services in Greece is biased towards indirect taxation (as we show in our previous chapter about the VAT system in the Greek tax structure, the current system of taxing financial services is dominated by the application of indirect cascade financial taxes) we form the general hypothesis that a VAT substitution in the sense of replacing the existing taxes on financial institutions would be feasible and economically effective for the Greek economy and financial sector as well.

The underlying empirically testable hypotheses are: (a) financial services are a key determinant of VAT base, thus a wider VAT base including financial services gives higher revenues or larger VAT revenue-to-GDP-ratio; theoretical contributions: Tait, (1988, 1990); Gillis, (1987); Bogetic and Hassan, (1993) (b) the inclusion of financial services in VAT base gives less embedded/blocked VAT on investment and capital goods (Tamaoka, 1994) and (c) the "cascade" indirect financial taxes have economic implications through the taxation of the intermediate and investment goods; Optimal commodity tax theory: Bovenmberg, (1987); Gottfried and Wiegard, (1991) etc.

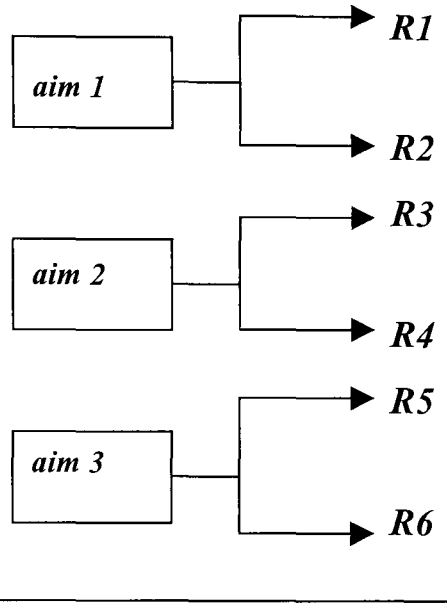
The information/data derived will be used to answer the following research questions, linked to our main research aims and hypotheses:

- what are the main differences among the Greek and other EU systems of taxing financial services? ***(R1)***
- what is the potential for competitive distortions for the Greek financial institutions of the current system of taxing financial services? ***(R2)***
- are financial services significant for the VAT base? (Yield from Taxation, estimation of the impact on VAT revenues, assessing the economic effects and efficiency) ***(R3)***
- what empirical relationship exists, first on VAT revenues/GDP, VAT base and VAT rates and second on consumption, indirect financial taxes and national income? ***(R4)***
- how changes in consumption taxes (i.e. taxes that only fall on final consumption) and "cascade" indirect financial taxes (i.e. taxes that might fall on intermediate and investment goods) affect the whole fiscal structure? (effects of consumption and indirect financial taxes on total tax rate and expenditures) ***(R5)*** and

- lastly, what is the impact of the existing consumption and indirect financial taxes on growth ? ***(R6)***

As we can see from figure 4.1, research questions ***R1***, ***R2*** are linked to the first aim; research questions ***R3*** and ***R4*** are linked to the second aim; and research questions ***R5***, ***R6*** are linked to the third aim.

Figure 4.1: Research aims and questions.



4.3 Methodology and Research Design

Our study is in fact an analytical and applied economic policy research. Thus, the research is essentially desk-based and quantitative. Secondary data and information are employed in studying in depth the relevant legislation applied in EU Member States to establish a full comparative evaluation of the current indirect tax systems applied to tax financial services in Greece and other EU Member States by:

- identifying the main differences between the Greek system and other National systems
- identifying the major distortions within and across those systems (Research questions ***R1*** and ***R2***).

At this point we chose to include in our analysis all the EU Member States because in our opinion this will give us a complete overview of the tax treatment of financial services in Greece and EU facilitating our comparisons. In addition the availability of data for all EU Member States and the harmonisation of VAT system in EU will facilitate our efforts to identify important differences in the tax treatment of financial services. The main areas for

study here are the scope and liability of taxation on financial services, the recovery of input VAT incurred by financial institutions, and the taxation of insurance services. This study will provide us with more information needed for the generalisability criteria of our research (external validity). With this qualitative analysis, the basic structural elements of the VAT treatment of financial services are identified and for each Member State the approach adopted by that Member State to tax financial services is briefly explained. It is therefore possible to classify the different approaches for each structural element (categories of financial services) and identify groups of Member States who use a similar approach i.e. to apply the same or similar VAT treatment for particular elements (categories of financial services). Groups or individual Member States who apply different treatment outside the "average" can also be identified. This qualitative analysis does not attempt to identify which approach to a specific category of financial service is the "best". Each Member State has established its rules with the aims of constituting a coherent tax system to meet its particular need to tax financial services.

Then the research will continue by quantifying the revenues that could be raised in Greece from the exempted financial services and by estimating the revenue yield if such services were taxable. This quantitative analysis allows us to measure the effect of the particular tax measure. Our aim in this part of our research is to estimate the fiscal revenue loss of VAT exemptions in financial sectors in Greece (including insurance services) over the period 1987-1998 (Greece introduced VAT in 1987) (Research question ***R3***).

At this stage an input-output table method based on National Current Account Inputs and National Capital Account Inputs will be used for the first time in Greece. This will help us to identify the value added by the financial sector, and after the calculation of the weighted average VAT rate (AWVR) to estimate the yield from exemption/taxation. This approach (National accounts approach) is well known in the VAT literature and was adopted, as we have seen in our literature review, by other researchers in the field of indirect taxation as well (i.e. Aguirre and Shome, 1981; Mackenzie, 1991; Jack, 1996; Kodrzycki, 1998; Tesche, 1998). The starting point for the calculations in this method is the most recent annual measure of nominal gross domestic product (GDP), where the study is measuring the whole VAT base, or the output of the sector (estimated from National accounts), where

the study is measuring the VAT base for the sector. Then three main categories of adjustments are made as follows:

- adjustments to produce the Consumption VAT base for the economy or for the sector
- adjustments for exemptions
- adjustments for the reduced VAT rates

The first set of adjustments is definitional. These are adjustments to produce the consumption VAT base (for example imports must be added to and exports subtracted from GDP, or the gross fixed investment must be subtracted from sector's output etc.). The second set of adjustments concerns exemptions. The VAT may exclude consumer purchases from exempt industries (education, professional services, health care etc.). The VAT may also exclude consumer purchases from business below the VAT threshold, such as small farms and self-employed providers of services. Finally the third set of adjustments account for reduced rates of tax on some goods and services consumed domestically. In general, although input-output tables are unlikely to be up-to-date, they can provide a guide to the purchases of inputs by exempt industries (i.e. financial institutions) relative to the importance of final sales of these items to consumers. The National accounts data refer to the final expenditure of the economy; they are therefore the appropriate ones since VAT is closely related to the taxation of final expenditure on goods and services. Furthermore, although this method does not capture general equilibrium effects, it allows analysis of the effects of the financial sector's taxation in a simple spreadsheet model. However, this method can only be used for forecasting as long as there is no change in tax rates or goods (services) affected since it calculates the economy wide average VAT rate. In addition, in applying the method to financial sector the split of value added between depositors and deptors is ad hoc and not based on economic factors.

An alternative approach is the one developed by Genser and Winker (1997) to examine the issue of VAT exemption of banking services in Germany. This approach is based on the use of disaggregated data and identification of value added on a transaction by transaction basis. In their study they estimated the size of the fiscal revenue loss due to the current VAT exemption of commercial banking in Germany. They used a balance sheet approach for the calculation of value-added in margin services based on the introduction of a

benchmark interest rate which economically reflects the marginal cost of financial funds and allows for assigning bank services to debtors and depositors. Using this approach it was possible to approximate the fiscal revenue loss due to VAT exemption based on aggregate bank balance sheet and interest rate data. As we mentioned in the literature study, the numerical results indicated a net revenue loss of exempting bank services in Germany around 4% of the VAT revenues for the year 1994. Although this method is expressed in detail and seems rather sophisticated allowing a series of sensitivity analyses with regard to changes of the underlying assumptions, unfortunately is not well suited, in our opinion, for our purpose. This method clearly considers only deposit and loan services and disregards other banking activities. In addition it does not calculate the overall VAT base for the financial sector including insurance services. Furthermore the above mentioned method is based on desegregated bank data and on the introduction of a benchmark interest rate in order to improve the estimates for the fiscal effects and to study the issue of implementing a regular VAT on banking services in more detail, which unfortunately are not available from the official published bank statistics in Greece.

In addition to test the significance of the financial exemptions in Greece and to investigate what empirical relationship is emerging from the existing time-series data on VAT revenues, VAT base, and VAT rates we will use an econometric model (using regression techniques) relating the above variables. This model will help us also to make comparisons, at a later stage, with Spain and Portugal. Our aim here is to investigate the strength of the relationship between the VAT base (i.e. exemptions) and VAT revenues' performance (VAT revenues/GDP) in each country (Research question ***R4***).

Moreover in our research we will try to gain a better understanding of the existing indirect financial taxes in Greece by estimating the elasticities of these taxes on National Income and comparing the results with those for VAT, consumption taxes and total tax revenues. In tax literature the income elasticities of taxes are frequently used as an indicator of short-run variability and long run growth (Sobel and Holcombe, 1996). Our aim in this part of our research is to examine the variability of different taxes (indirect financial taxes, VAT, Consumption taxes) in relation to changes of Net National Income. The estimation will cover the period 1965-1998 (for financial and Consumption taxes) and 1987-1998 (for VAT). For the estimations we will use regression techniques and a simple log-linear model

relating the different tax revenues to Net National Income. At a later stage following the same methodology we compare the above mentioned results with those derived for Spain and Portugal. These two countries were selected for a comparative evaluation due to the similarities in indirect tax system which makes the comparisons feasible. Both countries introduced VAT during the same period as Greece (1986) and apply indirect financial taxes in a uniform way. Here we enrich our results by estimating the average effective tax rates on consumption as well. This numerical analysis relates realised tax revenues (e.g. from consumption and indirect financial taxes) directly to the relevant macroeconomic variables in National Accounts. Following Mendoza, (1994) and OECD, (2000a) we calculated the average effective rate on consumption (t_c) for Greece, Spain and Portugal over the period 1965-1998 based on the following formula:

$$t_c = \frac{General\ Consumption\ taxes\ +\ Excises}{Private\ Consumption + Public\ Consumption}$$

In our calculations using the above formula we consider some methodological issues concerning the inclusion of indirect taxes on investment on the numerator (a detailed explanation of this analysis is following in the relevant chapter including the estimations). Here we calculate also the average effective rate on consumption attributed to the existing indirect financial taxes in three countries. (Research question ***R4***).

The next step is to examine the effects of consumption and indirect financial taxes on fiscal structure (i.e. revenues and expenditures) in Greece, Spain and Portugal using annual data over the period 1965-1999. This shall be done by using cointegration techniques and testing the model for parameter instability in the cointegration relationship between the variables, due to structural breaks around times of unusual events. Our concern here is the time series analysis of the variables of interest (i.e. total tax rate/expenditures, consumption and financial taxes). Here we wish to examine the long run relationship between the variables and how they interact in a system. Therefore we need to utilise a methodology which accounts for these dynamics and provides results concerning the long run. We feel that the most appropriate methodology is to test, as we mentioned above, for cointegration between the variables. The notion of cointegration refers to the case where two or more variables move together over time and the difference between them is stable

over time. This methodology will give us an insight into the relationship of each of the variables with other and how they behave as a system. In the present analysis this methodology is particular relevant because we wish to establish not only how these variables relate, but also which of the variables are endogenous. In this present analysis we will use the Johansen (1988) and Johansen, Juselius (1992) cointegration methodology which involves several steps. The Johansen methodology is rather complicated and by now well has known in the academic literature (a brief overview of it will follow in the empirical chapter) (Research question ***R5***).

The final step will be to consider the time series properties of growth and indirect financial taxes in Greece, Spain and Portugal. Our aim at this part of the present analysis will be to test whether changes in indirect financial taxes permanently affect growth and its components (e.g. investment and labour force) (short-run and long run effects of financial taxes on growth). Endogeneity of the relevant variables here is an important issue because we expect the tax system and the relevant revenues to cause economic growth and vice-versa. At this stage we will use the same methodology (cointegration) as mentioned above using data over the 1965-1999 period. This will help us to understand the possible effects of a tax reform in the tax treatment of financial services in three countries, and to develop policies on the indirect taxation of financial services in the context of a comprehensive reform of the tax system in Greece (Research question ***R6***).

4.4 Data collection

Since we carry out a macroeconomic quantitative research we are mainly concerned with the collection and analysis of secondary data in numeric form. In addition we will also use secondary data in other forms such as books, journals, published and unpublished papers, reports, minutes of meetings, computer-based material and other governmental documents (e.g. legislation). In broad terms we use sources and statistics from government, private organisations, international institutions and "documentary and text analysis" for the non-numeric type of secondary data. But this documentary analysis will be in the form of literature review ("content analysis") rather than a specific analysis method.

The data needed for the legislative study has been collated from the following sources:

- Greek VAT legislation (Law Nr. 1642/86)

- EU VAT legislation (Sixth VAT Directive, 77/388/EEC)
- EU law data base (EUR-LEX, code 09.30.10 VAT)
- European Court of Justice's relevant decisions
- EU VAT Committee
- OECD (Consumption Tax Group)
- London Underwriting Centre (LIRMA) for the taxation of insurance services.

The main data source for the estimation of the impact (economic effect) of taxing financial services on VAT revenues and GDP, is the National Accounts Input-Output Tables (Greece's National Statistic Service) over the period 1987-1998 (time-series/annual data). We would like to mention here that in Greece the National Accounts shows VAT exclusive figures in input-output tables and holds the corresponding VAT information behind each figure (capital purchases from the financial sector, Intermediate consumption etc.). Furthermore, the additional data needed for the estimation of VAT indicators such as the average weighted VAT rate (AWVR) and the recovery rates in Greece will be taken from the Greek Fiscal Authorities (Greek Ministry of Finance and National Statistical Service). These data are necessary for the estimation of the revenues collected by denying the recovery of input tax in respect of currently exempt financial services and instruments and finally for the estimation of the revenues taxing these services would collect that.

Finally, in our econometric analysis, we will use time-series data from OECD ("Revenue statistics", 2000 edition in disc format) concerning VAT revenues, consumption taxes, total tax revenues, indirect financial taxes and GDP for Greece, Spain and Portugal over the period 1965-1998. Lastly from IMF ("International Financial statistics, Yearbook" 2001 edition) we use time series data, over the same period of estimation, on total consumption, expenditures, Net National Income, and gross fixed capital formation. Data on active labour force are taken from International Labour Organisation (ILO/Laborsta database). The variables are in billion of National currencies and are expressed in real prices (at 1995 prices). The variable representing the labour force is expressed in thousands of employees.

4.5 Data analysis

First in our legislative study to facilitate our analysis and comparisons we will look at twenty main categories of financial services (banking and insurance) and two categories of activities auxiliary to financial intermediation (professional and advisory services). It means that the VAT assessments (i.e. status of taxation for each category of financial service) will be given under the Greek VAT legislation and under the other Member States' legislation as well. In the light of the definitions provided by the Sixth VAT Directive (77/388/EEC) and GATS/WTO/FSA Annex on financial services, the above mentioned list is not exhaustive. However, in our opinion it covers the majority of the different financial services provided by the financial institutions. The information or data collected from the legislative study will be analysed manually in order to serve the research aims (identification of differences and similarities in legislation between Greece and EU Member States, identification of distortions etc.).

Our data analysis needed to construct the input-output tables will start with production data from the National accounts which we will modify as necessary to get the VAT base and VAT revenues with the application of the average weighted VAT rate (AWVR), in the hypothetical case of taxing the financial services under the VAT system in Greece. A detailed analysis of this methodology will follow in the chapter on the impact of taxing financial services on VAT revenues. This analysis will be performed in a simple spread sheet framework.

Finally in our econometric analysis we will estimate linear versions, using the Ordinary Least Squares (OLS) techniques relating the relevant variables of interest (time series data, estimation period 1987-1998 and 1965-1998) to estimate the elasticities of different taxes on Net National Income, in order to examine the variability of each tax (VAT, indirect financial taxes etc.). Then we shall continue searching for long run relationships and comparisons with other countries (Spain and Portugal) by using, as we explained before, multivariate techniques for the period 1965-1998 (cointegration, Johansen procedures), trying to identify differences in consumption tax systems (i.e. differences between consumption taxes, thus taxes that fall only on final consumption, and indirect financial taxes, thus taxes that may fall on intermediate and investment goods). Finally, using the same methodology, we will examine the relation of growth and indirect financial taxes by

testing for causality (i.e. possible direction of causality) and by examining the long run effects of the existing indirect financial taxes on the growth variable and its components. For the above-mentioned econometric analysis the Microfit 4.0 software will be used. Finally the following Figure 4.2 describes the research process developed in this thesis and table 4.1 details the customised research design for meeting the objectives of this study.

Figure 4.2: Overview of Research process

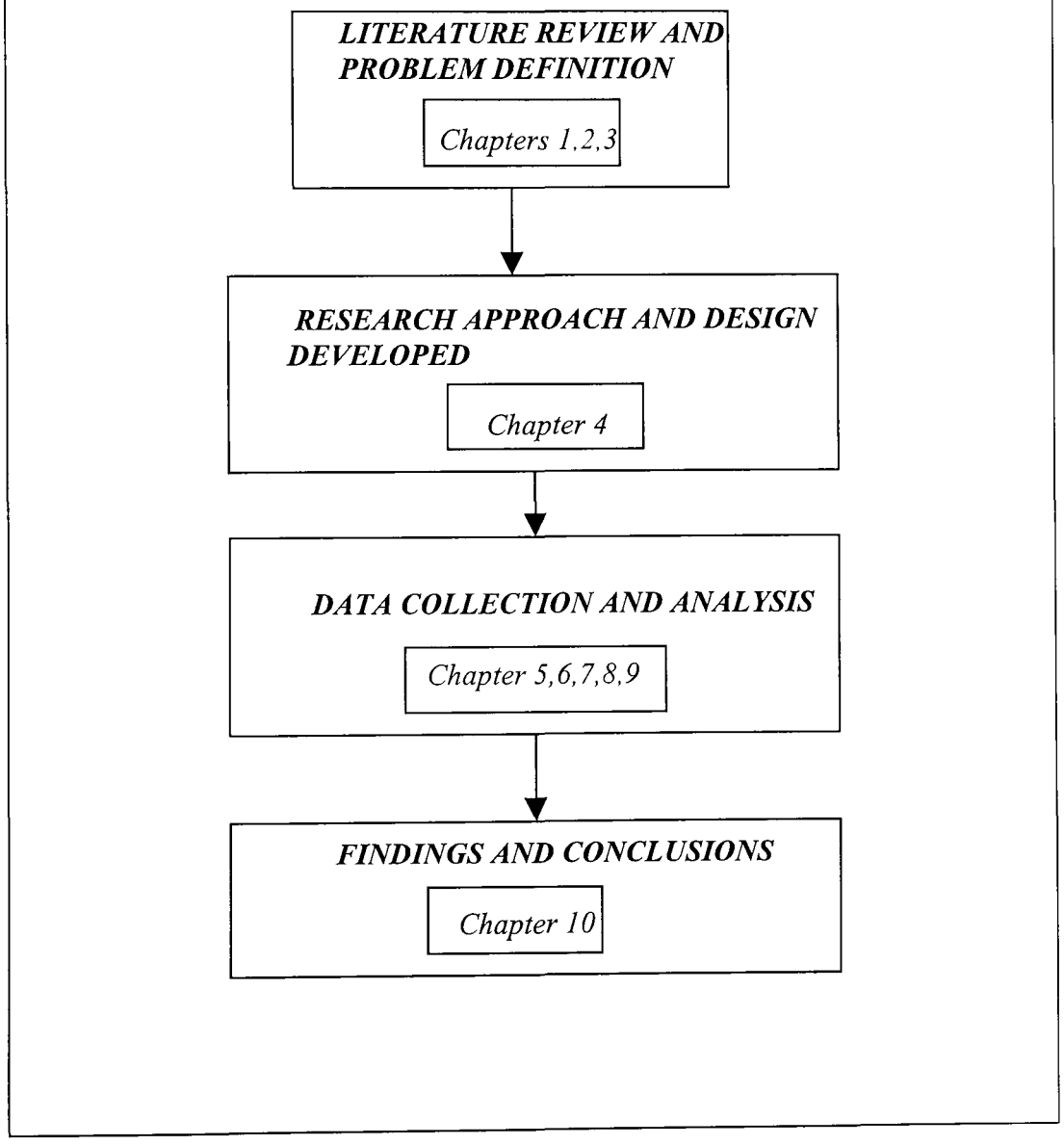


Table 4.1. Customized Research design: Methodology and Data production			
Research questions	***Methodology***	***Data***	***Data analysis***
1. What are the main differences between the Greek and other EU systems of taxing financial services? ***(R1)***	Comparative legislative study.	Greek VAT law, Sixth VAT Directive, National legislation, EU data base (EUR-LEX-code 09.30.10 VAT), European Court of Justice (ECJ) relevant decisions, EU VAT Committee OECD (Consumption Tax Group).	VAT status in Greece and other 14 EU Member States, of twenty two categories of financial services. Indirect tax (other than VAT) treatment of insurance services.
2. What are the major distortions within and across those systems? ***(R2)***	Comparative legislative study.	The same as in the above question.	Based on the above analysis.
3. What is the impact of financial exemptions on VAT base? Does wider VAT base including financial services give higher VAT revenues? ***(R3) (a)***	Input-output table (National accounts approach).	National accounts, Greece's own resources statement, time series data from OECD (Revenue statistics) and IMF (International Financial Statistics Yearbook).	Modification of production data, to estimate the VAT base of financial sector in Greece. Application of the Average Weighted VAT Rate to estimate the yield from taxation. Estimation period 1989-1998.
4. Does the inclusion of financial services in VAT system, give less embedded/blocked VAT on financial institutions inputs? ***(R3) (b)***	Input-output table (National accounts approach).	The same as in question 3.	Estimation of the inputs of financial institutions in Greece.
5. What empirical relationship is emerging from the existing data on VAT revenues (VAT rates, base) and other taxes i.e. Consumption and indirect financial taxes, comparisons between Greece, Spain and Portugal)? ***(R4)***	Estimation of the elasticity of tax on National Income. Econometrics. Estimation of the average effective rates on consumption.	Time series Data (OECD, IMF).	Ordinary Least Squares Technique (OLS). Period of estimation 1986-1998 and 1965-1998 (comparisons).

Table 4.1. Customized Research design: Methodology and Data production (Continued)			
Research questions	***Methodology***	***Data***	***Data analysis***
6.How do changes in consumption and "cascade" indirect taxes affect the fiscal structure in Greece? (comparisons with Spain and Portugal). ***(R5)***	Econometrics.	Time series Data (OECD, IMF).	Application of cointegration techniques. Johansen (1988) and Johansen, Juselius (1990). Testing for structural breaks and comparisons. Estimation period 1965-1999.
7.What is the impact of the existing indirect "cascade" taxes on growth in Greece. Comparisons with Spain and Portugal. ***(R6)***	Econometrics.	Time series Data (OECD, IMF, ILO).	Application of cointegration techniques. Johansen (1988) and Johansen, Juselius (1990). Testing for causality (strength and direction), comparisons. Estimation period 1965-1999.

4.6 Concluding remarks

This chapter provided a depiction of the research design and processes used to analyse, and interpret the data that were collected. The research process phases in this thesis beginning with problem formulation, theoretical underpinnings, research methodology, data collection and analysis were detailed. The research methodology employed in this study appeared appropriate because it helped to state and to answer the research questions.

In our opinion in order to deal with the problem of methodology in our study we have to look at it in the context of the European integration in the field of indirect taxation. If this is the case the need for an open methodology, which can readily absorb new factors and elements and maintains an interdisciplinary outlook appears to be relevant to the research aims. For this, an in depth study of the relevant legislation applied in the 15 EU Member States seems appropriate. In addition, because of the nature of our research which is in fact secondary analytical and applied economic policy research, more contextual and diagnostic, our first concern will be the time-series analysis of the variables of interest. Consequently the application mainly of econometric methods in parallel with an input-output method (National account approach) seems to us straightforward. Finally, the comparisons of the results for Greece with those derived for other selected EU Member States (Spain and Portugal) will reinforce our conclusions and the validity of the study on the tax treatment of financial services, in order to develop policies on the indirect taxation of financial services.

CHAPTER 5: COMPARATIVE TREATMENT OF FINANCIAL SERVICES UNDER INDIRECT TAXATION IN GREECE AND IN THE OTHER EU MEMBER STATES.

5.1 Introduction

In this chapter we evaluate the current indirect tax system used to tax a wide range of financial services in Greece, and compare it with those used in other Member States (including Spain and Portugal) by:

- identifying the main differences between the Greek and other EU systems [*Research question **R1***, Table 4.1 p.100], and
- identifying the major distortions within and across those systems [*Research question **R2***, Table 4.1 p.100].

This will enable us to identify the VAT status of financial services, which Greece and other Member States provide. Every effort has been made to make this chapter as up to date as possible (2000).

The indirect taxation of financial services is a complex and technically difficult subject, both in terms of the products themselves and the context in which wholly financial transactions are undertaken. Historically, many financial services have been exempted from consumption taxes. As we discussed in literature review, the reasons for this are both theoretical and pragmatic. Whilst on a practical level it has often proved difficult, it is not impossible to establish the tax base for certain intermediation services. A study of this subject is in our opinion likely to meet with difficulties in obtaining consistent and reliable information for all EU Member States. For this reason, we focus our study on the scope and liability of taxation in the area of financial services where comparable and reliable data are available from the National and the EU legislation. In this chapter we go some way forward by identifying the main differences between Greece's system and other EU Member States' systems in those areas which were selected for research. These areas are the scope and liability of taxation on financial services and instruments (what is subject to VAT and what is exempted), the recovery of input VAT incurred by financial institutions

and finally the taxation of insurance services which is an issue which has been neglected so far from all the latest studies as we mentioned in our literature review.

5.2 Data and methodology

The Data contained in this chapter has been collated from the following sources:

- The Greek VAT law Nr. 1642/86, "On implementing Value added tax (VAT) and other provisions" and Law Nr 2859/2000(the new complete consolidated version of the VAT legislation-VAT code)
- The Sixth VAT Directive 77/388/EC, of 17 May 1977, "On the harmonisation of the laws of the Member States relations to turnover taxes-common system of value added tax: uniform basis of assessment", Official journal L 145, 13/06/1977
- The EU law data base EUR-LEX, under "community legislation in force" code-09 taxation, code 09.30 indirect taxation, code 09.30.10 VAT
- European Commission, "Inventory of taxes", 2000
- The European Court of Justice relevant decisions (ECJ)
- The European Commission's "VAT committee" (National legislation and changes, Inventory of taxes)
- The OECD's "Consumption tax group", mainly information about the recoverable VAT on inputs by financial institutions and tax treatment of different financial services
- The London Underwriting Centre (LIRMA, data on indirect tax treatment, other than VAT, of insurance services).

To identify the differences in tax treatment of financial services we will start to study the Greek VAT law by identifying the relevant provisions. Having examined in this way the current system of taxing financial services in Greece, we shall continue with the EU legislation (sixth VAT directive) and finally we will compare, where appropriate, the VAT treatment of financial services in Greece with other systems applied in EU Member States. To facilitate our comparisons we looked at twenty main categories of financial services (banking and insurance) and two categories of activities auxiliary to financial intermediation (professional and advisory services). It means that the VAT assessments (i.e. status of taxation for each financial service) are given under the Greek VAT legislation and under the other Member States' legislation as well. We would like to

mention here that we have chosen the above-mentioned definitions and categories of financial services because all the businesses covered by this chapter provide, or are in one way or another involved in finance and insurance. Most of what they do is directly related to money and insurance contracts. At its simplest, this will mean dealings in money or its equivalent (including foreign exchange) and the provision of credit i.e. lending. It also extends to providing current account facilities, letters of credit and other more specialist types of finance and insurance, including hire-purchase or instalment credit finance, debt factoring, loss adjustment services etc. More permanent or long-term finance may involve securities, such as shares or loan stock, derivatives etc. However, by no means all-financial services have this direct link with money. There is also a wide range of associated services and facilities to which the monetary link is peripheral, i.e. investment or other financial advise, professional services, underwriting of the issue of securities etc.

In addition, in our comparisons the following definitions have been used:

- Ex, exempt from the tax with no right to deduct the input tax. This income is included in the calculation to establish the recovery of VAT on general expenditure (pro-rata mechanism)
- S/R, standard rated, i.e. subject to Greek VAT at 18%
- O/S, outside the scope of VAT, without credit for related input tax. This income is not included in the calculation to establish the recovery of VAT on general expenditure
- Ex/R, exempt from VAT but with credit for related input tax. Here we include the zero-rated financial services as well (technically taxable but at 0% with a right for deduction of the input tax).

Finally by using data from the London Underwriting Centre (sourced in part from the Comite Europeen des Assurances, and up dated year 2000) and from the European Commission, Inventory of Taxes, 2000), we have examined the indirect taxation on insurance services (contracts) in Greece and other EU Member States, filling in our opinion an important gap in the existing literature. Although there is literature on the appropriate treatment of insurance services under corporate and personal taxes (see for example Aaron, 1983), little attention has been given to the question of its treatment under indirect taxes.

5.3 The current applied VAT legislation on financial services in Greece

5.3.1 The financial exemptions in Greece

According to the Greek VAT Law (Nr.1642/86, article 18[28] (1), k, ka, kb, kc, kd, ke, kf) the following financial transactions are exempted from VAT:

- insurance and reinsurance transactions including related services performed by insurance brokers and insurance agents (k)
- transactions, including negotiation, concerning currency, bank notes and coins used as legal tender with the exception of coins and bank notes for collectors (ka)
- transactions, including negotiations, except safekeeping and management in shares of S.A companies, interests of companies, bonds and other securities, excluding documents establishing title to goods (kb)
- management of the joint funds provided for the provisions of the Law 608/1970 (Gov. Gaz. 170) (kc)
- the granting and the negotiation and the management of credit by the person granting it (kd)
- dealing in bonds, personal or financial guarantees and other securities negotiation and dealing in these transactions and the management of credit guarantees by the person granting the credit (ke)
- transactions, including negotiation, concerning deposit and current accounts, payments, transfers of deposits and remittances, debts, securities for credit, cheques and other negotiable instruments but excluding the collection of third party debts. Also the transactions concerning factoring agencies involved in this sector (kf).

5.3.2 The right for deductions, article 23[29] of the Greek VAT Law (Nr. 1642/86)

The taxable person is entitled to deduct from the tax which corresponds to the transactions carried out by him in supplying goods and services and intra-community acquisitions of goods, the tax charged on the supply of goods and services made to him and on importation of goods effected by him, as well as the tax due in respect of intra-community acquisitions of goods, effected by him. In the case of supplying investment goods, the right to deduct the tax is exercised definitively at the time when the goods are first used. This deduction is granted in so far as the goods and services are utilised in carrying out

[28] Art.22 (jl, k, ka, kb, kc, kd, ke) in the new version of the VAT legislation/VAT code, Law Nr 2859 2000.

transactions subject to the tax. The right to deduct the tax is also granted to the taxable person in so far as the goods and services are used for the transactions exempted under article 18 (1), (k, ka, kb, kd, ke and kf) namely banking services, when the customer is established outside the European Union or when these transactions are directly linked with goods being exported to a country outside the European Union article 23[30] (2)(d) of the VAT Law, Nr 1642/86.

5.3.3 The place of supply (taxation) of financial services

The place of supply of services according to the article 12[31] (1) of the Greek VAT Law is considered to be in Greece where at the time when the chargeable events occurs, the supplier has established his business or has a fixed establishment from which the service is supplied or, in the absence of such a place of business or fixed establishment, the place where he has the permanent address or usually resides. Exceptionally, the place of supply for banking, insurance, including reinsurance, and other financial transactions, with the exception of the hire of safes, is considered to be within the country, when supplied by persons identified in another Member State to taxable persons, established their business within the country. The same rule is applied where the above services are provided by persons established outside the community, to any customer identified for VAT purposes within the country (taxation within the country/Greece).

By way of derogation from the above mentioned, the place of the supply of services is considered to be outside the economy of the country, when the supplier, identified within the country supplies financial services (as mentioned in the above paragraph) rendered to a customer identified in another Member State or the Community Institutions or to every customer established outside the European Union.

5.4 The sixth council VAT directive-77/388/EEC

5.4.1 Article 13 B (d) 1-6

Generally speaking, the 6th VAT Directive does not identify value added to be the taxable event. Apart from importation, the taxable events are the supply of goods, the intra-

[29] art. 30 of the VAT code, Law Nr 2859/2000.
[30] art.30(2)(d) of the VAT code, Law Nr 2859/2000.
[31] art.14(1) of the VAT code, Law Nr 2859/2000.

community acquisitions and the supply of services rendered for consideration. According to the 6th VAT Directive (article 6) any transaction not subject to the legal definition of a supply of good constitutes a supply of service (taxable event). **This is a broad definition that ignores economic axioms. Regardless of whether there is a value added, financial activities constitute a service from a sixth Directive legal perspective.**

Analytically the above mentioned relevant article [13B(d) 1-6] states that the Member States shall exempt from VAT the following transactions under conditions which they shall lay down for the purpose of ensuring the correct and straightforward application of the exemptions and of preventing any possible evasion, avoidance or abuse:

- the granting and the negotiation of credit and the management of credit by the person granting it
- the negotiation of or any dealings in credit guarantees or any other security for money and the management of credit guarantees by the person who is granting the credit
- transactions, including negotiation, concerning deposit and current accounts, payments, transfers, debts, cheques and other negotiable instruments, but excluding debt collection and factoring
- transactions, including negotiation, concerning currency, bank notes and coins used as a legal tender, with the exception of "collectors' items". The "collectors' items" in this case are gold, silver or other metal coins or bank notes which are not normally used as legal tender or coins of numismatic interest
- transactions, including negotiation, excluding management and safekeeping, in shares, interests in companies or associations, debentures and other securities, excluding:
  -documents establishing title to goods,
  -the rights or securities referred to in article 5(3) of the same Directive, thus rights in *rem* giving the holder thereof a right of user over immovable property and shares or interests equivalent to shares giving the holder de jure or de facto rights of ownership or possession over immovable property.
- management of special investment funds as defined by Member States.

5.4.2 Article 13 B (a)

This article includes separately the legislation for the exemptions of insurance services. It states that Member States shall exempt the following under conditions which they shall lay down for the purpose of ensuring the correct and straightforward application of the exemptions and of preventing any possible evasion, avoidance or abuse:

- insurance and reinsurance transactions, including related services performed by insurance brokers and insurance agents.

5.4.3 Article 13 C. Option to tax

This article gives a right for option to the Member States to tax financial services under the VAT system. Actually it states that the Member States may allow taxpayers a right of option for taxation in cases of the transactions covered in article 13 B (d), mentioned above. These transactions as we can see are banking services. It does not cover the insurance and the reinsurance services.

5.4.4 The place of supply (taxation) of financial services. Article 9(2)(e)

Generally, according to article 9 the place where a service is supplied and taxed is considered to be the place where the supplier has established his business or has a fixed establishment from which the service is supplied or, in the absence of such a place a business or fixed establishment, the place where he has his permanent address or usually resides. However, the place where banking, financial and insurance transactions including reinsurance, with the exception of the hire of safes, are supplied when performed for customers established outside the European Union but not in the same country as the supplier, is considered to be the place where the customer has established his business or has a fixed establishment to which the service is supplied or, in the absence of such a place, the place where he has his permanent address or usually resides.

5.4.5 Origin and scope of the right to deduct. Article 17(1) (3) (c), and 19

Generally, the right to deduct arises at the time when the deductible tax becomes taxable. In so far as the goods and services are used for the purposes of his taxable transactions, the taxable person is entitled to deduct from the tax which is liable to pay (VAT paid within the territory of the country in respect of goods and services supplied or to be supplied to him by another taxable person, VAT paid in respect of imported goods etc.). Member

States can also grant to every taxable person the right to the deduction or refund of VAT in so far as the goods and services are used for any transactions which are exempt according to Article 13 (B) (d) (1) to (5) when the customer is established outside the European Union or when those transactions are directly linked with goods to be exported to a country outside the European Union. **These transactions include all the banking services but exclude the management of special investment funds as defined by the Member States.**

In addition as regards goods and services which are used by a taxable person (i.e. financial institutions) both for transactions which VAT is deductible and for transactions in respect for which VAT is not deductible, only such proportion of the VAT can be deductible as is attributable to the former transactions. This deductible proportion is made up of a fraction having:

- as numerator the total amount, exclusive of VAT, of turnover per year attributable to transactions in respect of which VAT is deductible
- as denominator, the total amount, exclusive of VAT, of turnover per year attributable to transactions included in the numerator and to transactions in respect of which VAT is not deductible (known as pro-rata mechanism).

The proportion is determined on an annual basis, fixed as a percentage and rounded up to a figure not exceeding the next unit. By way of derogation from the above mentioned arrangements from the calculation of the deductible proportion are excluded, amounts of turnover attributable to the supplies of capital goods used by the taxable person for the purposes of his business. Finally amounts of turnover attributable to banking transactions [article 13 (B) (d)] in so far these are incidental transactions, and to incidental real estate and/or other financial transactions are also excluded.

5.5 Indirect tax treatment of financial services in Greece and other Member States

Table 5.1 shows the different taxes applied on financial services in the EU Member States. It gives a general overview of the indirect taxes (other than VAT) and direct taxes applied. At this stage we prefer to include direct taxes as well, taking into account that the majority of these taxes although in many countries are classified under the code 4400 in the OECD classification of taxes, thus as direct taxes and presented as such in budget reports in

Member States, many include some elements of indirect taxes as well. As we can see from Table 5.1 it is common to apply direct taxes (with some elements of indirect taxes) on banking services than to apply only indirect taxes. This is an indication of the difficulties the tax administrations face in applying indirect taxes on banking services. In addition the application of indirect taxes on insurance services seems to be a common tax policy in EU Member States. Actually seven Member States do not apply any indirect tax on banking services although eight do apply "pure indirect taxes". In addition all Member States apply indirect taxes on insurance services, which appears as heavily taxed in EU. Direct taxes (with elements of indirect taxes) are applied in almost all Member States. Only Spain does not apply any form of direct tax on financial services. In addition, among the EU Member States, Belgium applies the larger number of direct taxes on financial services. From the first overview of the system applied to tax financial services in EU (Table 5.1) we could conclude that we are far away from the target of achieving tax harmonisation in the tax treatment of financial services.

Table 5.1: Comparison of taxes applied on financial services in EU Member States

Member State	***Indirect taxes***		***Direct taxes***
	banking	***insurance***	
Austria	Tax on interest yields: bank and bond interest	Tax on insurance contracts	Capital transfer tax Tax on capital transactions: stock exchange turnover tax
Belgium	-	Annual tax on insurance contracts	Registration duty Annual tax on collective investment organizations, credit institutions and insurance companies. Special tax on the retained profits of certain credit institutions. Tax on capital transactions Tax on long term savings Tax on stock market operations and carry over transactions Tax on bearer's bonds Tax on shares quoted in stock market
Denmark	-	Duty on insurance contracts	Stamp duty on financial services Taxation of profits and losses on claims and debts, and financial instruments Levy on banks and savings banks Duty on share capital creation Duty on transfer of shares

Finland	-	Tax on insurance contracts	Credit tax Transfer tax on capital transaction
France	Exceptional tax on all bank and financial institutions Tax on credit	Tax on insurance contracts Registration fee on insurance contracts	Stamp duty on capital transactions Tax on stock market operations Additional tax on registration
Germany		Insurance tax Fire insurance tax	Capital transfer tax Bill of exchange tax
Greece	Gross-sales tax Stamp duty on loans and credits	Turnover tax Stamp duty	Tax on capital and financial transactions Tax on capital changes
Ireland	Bank levy	Gross-sales tax (levy of assessable gross) Security duty Duty on policy of life insurance	Stamp duty Stamp duty on certain statements of interest Stamp duty on credit, charge, and cash cards
Italy	Stamp duty on financial services Stock exchange turnover tax	Insurance tax	Registration duty Stamp duty on financial transactions Tax on net company assets
Luxembourg	Tax on bank notes	Tax on insurance contracts	Registration duty Stamp duty on banking operations
Netherlands	-	Tax on insurance contracts	Stamp duty on financial transactions Tax on dividends Registration duty
Portugal	Stamp duty on banking operations Tax on credit	Insurance premium tax	Tax on capital transactions
Spain	Turnover tax Tax on economic activities	Tax on insurance contracts	-
Sweden	-	Insurance premium tax	Taxes on financial and capital transactions Tax on securities
UK	-	Insurance premium tax	Stamp duty on financial and capital transactions

Data: OECD Revenue Statistics, edition 2000, and European Commission, Inventory of taxes-EC, 2000a.

Looking at the VAT treatment of financial services in EU in general it appears that Member States control providers of financial services by regulation and only for these purpose financial services are defined in the existing legislation. However, as we mentioned in our literature review, there is no generic definition of financial services for indirect tax purposes. The EU's and the State's indirect tax legislation defines those financial services, which are exempted from VAT. Certain other financial services are considered to be outside the scope of the tax and the remaining financial services are taxed under the VAT system. Table 5.2 gives a detailed description of financial services (categories) considered in this study in the analysis of VAT treatment. This is by no means an exhaustive list, but these services are recognised (through the core legislation we mentioned above) as being quite clear financial in nature in Greece and other Member States. We would like to notice that we do not include in our list the transactions in gold given the harmonisation achieved in EU by the applied special tax scheme on investment gold (Directive 98/80/EC of 12 October 1998).

Table 5.2. VAT treatment of financial services in Greece and in the other EU Member States.

	Accounts operations	*Money transactions*	*Credit and auxiliary services*	*Provisions of loans*	*Credit card*	*Dealings in financial instruments and shares*	*Share Dividends*	*Futures*
Austria	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex	O/S	Ex, S/R
Belgium	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex	O/S	O/S, S/R, Ex
Denmark	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex	O/S	Ex, S/R
Finland	Ex	Ex, S/R, Ex/R	Ex, Ex/R	Ex, S/R	Ex	Ex	O/S	Ex, S/R
France	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex, S/R	Ex	O/S	Ex, S/R
Germany	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex, S/R	Ex	O/S	O/S
Greece	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex, S/R	Ex	Ex	Ex, S/R
Ireland	Ex	Ex, S/R	Ex, Ex/R	Ex	Ex	Ex	O/S, Ex	Ex, S/R
Italy	Ex	Ex, S/R, O/S	Ex, Ex/R	Ex, S/R	Ex	Ex, O/S	O/S	Ex, O/S, S/R
Luxembourg	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R, Ex/R	Ex, S/R	Ex	O/S	Ex
Netherlands	Ex	Ex, S/R	Ex	Ex, S/R	Ex	Ex	Ex	Ex
Portugal	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex, S/R	Ex	Ex, S/R
Spain	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex, S/R	O/S	Ex, S/R
Sweden	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex, S/R	O/S	Ex
UK	Ex	Ex, S/R	Ex, Ex/R	Ex, S/R	Ex	Ex	O/S	Ex/R, S/R, O/S

Data: OECD, Consumption Tax Group and European Commission, VAT Committee (National legislation).
Ex: exempt from the tax with no right to deduct the input tax
S/R: taxable at standard rate
O/S: outside of scope of VAT , without credit for related input tax
Ex/R: exempt from VAT or zero-rated but with credit for related input tax

Table 5.2. VAT treatment of financial services in Greece and in the other EU Member States (continued).

	Options	*Swaps*	*Underwriting financial instruments*	*Foreign exchange transactions*	*Leasing*	*Factoring*	*Safekeeping*	*Fund management*
Austria	Ex, S/R	Ex	Ex	Ex	Ex, S/R	Ex	S/R	Ex
Belgium	O/S, Ex, S/R	O/S, Ex, S/R	Ex	Ex, O/S	S/R	Ex, S/R	S/R	Ex
Denmark	Ex	Ex	Ex	Ex	S/R	Ex, S/R	S/R	Ex
Finland	Ex, S/R	Ex	Ex	Ex	Ex, S/R	Ex	S/R	S/R
France	Ex, S/R	Ex	Ex	Ex	Ex, S/R	Ex, S/R	S/R	Ex, S/R
Germany	Ex, S/R	Ex, O/S	Ex	Ex	Ex, S/R	S/R, O/S	S/R	Ex
Greece	Ex	Ex	Ex	Ex	S/R	S/R	S/R	Ex, S/R
Ireland	Ex	Ex	Ex	Ex, O/S	Ex, S/R	Ex, S/R	S/R	Ex, S/R
Italy	Ex, S/R	Ex, O/S	Ex	Ex, O/S	Ex, S/R	Ex	S/R	Ex
Luxembourg	Ex	Ex	Ex	Ex, O/S	S/R, Ex/R	Ex, S/R	Ex, S/R	S/R
Netherlands	Ex	Ex	Ex	Ex	Ex, S/R	S/R	S/R	Ex, S/R
Portugal	Ex, S/R	Ex	Ex	Ex	S/R	Ex	S/R	Ex
Spain	Ex, S/R	Ex	Ex	Ex	Ex, S/R	Ex, S/R	S/R	Ex, S/R
Sweden	Ex, S/R	Ex, S/R	Ex, S/R	Ex, O/S	Ex, S/R	Ex, S/R	S/R	Ex, S/R
UK	Ex, Ex/R, S/R, O/S	Ex	Ex	Ex,O/S	Ex, S/R	Ex, S/R	S/R	Ex, S/R

Data: OECD, Consumption Tax Group and European Commission, VAT Committee (National legislation).
Ex: exempt from the tax with no right to deduct the input tax
S/R: taxable at standard rate
O/S: outside of scope of VAT , without credit for related input tax
Ex/R: exempt from VAT or zero-rated but with credit for related input tax

Table 5.2. VAT treatment of financial services in Greece and in the other EU Member States (continued).

	Life insurance/reinsurance	*Non-life insurance/reinsurance*	*Settlement of insurance claims*	*Loss adjusting services*	*Professional services*	*Advisory services*
Austria	Ex	Ex	O/S	S/R	S/R	S/R
Belgium	Ex	Ex	Ex	Ex, S/R	Ex, S/R	S/R
Denmark	Ex	Ex	O/S	S/R	S/R	S/R
Finland	Ex	Ex	Ex	Ex	S/R	S/R
France	Ex	Ex	O/S, S/R	S/R	S/R	S/R
Germany	Ex	Ex	O/S	S/R	S/R	S/R
Greece	Ex	Ex	Ex	S/R	Ex, S/R	S/R
Ireland	Ex	Ex, S/R	O/S	S/R	Ex, S/R	S/R
Italy	Ex	Ex	Ex	Ex	S/R	S/R
Luxembourg	Ex	Ex	O/S	S/R	S/R	S/R
Netherlands	Ex	Ex	Ex	S/R	S/R	Ex, S/R
Portugal	Ex	Ex	O/S	S/R	S/R	S/R
Spain	Ex	Ex	O/S	S/R	S/R	S/R
Sweden	Ex	Ex	O/S	Ex, S/R	S/R	S/R
UK	Ex	Ex	O/S	Ex, S/R	Ex, S/R	S/R

Data: OECD, Consumption Tax Group and European Commission, VAT Committee (National legislation).
Ex: exempt from the tax with no right to deduct the input tax
S/R: taxable at standard rate
O/S: outside of scope of VAT , without credit for related input tax
Ex/R: exempt from VAT or zero-rated but with credit for related input tax

Table 5.2 provides an indication of the indirect tax treatment of financial services across Member States. It seems that generally, there is a basic level of consistency in the treatment of such services across EU Member States. However, some significant differences can be identified (including in Greece).

Generally speaking, monetary financial services are almost exclusively exempt from VAT. Few are taxed at standard rate. This, as seen in the chapter about the structure of VAT, implies loss or restriction in input tax deduction. In some countries, however, a number of such financial services are outside the scope of VAT, and depending on the method applied for the calculation of input tax (pro-rata mechanism) this may mean input tax is not inevitably an expense. This applies particularly to certain international, as opposed to purely domestic, financial transactions because in many cases some EU States provide the right for deduction of the input tax when these services are supplied to third countries (outside the EU). Non-monetary services are still, in some cases exempt. However, most are taxed at the standard rate. This is applied, in particular areas such as leasing and factoring, but is also extended to many services of professional or broadly administrative nature. Again, depending on what is involved, a number of financial services are outside the scope of the tax and zero-rating is still available in some situations. **In short, from a first look at the relevant table 5.2, it appears that recovering input tax, rather than accounting for output VAT, is the main concern from an economic point of view.** How much is recovered depends, however, on the individual business and, in many cases, the extent to which it is internationally based rather than domestic. Sometimes equally important can be the extent to which individual accounting systems can accommodate some of the more sophisticated approaches in the partial exemption mechanisms.

Finally, the typically exempted financial services directly involve a financial transaction or negotiation of a transaction, in money or a security for money (including shares and debentures). They may also involve intermediation. The consideration is interest based or indexes based. Categories which are typically exempt are: loans/credit, dealing in money, shares, securities, derivatives. The typically taxable financial services are related to, but not directly involve, the negotiations of performance of financial transactions. These services may also involve support or administrative services and general advisory services. The consideration is fee or commission based. Categories, which are typically taxable, are:

safekeeping, debt collection, portfolio and fund management, management of credit by third parties, advisory or introductory services and accountant services.

5.6 Differences in the VAT treatment of financial services in Greece and other EU Member States

5.6.1 The main differences in Greece

Our earlier discussions of the relevant provisions in Greek and EU legislation, show that Greece has adopted and translated in the National legislation (Law Nr 1642/86 and Law Nr 2859/2000/VAT code), the EU legislation regarding the VAT treatment of financial services with the exception of the provisions included in article 13(c) of the sixth VAT Directive (77/388/EEC), thus not giving to financial institutions the right of option for taxation. **However, Greece, has adopted article 17(3)(c) (see table 5.3) of the sixth VAT Directive (77/388/EEC) granting the financial institutions with the right for the deduction or refund of input tax in so far as the customer is established outside the EU or when those financial transactions are directly linked with goods to be exported outside the EU**. We will investigate the importance of this amount for the "cascade effect" in the following chapter (see chapter 6) where we will study the impact on revenues of taxing financial services under the VAT system in Greece.

Table 5.3. VAT treatment (place of taxation) of financial services in Greece.				
Supplier: ***Financial institution,*** ***Greece***	***The customer resident in:***			
	Greece	***EU, not taxable person***	***EU, taxable person***	***Third country***
1. Supplies of taxable financial services	Place of taxation Greece, art. 9 (1) of the Sixth VAT Directive, art. 12 (1) of the Greek VAT Law(1642/86) or 14 (1) of the VAT code, Law Nr 2859/2000.	Place of taxation Greece, art. 9 (1) of the Sixth VAT Directive, art.12 (1) of the Greek VAT Law (1642/86) or art.14 (1) of the VAT code Law Nr 2859/2000. Origin principle.	Place of taxation outside of Greece art. 9 (2) (e) of the Sixth VAT Directive, art. 12 (3) (5) of the Greek VAT Law (1642/86) or art 14 (3) (5) of the VAT code Law Nr. 2859/2000. Destination principle.	Place of taxation outside of Greece art. 9 (2) (e) of the Sixth VAT Directive, art. 12 (3) (5) of the Greek VAT Law (1642/86) or art.14 (3) (5) of the VAT code, Law Nr 2859/2000. Destination principle.
2. Supplies of exempt financial services	Exempt, with no right for deduction, art.13 B (a) (d), and 17 of the Sixth VAT Directive, art.18 (1), and 23 of the Greek VAT Law(1642/86) or 22 (1) and 30 of the VAT code Law Nr 2859/2000.	Exempt, with no right for deduction, art.13 B (a) (d), and 17 of the Sixth VAT Directive, art.18 (1), and 23 of the Greek VAT Law (1642/86) or art. 22 (1), and 30 of the VAT code Law Nr 2859/2000.	Exempt, with no right for deduction, art.13 B (a) (d), and 17 of the Sixth VAT Directive, art.18 (1), and 23 of the Greek VAT Law (1642/86) or art. 22 (1) and 30 of the VAT code, Law Nr 2859/2000.	Exempt, with right for deduction art. 17 (3) (c) of the Sixth VAT Directive art.23 (2) of the Greek VAT Law (1642/86) or art. 30 (2) of the VAT code, Law Nr 2859/2000.

Data: Greek VAT law, Law 1642/86; Sixth VAT Directive (77/388/EEC).

Beyond the above mentioned general remarks, the main and most important differences which we can identify from table 5.1-5.2 for Greece in VAT treatment of financial services, in comparison to other EU Member States, are the following:

- *Dealing in money*: Greece treats supplies of collectors' items as taxable
- *Credit and auxiliary services*: There is an exemption applied with credit for the input tax for financial services in relation to exports of goods outside the EU
- *Provision of loans*: Greece treats the management of loans by persons other than the person granting the loans as taxable
- *Credit card services*: Greece exempts with no right for deduction of the input tax the services provided by the organisation which issues the credit card to the customer but applies the VAT at the standard rate to the use of organisations' networks for the payment of the bills, by the credit card owner
- *Leasing*: The whole charge is treated in Greece as taxable at the standard rate
- *Factoring*: Debt factoring is treated in Greece as taxable at the standard rate
- *Provision of non-life insurance/re-insurance*: The provision by a non-authorised insurer of insurance cover relating to a specific risk (i.e. theft, loss, damage, illness etc.) in return for a periodic premium, including the services of non-authorised brokers or agents, is treated in Greece as taxable at the standard VAT rate
- *Settlement of insurance claims*: All services provided from non-authorised insurer broker or agent are treated in Greece as taxable at the standard VAT rate
- *Fund management*: Greece treats the management of mutual funds as exempt with no right to deduct the input tax. Any other fund management services are treated as taxable at the standard VAT rate
- *Professional services*: Greece treats lawyers' services as exempt from VAT. On the contrary accountants' services are taxable at the standard VAT rate.

5.6.2 Differences and potential distortions between the EU Member States

As we mentioned above, from the information arising from table 5.2, it appears that there is a basic level of consistency in the treatment of financial services across EU Member States. However, there are number of cases where we can identify main differences between Member States and consider the potential distortions of competition arising as a result of them. The types of distortions arising can be broadly categorised as follows:

- distortions leading to competitive advantage/disadvantage between suppliers of financial services in the same Member State
- distortions leading to competitive advantage/disadvantage between suppliers of financial services in different Member States
- distortions caused by the variation in the level of "cascade effect" passed through to taxable business

With no doubt, a key step in determining the economic and competitive effect of these distortions would be to quantify the level of the "cascading tax" arising from the exemptions of most financial services and instruments. This will be examined in the case of Greece in the following chapter on the impact of taxing the financial services under the Greek VAT system.

Based on the information provided in table 5.2, categories of financial services where there are significant differences between the EU Member States are the following:

- *Dealing in foreign exchange*: Actually the differences in treatment of foreign exchange exist where no fee or commission is paid (the profit being made on the margin). Thus this category is treated as taxable for VAT purposes or outside the scope of the tax. Where both the buyer and the seller are within the same Member State, the differences in treatment are unlikely to give rise to any significant indirect tax consequences. However, where transactions are made between different EU Member States, or between EU and non-EU Member States, the difference in treatment will cause a disparity in the seller's ability to recover VAT on inputs. This current difference in treatment will lead to an increase in the cost base of institutions located in the Member States where foreign exchange dealing is treated as outside the scope of the VAT. This treatment may affect their competitiveness and profitability against those institutions located in more favourable locations.
- *Financial leasing*: Many Member States treat the whole of any leasing charge as taxable, whereas others treat the finance (or interest) element as exempt. This could affect the VAT revenues since those Member States applying VAT to the whole charge allow VAT, through deductions, to flow and to be paid by the final consumer, whereas those countries which exempt part of the charge create "hidden tax" through the "cascade effect". In addition these differences could potentially lead to distortions

within Member States. For example, in Member States where financial leasing is taxable, certain consumers who are not able to recover input VAT may restructure agreements to purchase assets under one contract and take a loan or credit under a separate agreement thus avoiding to pay VAT on the interest payable.

- *Fund management*: Some Member States treat fund management as exempt whereas others treat it is as a taxable. For businesses this mean that they can set up investment funds in jurisdictions which exempt fund management services and buy the relevant services from a jurisdiction which taxes them. This may allow the services to be purchased without "hidden tax" and without application of VAT on the import services. On the other hand non-taxable persons could, in theory, seek to purchase fund management services from a jurisdiction which exempts such services and so incur only the "hidden tax" element which is considerably lower than VAT on the whole of the fee.
- *Factoring*: There are many apparent differences in the VAT treatment of these services between Member States. However, the indications are that the differences are actually a matter of variation in the interpretation of the nature of the services in the legislation. It general, it appears that if a debt is sold and the risk passes to the purchaser, the sale is an exempt supply for VAT purposes. Fees for administration and tracing bad debtors are generally taxable. This different treatment is likely to give rise to significant indirect tax consequences (same as those mentioned in the treatment of financial leasing above).
- *Option to tax*: Beyond the above mentioned differences the application of article 13(C) of the sixth VAT Directive (77/388/EEC) in some Member States (Germany, France, Belgium), giving to businesses the right to opt, could lead to distortions within these Member States (for example between businesses which opted for taxation and between businesses which did not) and between Member States. **We would like to clarify here that table 5.2 is not relevant where an option for tax is granted (in which case the relevant financial services are taxed with a right to deduct the input tax).** In Germany this option is applicable for financial transactions relating to payment and cashing, currency and security transactions, credit and bullion; in France for payment and cashing, commercial paper, credit and guarantees, fees on futures and factoring; and in Belgium only for payment and cashing financial transactions (not for credit operations).

- *International financial services:* All EU Member States appear to apply a mixed destination/origin principle. The destination principle applies to non-EU customers and VAT registered businesses within the EU (application of the above-mentioned article 9(2)(e) of the Sixth VAT Directive-77/388/EEC). The origin principle applies if the customer is an EU resident but is not a registered VAT trader. When the financial services are supplied outside the EU the place of supply is where the transaction occurs and the destination principle applies for the supplies of the services. Significant relief in the form of the input VAT recovery (for exempt financial services) is allowed in the context of international transactions (outside the EU) by virtually all countries (with the exemption of Italy). Despite the uniformity in the place of supply rules of international financial services the differences in the scope of tax itself within the EU Member States and between EU Member States and third countries could lead to potential distortions such as double or no taxation, competitive disadvantages, increased compliance cost etc.

Finally we would like to mention here that there are other additional differences in national legislation in EU Member States, not directly related to financial services, but which could lead to potential distortions when applied to financial institutions. These differences arise from the different legislation applied in the VAT treatment of some cases such as the special regulations applied on "VAT groups[32]", the different treatment of capital goods, the restrictions applied to exempt bodies and the different methods of input tax recovery.

5.6.3 Differences in taxing financial services under the VAT system in Greece, Spain and Portugal

As we can see from table 5.2 there appears to be a similarity in the type of financial services which are treated as taxable and those which are treated as exempt in Greece, Spain and Portugal. Although a form of indirect tax has been applied to the main banking services (see Table 5.1) other exceptions related to specific financial services have been identified for the above countries. Table 5.4 shows that there are a variety of treatments under the VAT system for eight main categories of financial services in three countries.

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[32] According to the article 4(4) of the 6th VAT Directive each Member State may treat as a single taxable person, persons established in the territory of the country who, while legally independent, are closely bound to one another by financial, economic and organisational links.

Table 5.4: Differences in taxing financial services under the VAT system in Greece, Spain and Portugal (Extract from table 5.2).			
Categories of financial services	***Tax treatment under the VAT system***		
	Greece	***Spain***	***Portugal***
Credit card services	Ex, S/R	Ex	Ex
Dealing in financial instruments and shares	Ex	Ex, S/R	Ex, S/R
Share dividends	Ex	Ex	OS
Leasing	Ex, S/R	Ex, S/R	S/R
Factoring	S/R	Ex, S/R	Ex
Fund management	Ex, S/R	Ex, S/R	Ex
Settlement of insurance claims	Ex	OS	OS
Professional services	Ex, S/R	S/R	S/R

Data: OECD, Consumption Tax Group and European Commission, VAT Committee (National legislation).
Ex: exempt from the tax with no right to deduct the input tax
S/R: taxable at standard rate
O/S: outside of scope of VAT, without credit for related input tax
Ex/R: exempt from VAT or zero-rated but with credit for related input tax

Analytically the above-mentioned differences for Spain and Portugal (in relation to Greece) are as follows:

- *Spain*

➢ *Credit card services*: Even the activities of intermediaries and the operation of a network for the supply of these services are exempt.

➢ *Dealing in financial instruments and shares*: The issue, services and operations linked with values which represent goods and commodities or which are considered as property rights regarding real estate are standard rated (taxable). Commodities futures are standard rated unless traded on the official market in which case they are exempt. Options in respect of interest rates, exchange rates, securities, stock indices and other financial instruments are exempt. All other options are standard rated.

➢ *Leasing*: The charge for credit if it is separately disclosed is exempt.

➢ *Factoring*: If factoring services do not include any advance, payments are standard rated.

➢ *Fund management*: Only the management of specific investment funds is exempt. All the other types of fund management are standard rated.

- *Portugal*

➢ *Dealing in financial instruments and shares*: Opening the stock deposit of securities, the stock deposit and drawing of securities, the transfer of securities among credit institutions, the payment of interest, registration and cancellation of securities, dealing in instruments which confer certain rights of land, are standard rated. In addition commodity future contracts, and option in goods/commodities are standard rated.

- *Share Dividends and Insurance claims*: They are considered to be out of scope of taxation (i.e. they are not included in the calculation of the Pro-rata fraction in order to establish the recovery of VAT on general expenditure).
- *Fund management*: Only guarantees and related services including management services, which are not supplied by the original guarantor, are standard rated.

A general conclusion is that although there are few differences among the three countries in VAT treatment of financial services, competitive distortions may arise from the differences in VAT treatment where the financial service in question is of a type which can easily be supplied cross-border. In particular, these competitive distortions may arise in Fund management, Professional services (different VAT treatment of lawyers and accountants) and in transactions based on different financial instruments.

5.7 Implications of ECJ Decisions

For a proper assessment of the current legislation on the VAT treatment of financial services in the EU Member States it is important to look into the guidance given and limitations indicated by relevant jurisprudence of the European Court of Justice (ECJ) as well. Unfortunately in this field the ECJ has not developed a large body of case law. However, the importance and the impact of some cases should not be neglected. By far the most important was the ECJ's conclusions in *Sparkassernes Datacenter v Skatteministeriet (case C2/95).* The issue in the above mentioned case concerns the scope of the exemption for financial services in article 13 B (d) 3-5 of the EU sixth VAT Directive and in particular its application to services sub-contracted by a financial institution to a third party. The ECJ concluded on the application of financial exemptions of the above mentioned article that it is not only the nature of the service which is decisive for the exemption but also the capacity in which a person makes the supply of financial services. For example, whether he is a sub-contractor or not is very important for the exemption of the services provided. This will be a major source for change in the way outsourced financial services are treated for VAT purposes throughout the European Union. Everything else being equal, this is a bound to lead banks and other financial institutions preferring the in-house option in order to avoid sticking VAT on outsourced services such as cheque clearing, payment card processing etc., even where because of economies of scale this is from an economic point of view a better option. **The practice hitherto in**

Greece and the other EU Member States has been to judge such contracted services on their merits for VAT purposes. If they are purely of administration and data processing, they have been treated as taxable, but if the activity has involved settlement and payments transactions between the financial institution and other financial institutions and the financial institution and its customers, the services has been generally accepted as exempt. **In the final analysis, the narrowing of the scope of exemption provided by the article 13 B (d) 3-5 of the Sixth VAT Directive could cause problems of the interpretation of the Decision by EU Member States and could well, in our opinion, increase the attractiveness of the proposals currently under consideration for the taxation of financial services.**

Furthermore it is worth noting here two other important decisions taken by the ECJ, namely the cases C-281/91 and C-306/94. The first concerns the application of article 19.2 of the Sixth VAT Directive on the deduction of input tax. According to this decision financial receipts are not included in the denominator of the pro-rata fraction if they consist auxiliary services. However, these receipts are included (taxed under the VAT system) if they consist the main activity of business. The second case is less important but it can play a role in determining whether the interest charged on credit sales are taxable or not under the VAT system (scope of the exemption for financial services in article 13 B (d) of the Sixth VAT Directive). Finally the ECJ in the cases C 70/83 and C 255/81 gave legal guidance for the exemptions provided in article 13(B) (d) (1) (i.e. guidance on the entry into force for the exemptions of negotiations of credit in Member States).

5.8 Indirect taxation on insurance services in Greece and other EU Member States

Generally insurance represents an arrangement in which one party (the insurer) assumes the risk for certain types of liabilities in return for premiums or other financial payments from a person being insured (the policyholder). What is or not insurance is clearly important. In the absence of any statutory definition, either in the Sixth VAT Directive (77/388/EEC) or in National legislation the matter falls to be construed according to the principles of the general law. We can identify three elements, which can define the insurance services:

- the contract must provide that the assured will become entitled to something on the occurrence of some event

- the event must be one which involves some element of uncertainty
- the assured must have an insurable interest in the subject matter of the contract.

In terms of the general law of contract these usually mean that there must be an offer and acceptance between the two parties, an intention to enter into a legal relationship, and a consideration (some kind of payment). There are a wide variety of arrangements, which involve, in effect, insurance services in EU. Therefore, the discussion of the indirect taxation on insurance contracts in EU covers not only general insurance and life and health insurance but also such arrangements as guarantees, reinsurance, certain types of hedges and any other mechanisms with the same attributes. As we have seen in table 5.2, by far the majority of supplies by businesses in insurance sector do not attract VAT. Insurance is, with rare exceptions, exempt. Understandably, therefore, in an industry where recovery rates tend to be low, the emphasis is often on input VAT and on other taxes applied, which can create "cascade effect" in other sectors as well. As we can see from table 5.5, which gives an insight into the application of indirect taxes on insurance services (contracts) in EU, in the majority of the EU Member States the insurance premium tax (IPT) is applied (including Spain and Portugal). The rate appears to vary from 2% in Ireland to 22% on some types of insurance in Finland. The scope of the tax varies considerably and there are many differences in tax accounting and assessment. However, it seems that there is some consistency in tax base and in liability of taxation.

Table 5.5. Summary of indirect taxation on insurance services in EU.

M. State	Tax base	Taxable person	Rate	Scope of Tax
Austria	Insurance Premium. Includes brokers' and agents' commission.	Insurers, insured, agents.	4%, Pension fund contributions, 11% life and invalidity insurance. 2.5% on health insurance contracts.	Applicable on transport risks, vehicles and credit insurance. Export credit, social security and reinsurance are exempt.
Belgium	On total premium. Insured costs in most cases are included as well as commitments of a pension fund.	Insurers, non-established insurers, insured. Insurance associations, pension funds brokers.	1.40% for insurance against risks in international transport. 4,40% for life insurance. 9.25% for the other cases.	Applicable on transport risks, vehicles and credit insurance. Insurance on shipping by sea and reinsurance are exempt. Aircrafts principally used for international public transport are exempt. Temporary annuity contracts concluded individually are exempt as well.
Denmark	Insurance Premium but does not include agents' or brokers' commission. Third party insurance tax for motor vehicles etc.	Insurer.	12%,40%, for buses, 50% of the premium of the third party insurance.	Transport risks and credit insurance are subject to stamp duty. Insurance tax on pleasure craft registered in Denmark. Vehicles insurance is subject to tax at the rates specified. Life insurance, reinsurance and marine aviation are exempt.
Finland	Tax on insurance Premium. Includes agents' or brokers' commission. Fire insurance levy (total gross amounts of annual premiums paid for this insurance policy).	Insurer or insured.	22%, 3% for the fire insurance levy.	Applicable on insurance premiums when the insured property or interest is situated in Finland. Exemptions: Premiums related to a personal or credit agreement, a reinsurance agreement, transport insurance for imported goods or goods in transit and transport equipment insurance. Premiums related to insurance against injury during medical treatment as well as premiums related to insurance for transport equipment. The fire insurance levy is deductible in the insurer's income taxation.
France	General tax.	Insurer, intermediary and insured.	7%,9%,18%,19%	Vehicles insurance is subject to a tax at rate specified. Transport risks and credit insurance are exempt.

Table 5.5. Summary of indirect taxation on insurance contracts in EU (continued).

M. State	Tax base	Taxable person	Rate	Scope of Tax
Germany	Insurance Premium. Includes brokers' and agents'commission.	Insurer.	Fire insurance 10% of the premium. 13.75%, building insurance,14% house contents insurance. Insurance of the ships 2% of the premium. Accident insurance 3% with return of the premium. 15%, all the other policies.	Life insurance policies and reinsurance are exempt.
Greece	Turnover tax. Insurance Premiums and all changes accruing from insurance contracts without any reduction of discounts allowed to clients, and likewise without any reduction of brokerage fees and commissions paid to third parties.	Insurer.	4%,10%, 2.40%	Exemptions: International transports insurance, marine aviation and reinsurance. Life insurance Premiums subject to the period of insurance being not less than 10 years. Insurance Premiums rendered for the insurance of the crews of the ships and aircraft's. Insurance Premiums covering certain risks incurred by agricultural undertakings.
Ireland	2% levy of assessable gross. Stamp duty on all policies.	Insurer.	2%	Tax arises on non-life premiums only. It is charged on the gross premiums received by a non-life assurer where the risk is located in Ireland. Premiums received in respect of marine aviation, transit and health insurance business are excluded from the charge.
Italy	Calculated on all sums paid to insurer	Insurer.	Four rates of tax are applicable depending on the type of insurance or the annuity of the contract (2.5%, 7.5%, 12.5%, 21.5%).	Reinsurance or insurance policies on ships or aircraft's of foreign nationality, unless they are used in Italy, are exempt.
Luxembourg	Tax on Premiums. Includes costs and commission.	Insurer.	4%	Applicable on transport risks, vehicles and credit insurance. Reinsurance, life insurance and like contracts, and compulsory contracts with social insurance institutions are exempt.
Netherlands	Total charged to insurer.	Insurer, some registered brokers and insured.	7%	Life, accident, invalidity, disablement, medical, uneployment, marine aviation, reinsurance, and export credit are exempt.
Portugal	Tax on insurance premium calculated on total premium.	Insurer.	3% on the whole amount of the insurance premium. 5% on medical, farming and stockbreeding. 6% on transport of goods. 9% on any other kind of insurance.	Life, export credits and reinsurance is exempt.
Spain	Based on total premium paid by the insurer.	Insurer.	6%	Life insurance, reinsurance, credit insurance, agricultural insurance, quarantee insurance, social insurance, pension plans, health care and sickness insurance contracts and international transport risks are exempt.

Table 5.5. Summary of indirect taxation on insurance contracts in EU (continued).

M. State	*Tax base*	*Taxable person*	*Rate*	*Scope of Tax*
Sweden	Total amount of premium.	Insurer.	15%	Health, accident insurance, and marine aviation are exempt.
UK	Gross premium including brokers' and agents' commission.	Insurer, representative, and in some occasions the insured.	5%, 17.5%. 17.5% applies to insurance relating to motor cars or motor cycles, domestic appliances when sold by a supplier of those goods or services and on all travel insurance.	Payable on most general insurance where the insured risk is located in the UK. Exemptions: Life and pensions, marine aviation and reinsurance. Insurance contracts relating to risks situated outside the UK. Contracts relating to goods in foreign or international transit. Contracts relating to credit, to exchange losses or to the provision of financial facilities.

Data: London Underwriting Centre (2000), European Commission, and Inventory of taxes (2000).

The tax base appears to be the premium and the person liable to taxation, in most cases, is the insurer. **Only two countries apply other taxes than insurance premium tax (IPT). France apply a general consumption tax (but similar to IPT), and Greece a turnover tax with a stamp duty tax of 2.4%.** The turnover tax in Greece is a single stage tax where the deduction of the tax on inputs is restricted (with cumulative effect). By far the majority of insurance services concerning life and health insurance are exempt, or are taxed less heavily, in comparison to other categories (reduced rates). In addition there is an obvious tendency to tax more the property, the householder and vehicles with cumulative effects (restricted deductions).

5.9 The recoverable VAT by financial institutions

The fact that financial services are usually exempt from VAT means that financial institutions face some restriction in the amount of input tax they can recover. However, as we have seen from the legislation applied in EU Member States, to the extent that financial services are supplied to customers outside the EU, specific relief is provided. In most cases, the amount of tax recovered will be low (generally under ten per cent and often much less) due to the high incidence of exempt supplies for which the right of input VAT deduction is not available. How much is recovered depends, however, on the mix of particular company's business and what is the method for "partial exemption" applied. Mainly we could identify three important approaches[33] in partial exemptions` rules applied by the EU Member States. These are:

- *The standard approach*: Currently the standard method looks first at direct attribution for input tax incurred exclusively in making taxable or exempt financial services. This is either recovered or disallowed in full. Thereafter, the residual input VAT is recovered on a pro-rata basis according to the values of outputs or supplies of financial services made i.e. $\frac{value\ of\ taxable\ supplies}{value\ of\ total\ supplies} * input\ VAT$. Taxable supplies for this purpose, for the most part, represent financial services, which are currently either exempt or outside the scope, but in either case with the right to recover underlying input VAT. In other words, they are financial services charged to customers established outside the EU or in connection with the export of goods.

[33] Article 18-19 of the Sixth VAT Directive.

- *The cost allocation/sectorisation method*: This is a more complicated, but often more accurate, cost/income centre approach. Under this arrangement expenditure and related VAT is first allocated specifically where possible to particular cost or income centres. Where this is not possible the allocation is done indirectly on an appropriate basis. VAT allocated to cost centres is then re-allocated to the appropriate income centres, again on a reasonable basis according to use of contribution (i.e. according to the relative value of business, number of staff employed in each section etc.) and
- *The simple apportionment*: Where costs cannot be allocated specifically or a detailed cost/income approach is impractical, the apportionment of input VAT between different categories of income might be made on a basis of a fixed percentage laid down by the tax authorities of Member States.

Table 5.6 (from the existing data) shows that there are significant differences between Member States in respect of the basis on which input VAT recovery can be made. In some Member States recovery rates are significantly higher than those achieved by other Member States. This may be because of the taxable activities undertaken by the institutions (for example financial leasing) to which most of the input tax can be directly attributed. **This suggests that it may not be only the basis used to calculate the recovery of VAT (methods for partial exemption mentioned above) which influences the level of recovery achieved. The differences may also reflect the fact that different types of business and mixes of activity undertaken by financial institutions depend, in part, on the markets in which they compete (international business orientation) and the Member State in which they are established.** In our opinion it is unlikely that the differences in input VAT recovery would form a consideration for a financial institution when deciding where to locate its operations. Other fiscal and Market factors are likely to be far more significant. However, differences in this area may affect the profitability of the financial institution in a number of ways i.e. the actual amount of VAT on expenditures which may be recovered, the administrative cost of applying a complex recovery formula, the cash-flow cost depending on frequency and timing of repayments of VAT etc.

Table 5.6. Percentage of the deducted input VAT by financial institutions		
M. State	***Banks***	***Insurance***
Austria	N/A*	N/A
Belgium	5-65%	0%
Denmark	2%	2%
Finland	<5%	<5%
France	3-25%	5%
Germany	10-20%	N/A
Greece	1-2%	1-2%
Ireland	77-85%	76-86%
Italy	0-2%	0-2%
Luxembourg	8-70%	0%
Netherlands	5-30%	0-5%
Portugal	3-10%	1%
Spain	N/A	N/A
Sweden	5-21%	0%
UK	8-60%	2-50%

Data and estimations: OECD, Consumption Tax Group (1998)

**Data not available*

From the existing data in table 5.6 (year 1998) it is not possible to evaluate the significance and the impact on tax yield of the differences in the levels of recovery in input tax of financial institutions. A simple conclusion could be that those Member States which indicate high levels of recovery by financial institutions are likely to be suffering a reduced yield from VAT measured against those Member States demonstrating low levels of recovery. This will be studied further in the case of Greece in the following chapter where we shall estimate the value of VAT incurred by financial institutions. Finally, in the specific case of Greece and Portugal the available data suggest some similarities in the level of deducted input tax (data were not available for Spain). Both countries appear with almost the same percentage of deducted input tax in insurance sector (1-2% for Greece, 1% for Portugal). However, Portugal appears with higher level of deducted input tax in banking sector (3-10% for Portugal, 1-2% for Greece) which can be best explained by the identified differences in VAT liability of the different categories of financial services, as we mentioned above.

5.10 Concluding remarks

In this chapter we have examined the legislation regarding the current indirect tax system used to tax financial services under the VAT system in Greece and the other EU Member States. We went some way forward by identifying the main differences between the EU Member States in the scope of taxation of financial services.

Generally it appears that there is some degree of consistency regarding those financial services, which are exempt from VAT. In addition we have found that some of the existing differences in the VAT treatment of certain categories of financial services could potentially lead to distortions of competition within EU Member States (e.g. example financial leasing). Differences may also lead to distortions between EU Member States (e.g. example fund management). Of course this distortive impact of differences in the taxation of financial services should be considered in the context of the wider range of other potentially distortive influences including special arrangements in VAT system, regulatory constraints, market development, country location etc.

In addition we have reached the conclusion that Greece adopted in the National legislation the EU legislation regarding the VAT treatment of financial services. However, we were able to identify a number of important differences between Greece and other EU Member States. **These differences which could easily lead to potential distortions are mainly in the scope/liability of taxation in financial transactions such as dealing in money, documentary credits, provision of loans, credit card services, financial leasing, factoring, fund management etc.** At this stage the same results could arise from the comparative evaluation in VAT treatment of financial services among Greece, Spain and Portugal. In the next step we have identified important differences between all the EU Member States. These differences are arising mainly from the different treatment of financial transactions such as dealing in foreign exchange, financial leasing, factoring, the right to option for taxation and the different treatment of international financial services.

Likewise, the evaluation of the indirect taxation (other than VAT) on insurance services (Contracts) in EU Member States has shown that there is some degree of consistency in indirect taxes applied (the application of insurance premium tax), with the exception of Greece where a turnover tax and stamp duty on insurance services (contracts) are applied

and France where a general consumption tax is applied. In particular, all Member States have special taxes on insurance, sometimes expressed as a percentage of the premium, sometimes as a percent of the value of the policy. **However the differences in the scope of taxation between the EU Member States gave us a useful insight that we are far away from a common tax system on insurance services.**

Furthermore, a key step in determining the economic and competitive effect of the above mentioned distortions in tax treatment of financial services would be to quantify the level of the "cascading tax" arising from the existence of so many exemptions in VAT treatment of financial services and the different partial exemptions rules applied (value of VAT incurred by financial institutions).

To summarise, the analysis in this part of the study has clearly shown that many of the obstacles concerning the taxation of financial services depend on the differing implementation by Member States of the Sixth VAT Directive. Such differences are of course to some extent intrinsic to the legal instrument of a "Directive" but the analysis has revealed a number of issues that merit further consideration. Generally, while a limited degree of divergence of implementation and interpretation of the Directive by Member States in drafting their national laws is inevitable, significant differences in the conditions under which the benefits of the Directive are applicable give rise to problems. Moreover, the substantially different implementation of the EU law in the Member States increases further the compliance cost resulting from the existence of 15 tax systems within the Single Market. A more uniform application of (existing and future) EU tax law (concerning financial services as well) could be an important step in order to reduce the differences and compliance costs and to make sure that, where EU tax law is relevant, comparable situations are treated in a comparable manner. At the same time, the need for litigation would be reduced. One way of achieving these objectives and to tackle the various problems relating to the divergence of the application of EU tax law across Member States would be the introduction of some kind of collective monitoring of the implementation of the relevant Directives. This would involve the creation of a mechanism for the exchange of best practice and/or some of peer review. After discussion with Member States, the commission could issue guidance on the interpretation of the relevant provisions especially of the Sixth VAT Directive. In this context, it is important to note

that the differences in the implementation of the Directives are often related to different legal traditions and concepts. In the provisions of the Sixth VAT Directive regulating the exemptions of financial services, many cross-border difficulties boil down to a varying understanding of the definition of financial services. In the long run, the elaboration of binding guidelines on what constitutes a financial service could help to find solutions to obstacles that respect the justified interests of tax administrations in all Member States.

Finally given the importance of the underlying problems in the field of indirect taxation of financial services "collective monitoring" appears to be a particularly appropriate means to deal with these sorts of tax obstacles in the Single Market. It is worth noting that the 6th VAT Directive explicitly provides for a VAT committee[34] as an interpreting body of the relevant provisions. This committee could play a key role in finding solutions to obstacles for tax harmonisation in the tax treatment of financial services. Obviously any possible solution to the existing tax differences in the tax treatment of financial services must take into account the existing judgements of the European Court of Justice (ECJ) considering to what extent the European Court of Justice jurisprudence calls for further co-ordination between Member States in this field. Unfortunately, while the ECJ has unquestionably made a significant contribution to the removal of tax obstacles in indirect taxation (VAT harmonisation, abolition of fiscal frontiers etc.), it is unlikely that the interpretation of the few ECJ decisions on financial services could be sufficient to address all tax obstacles (in taxation of financial services) to cross-border activity. In consequence, the ECJ, in our opinion, is necessary to develop a larger body of case law in the field of indirect taxation of financial services and on the compatibility of the national tax rules with the relevant provisions of the 6th VAT Directive.

[34] Title XVII, Art 29 of the 6th VAT Directive.

CHAPTER 6: THE ECONOMIC EFFECTS OF TAXATION: THE IMPACT ON REVENUES OF TAXING FINANCIAL SERVICES UNDER THE VAT SYSTEM IN GREECE.

6.1 Introduction

As we discussed in the literature study and demonstrated by the comparative study of legislation in EU Member States in previous chapter, most financial services are exempt from value added tax (VAT). This means that although these sectors pay very little in the form of output VAT, they are unable to reclaim most of the VAT they pay on their inputs. This exemption gives rises to non-neutralities relative to the taxation of other goods and services, which reduces the efficiency of the tax system. The exemption means that financial services are taxed less heavily than other goods and services because the value of inputs to the financial institutions rather than the value of the final products determine the effective tax rate. This chapter analyses the revenue effect of removing this exemption. We use an input-output method to estimate the effect on revenues of taxing financial services under the VAT system in Greece. The method is applicable to other (EU) VAT systems as well. **Our aim is to compare the present VAT exemption of financial services with a hypothetical benchmark case of taxing them, and to derive first quantitative estimates for the fiscal revenue loss.**

We will seek here to answer our research question about the impact of financial exemptions on VAT base. Thus, does a wider VAT base including financial services give higher VAT revenues? [*Research question **R3 (a)***, Table 4.1 p.100] (Recent general theoretical contributions: Tait, (1988); Gillis, (1987); Bogetic, (1994), where a positive impact of the abolition of VAT exemptions on VAT base and revenues has been pointed out). In addition our second subsequent research question, which we shall answer, is: Does the inclusion of financial services in the VAT base give less embedded blocked VAT on financial institutions inputs? [*Research question **R3 (b)***, Table 4.1 p.100].

6.2 The taxation of financial services under consumption type VAT. The specific problems in Greece

To understand the background and the problems of including financial services in VAT base we think that is necessary to recall from the literature review the main points and theoretical aspects which will help us to understand the steps we take in our empirical analysis which follows. Briefly, the unique characteristics of financial services make the application of VAT difficult under the traditional credit-invoice (consumption type) system. As we have seen, the difficulties in taxing financial services are discussed in a number of studies, such as: Barham, Poddar and Whalley, (1987); Hoffman, Poddar and Whalley, (1987); Thompson, (1988); Hoffman, (1988); Henderson, (1988); Garber and Raboy, (1989); Aujean and Poddar, (1997); Poddar and English, (1997). According to these studies, the problem of identifying or defining the elements of value-added on financial flows is the underlying rationale for exemptions in most VAT systems. Most EU Member States treat the vast majority of financial services provided within their economy by these institutions as exempt (article 13Bd of the EC sixth directive), with no right to recover the VAT on inputs. On the other hand, financial services supplied by financial institutions are generally treated as zero-rated supplies (or supplies deemed to be outside the country with full VAT recovery for inputs) when they are exported (see also table 5.2 p. 114).

Moreover it has been shown that an exemption on an intermediate stage of production could lead to the cascading of tax ("cascade effect") (Weidenbaum, Raboy, and Christian, 1989; Tamaoka, 1994). No credit is given for taxes paid on inputs before the exempt stage, neither under an invoice and credit VAT, nor in a sophisticated subtraction VAT. When the exempt firm sells products to a company further along the production chain, the purchasing company pays tax on its own value-added. However, since there is no credit for inputs from the exempt stage that include previously paid tax, value-added from previous stages is taxed again. Thus, due to this cascading effect, the overall tax burden is higher than if there had been no exemption. Many financial services are provided as intermediate inputs to other businesses. This is particularly true of banking and insurance. In addition, as most exported services are effectively zero-rated of the originating country, the exclusion of imported services from the tax base can produce competitive inequities and economic distortions in the destination country. Similarly double taxation and economic

distortions may arise where imported services that are exempt or standard rated at the originating country are fully taxed by the destination country (EC, 1996b). Given the size of financial services sector it is unlikely that any tax structure would exempt this sector from without imposing separate (gross receipt) taxes. However, as we concluded in our literature review, there is no firm information and empirical evidence available to determine whether any potential advantage from a change to the tax treatment of financial services would outweigh the costs of making such a change.

Beyond the aforesaid problems, in Greece the current system of imposing a special transactions (gross-sales) and turnover tax and stamp duty on banking institutions and insurance companies respectively is inefficient on economic and administrative counts. In general terms, the existing system does not exempt the acquisition of capital goods and so discriminates against capital formation. It also gives rise to cumulative effects resulting in a spillover of these taxes into industrial costs and hence into exports and capital formation; and weakens export competitiveness in so far as the amount of taxes incorporated in exports is not fully rebated. Moreover the administration of these taxes is troublesome for the Greek Tax Authorities (Greek Ministry of Finance, 1998).

Although the issues mentioned above are not new, they have gained significance due to a number of developments that occurred in the Greek financial sector in recent years. After the threshold of "1992" and the Single Market, attention is turning to the Monetary Union and to the participation in the final stage of EMU (June 2000). In Greece the financial sector is a growth industry whose structure will be affected through the Monetary Union (EMU) and the Single Currency. Financial institutions will bear a big part of the cost of the Single Currency. It has been estimated that this cost will be approximately 3.37 % of the total administrative expenditures for the banking sector (24.85 billion drachmas in 1996 prices; Hellenic Banks Association, 1998). Like in most monetary unions, but distinct from sovereign federations in which currencies and nations coincide, the EMU has no central fiscal authority. Although monetary and exchange rates policies are fully centralised, fiscal policy remains largely a national responsibility, in line with the subsidiarity principle. Fiscal and tax policies are co-ordinated through the multilateral surveillance and excessive deficit procedures of the Maastricht Treaty, as clarified in the Stability and Growth pact. Under the common currency, tax competition is likely to

increase for at least two reasons. First, tax-inclusive prices would become more transparent. Second with the loss of the monetary and exchange rate instruments, the role of tax policy in attracting business and enhancing competitiveness would become prominent (Cangiano and Mottu, 1998). If this is the case, a fiscal reform in the taxation of financial services will be crucial for Greece and especially for the competitiveness of financial sectors which will be one of the key factors for the smooth adoption of euro (as from January of 2002). **For such a change it is important (among the other issues mentioned above) to estimate the potential impact on revenues arising from the implementation of VAT on financial services which we examine in this chapter.**

6.3 Data and methodology

As we discussed in the chapter on methodology, to estimate the fiscal revenue loss of VAT exemptions in financial sectors in Greece we follow the "National Accounts" approach. This method is well known in the VAT literature and was adopted by many researchers in the field of indirect taxation as well (i.e Aguirres and Shome, 1988; Mackenzie, 1991; Jack, 1996; Kodrzycki, 1998; Tesche, 1998). This method is based on the construction of input-output tables (economic tables) derived from the National Accounts. The best known example of the above studies using the "National Accounts approach" in VAT literature is the approach developed by Aguirres and Shome (op.cit) in order to estimate the VAT base for Mexico of the years 1980 and 1983 (two years whose individual VAT structures were considerably different). To address the problem of the estimation of the VAT base for the relevant years, they started with production data modifying them by adjusting for exports, imports, capital transactions, changes in stocks, exemptions, and all intermediate uses (with the help of an input-output table) in order to arrive at taxable consumption. Furthermore, the same approach has been used by the EU Member States as a common method for the purposes of calculating the value added for the agricultural sector for EU budget purposes. These detailed procedures are included in Annex C of the Sixth VAT Directive (77/388/EEC). The agricultural sector like the financial is exempted from VAT in EU. According to the above method, to calculate the VAT base for the agricultural sector the Member States have to identify from the National Accounts the total final production of the agricultural sector, the total value of inputs and the gross fixed-asset formation. The VAT base in the case of the agricultural sector is equal to the difference between the value of the total final production, exclusive of value added tax, and the total

value of inputs together with gross fixed-asset formation. In our case we use aggregate data to work on the financial sector (banking and insurance), following the general principles of the above-mentioned method for the estimation of the financial sector's VAT base. With the help of input-output (economic) tables constructed for each year, for the period 1989-1998, we identify the VAT base for the exempted financial sectors and finally the yield from taxing the financial services under the VAT system. The calculations are based on the following formula:

$$B=Q-IC-I,$$

Where with B we denote the VAT base of the financial sector (banking and insurance), with Q the total final production of the financial sector (output), IC denoting all the intermediate transactions (inputs) and I the investment of the financial sector. In addition, following the OECD (see OECD/CFA, 1998) work on the cost of VAT exemptions on revenues, an additional modification has to be done at the final stage on the VAT base, to remove the "cost of the exemptions", thus removing the amounts which are not deducted by the exempted sector (general principle of the credit-invoice VAT system). In this case the above formula can be expressed as follows:

$$B=Q-IC-C_d-I,$$

With C_d we denote the non-deductible consumption (inputs) of the financial sector, which have to be removed from the VAT base or from the yield of taxing the financial services. These methods were modified as necessary to reflect the specificity of the sector's structure and the Greek VAT legislation and system (specific reference to Greece).

Most of the data (annual time series) used in the calculations come from the input-output balances (economic tables) issued by National Accounts of the National Statistical Service of Greece for the years 1988-1997 (1998 edition). From the Greek Ministry of Finance/General Accounting Office we obtain data on existing taxes on financial services in Greece (gross-sales tax on banking services and turnover and stamp tax on insurance companies). These data are included separately in the annual budget reports over the estimated period. This information about these specific taxes is necessary for the calculation of the net effect on tax revenues. We also use data from OECD (GDP, Total tax revenues and VAT revenues), "Revenue Statistics", 2000 disc format edition. The variables are expressed in billions of national currency (Drachmas) at market prices.

Analytically our aim in estimating the fiscal revenue loss of VAT exemptions in the financial sector, is to start with production data of the Greek financial sector and to modify them by adjusting for capital transactions, changes in stocks, exemptions and all intermediate uses, with the help of economic/input-output tables for the sector, derived from the National Accounts for the period 1989-1998. This period has been chosen because of the availability of data (revised according to the European System of Accounts, ESA)[35], the introduction of VAT (1987) and the application of the Single Market (1993) with the new "transitional VAT regime".

Our methodology can best be described through an explanation of the steps we take to reach the final results in the relevant tables. First, in our analysis we identify the yield from taxing the financial services under the VAT system by:

a) Identification of sector's outputs

b) Identification of the purchases to be credited by the sector

c) Estimation of the intermediate VAT base for the sector

d) Estimation of the consumption of fixed capital (to be credited by the sector) necessary for the calculation of the effective VAT rate *(t_e)* of the sector as well

e) Identification of the value-added (VAT base) of the sector

f) Estimation of the average statutory (weighted) rate for the Greek VAT system (AWVR)

g) Finally by applying the (AWVR) on financial sector's VAT base we get the yield from taxing the financial services under the VAT system.

Actually the potential VAT revenues can be derived as follows:

*Output (a)-Creditable purchases (b) = Intermediate VAT base (c), Intermediate VAT base (c)-Consumption of fixed capital (d) = VAT base for the financial sector (e), VAT base for financial sector (e) * (AWVR) = VAT revenues from taxing financial services.*

The estimation of the average statutory (weighted) rate for the Greek VAT system is in our case necessary, because of the additional adjustments which have to be done on the VAT base, in order to remove upward biases (because of the dispersion of VAT rates in financial sector's inputs and outputs) that would have resulted from simply applying the statutory rate. In addition, since the National Accounts do not contain information on the

[35] The ESA replaced the traditional system, which followed the principles of the standardised system of the OECD National Accounts of the Year 1958. The works on the revision of the Greek National Accounts started in the middle of 1990 and is still in progress for the period 1995-2000.

breakdown in rates for intermediate consumption and on inputs (exempt shares) for each sector of the economy, we use the weighted average statutory rate (AWVR) of the Greek VAT system derived from the whole, legally defined VAT base. In this case the breakdown of the VAT base (including VAT) is made according to the different applied VAT rates[36] and on the basis of the dispersion of the intermediate consumption for respective parts of the base. This rate also includes adjustments for the special scheme for farmers in Greece (special rates for VAT refund), the intermediate consumption of the exempt sectors, which we do not estimate in our first steps, the intermediate consumption of private cars, transactions in gold for non-industrial use etc. These of course will affect the VAT base of financial sector in the case of rendering such goods or services as inputs of financial sectors production and transaction chain. The data for the estimation of the Average weighted (statutory) rate for each year are included in the "Own Resources Statement[37]" Part 2, of the Greek Ministry of Finance and the National Statistical Service.

Next in order to get a clear view of the "cost" of financial exemptions in Greece we identify the inputs of financial sector which will be creditable when financial services will be taxed and which now are not creditable (yield from current exemptions). The "cost" in this context is defined as the difference between the VAT yield from the financial services sector at present (as a result of the exemptions for financial services) compared with the result that would be achieved, if financial services were subject to VAT. For the estimations we use data from the "Own Resources Statement" for the year 1995-1998, Part 2 Annex VIII, Greek Ministry of Finance and National Statistical Service, where there is special information on the exempt share of intermediate consumption and investment of financial sector (banking and insurance).

Finally we estimate the efficiency of VAT collection of the exempted sectors (finance and insurance) to gain a better understanding of the VAT revenues (in relation to financial sector's inputs) presently accruing to the tax administration from the financial sector. The general approach to measure the efficiency of VAT collection is to compare the effective VAT rate (t_e) to the average statutory rate (t_s). This methodology necessitates a measure of

[36] Applying the rates, which were in force for each year of calculation.
[37] This is an official statement based on National Accounts submitted to European Commission by each Member State every two-year for EU budget purposes.

revenue collections, an estimation of the consumption base on which the VAT is effectively levied and finally the calculation of the effective VAT rate. In this case the efficiency of VAT collection (e) is defined as t_e / t_s (see Jack, 1996). In our case the exemption of financial sector means that the effective VAT rate is determined by the value of inputs to financial institutions rather than the value of the final products. The effective VAT rate can be calculated as follows:

$$t_e = \frac{total\ capital\ expenditures}{VAT\ base\ of\ the\ sector}.$$

Jack (1996) assumes that the statutory tax rate on exempt goods is zero; despite the fact that inputs in the production of such goods may be taxed. But this is hardly the case for Greece or most of the other EU Member-countries where a number of these services provided by the financial institutions, as we have seen in the chapter on the comparative tax (legislative) treatment of financial services, are taxed (leasing, factoring, credit card and advisory services etc.) or are provided to third countries (outside the EU Member States) giving right for deductions (zero-rated).

6.4 Empirical findings

The data over the estimated period (1989-1998) indicate that Greece could benefit from a switch from the current system of exemptions to tax financial services under VAT system. Table 6.1 shows the VAT base and the yield of financial services in the hypothetical case of taxing them, under the VAT system in Greece (the detailed calculations of economic tables and VAT base for each year are displayed in Appendix 1).

Table 6.1: VAT base and yield from taxing financial services under the VAT system in Greece (in billions of Drachmas).			
Year	*Total VAT base for financial institutions (banking and insurance)*	*AWVR (Average weighted VAT rate in %)*	*Yield from taxation*
1989	338.966	12.23	41.47
1990	455.792	13.4	61.1
1991	585.257	14.05	82.25
1992	745.236	13.91	103.68
1993	614.852	13.48	82.89
1994	788.746	13.52	106.68
1995	939.041	14.5	136.16
1996	1037.296	13.29	137.939
1997	1121.22	13.32	149.404
1998	1231.663	13.51	166.498

Data: National Statistical Service.

In addition Table 6.2 includes the financial sector's VAT revenues as a percentage of GDP, Total tax revenues, and VAT revenues respectively, in billion of Drachmas at market prices. These amounts for the estimated period are 0.45 % (mean) as a percentage of GDP, 1.53 % (mean) as a percentage of total revenues and 6.31 % (mean) as a percentage of VAT revenues.

Table 6.2: VAT revenues from financial services as a percentage of GDP, Total tax revenues and VAT revenues (amounts are expressed in billions of Drachmas at market prices).							
Year	*GDP*	*Total tax revenues*	*VAT revenues*	*VAT revenues from financial services*	*as % of GDP*	*as % of Total tax revenues*	*as % of VAT revenues*
1989	10895.2	2949.8	714.2	41.47	0.38	1.4	5.8
1990	13143.1	3909	961.2	61.1	0.46	1.56	6.35
1991	16230.5	4846.9	1207.5	82.25	0.5	1.69	6.81
1992	18766.1	5787.4	1444.9	103.68	0.55	1.79	7.17
1993	21135.7	6627.8	1553.7	82.89	0.39	1.25	5.33
1994	23983.6	7591.1	1735.5	106.68	0.44	1.4	6.14
1995	26883.5	8622.4	1939.5	136.16	0.5	1.57	7.02
1996	29697.7	9517.2	2160.5	137.93	0.46	1.44	6.38
1997	32752.2	11053.6	2460.8	149.4	0.45	1.35	6.07
1998	35601.6	8807.2	2719.2	166.49	0.46	1.9	6.12

Data: National Statistical Service.

The VAT revenues derived from financial service taxation under the VAT system appear to be positive for the estimated period. On the other hand, mainly because of the changes in the VAT law in 1993 due to the implementation of the Single Market and the

"transitional VAT regime" in EU, we can see a decrease in the revenues from financial services in 1993. This can be explained by the general decrease in tax revenues and VAT base in 1993 due to the abolition of the fiscal frontiers (Single Market in EU Member States) and the new way of calculating and accounting for VAT. In any case it seems that the revenues resume their upward trend from the following years, 1994 and 1995. In the calculation of the net effect of taxing financial services under the VAT system in Greece, we had to take into account the revenues presently accruing to the Tax Administration from the existing taxes on banking and insurance services. These revenues would have to be foregone since these taxes would have to be abolished and replaced by VAT. For Greece these amounts are not negligible. In table 6.3 we present the revenues accruing to the Tax administration from the existing taxes on financial services in Greece (gross-sales tax on banking transactions and the turnover tax and stamp duties on insurance companies). The data on the different taxes on financial services in Greece are taken from the annual budget report for the respective years of the Greek Ministry of Finance (General Accounting Office, Year 1989-1998).

Table 6.3: Net revenue effects (billions of GRD at market prices).

Year	*VAT revenues from fin. services*	*Revenues from existing taxes on fin. services*	*Net effect on total revenues*
1989	41.47	81.7	-40
1990	61.1	62.3	-1.2
1991	82.25	76.9	5.35
1992	103.68	87.95	15.73
1993	82.89	109	-26.11
1994	106.68	121	-14.32
1995	136.16	99.9	36.26
1996	137.93	84.2	53.73
1997	149.4	106.2	43.2
1998	166.49	98	68.49

Data: Greek Ministry of Finance/General Accounting Office: Budget Statement (1989-1998)

As it appears from the above table the net effect on total tax revenues is negative in the years of VAT introduction and the application of the Single Market. This can be explained by the low VAT revenues (and VAT base) for these periods. On the contrary, positive for the other years giving a net effect of 36.26 billion of GRD for (1995) to 68.5 billion the total revenue effect is GRD for (1998). These amounts are not negligible, especially, if we take into account the way of application of the existing taxes on financial services (no

deduction for the tax on inputs). In addition table 6.4 and Box 6.1 include the procedure and the results of the calculations of the right of deduction of the financial institutions ("Yield from current exemptions"). These estimations indicate that there is no potential threat from removing the exemptions of financial services and providing the right for deduction for the VAT chargeable on inputs of financial institutions. The VAT chargeable on inputs as a percentage of VAT revenues is 0.86% for the year 1995. This percentage is expected to be relatively "stable" over the years depending on the right for deduction of financial sectors (defined in this case as a proportion of the total taxable outputs to total outputs or equally as a proportion of the deductible input tax to total input tax, "pro-rata mechanism"[38]). Indeed when we estimate the above mentioned amounts for the period 1996-1998 (for which definitive data exists) these amounts are around 0.8 % (mean) of VAT revenues (Table 6.4). In the case of changing the system and removing the exemptions these amounts shall be deducted by the financial institutions. Therefore to get the final result of the fiscal revenue loss of VAT exemptions on financial services we do an additional modification reducing the amount of VAT revenues of financial services with the above percentage (0.8 %) which still gives a final 5.51 % (mean) revenues from financial services as a percentage of total VAT revenues.

[38] When exemption is granted for certain classes of transactions, the partial exemption problem arises in cases where a financial institute supplies exempt and taxable products. In this case, the tax credit is restricted accordingly to goods or services purchased which are strictly related to the taxable supplies. However, the problem arises where financial institutions indiscriminately use taxable goods or services in the transaction chain of both exempt and taxable supplies. In these cases, the apportionment of inputs (and, therefore the tax on them) between those attributable to exempt supplies and those attributable to taxable supplies, is difficult to calculate. In practice the "pro-rata" mechanism is widely used in carrying out such an apportionment; the idea is to calculate the proportion of the deductible tax based on a fraction having as numerator the amount of the annual turnover, less the value added tax, attributable to the deductible transactions and as denominator the sum of transactions included in the numerator and the tax non-deductible transactions (exempted and non-taxable outputs).

Table 6.4. Calculation of financial institutions' inputs under the exemption system (amounts in billion of Drachmas)*.									
Inputs			**VAT rates in %**		**Input VAT**			**Total VAT receipts**	**Input VAT in % of VAT receipts**
Year	**lower rate**	**stand.rate**	**lower rate**	**stand.rate**	**lower rate**	**stand.rate**	**total**		
	(1)	(2)	(3)	(4)	(5)=(3)*(1)	(6)=(4)*(2)	(7)=(5)+(6)	(8)	(9)=(7)/(8)*100
1995	12.7	88.05	8	18	1.01	15.84	16.85	1939.5	0.86
1996	20.91	83.90	8	18	1.67	15.10	16.77	2160.5	0.78
1997	27.88	102.31	8	18	2.23	18.41	20.64	2460.8	0.84
1998	26.51	97.27	8	18	2.12	17.50	19.62	2791.2	0.71
*** Breakdown in rates has been estimated on the basis of breakdown of the total intermediate consumption of the exempt sectors.**									

Data: Greek Ministry of Finance, Own Resources Statement.

The amounts included in the above table 6.4 are found in the Own Resources Statement for 1995-1998, Part 2, Annex VIII, Greek Ministry of Finance. Amounts are in billions of national currency at market prices. Box 6.1 gives the detailed calculations for the year 1995, as an example of calculations and the breakdown of the inputs in different VAT rates.

Box 6.1: Calculation and breakdown of inputs. Year 1995.

Intermediate consumption of the exempted sectors, Banking and insurance: 68.57 (incl. VAT). Investment (incl. VAT), Banking and insurance: 48.92 (incl. VAT). The intermediate consumption is taxed at both reduced and standard rate whereas the investment is only taxed at the standard rate. Since the National Accounts (Own Resources Statement) do not contain information on the breakdown in rates for the intermediate consumption for each sector, an artificial breakdown in rates is made on the basis of the dispersion of the total intermediate consumption for all sectors on the different VAT rates. The breakdown by VAT rate and percentage of intermediate consumption of the exempt sectors is as follows:

Total intermediate consumption of all sectors: 531.87 (excl. VAT) of which 22.28 (=4.19%) is taxed at 4%, 83.22 (=15.65%) is taxed at 8%, and 426.36 (=80.16%) is taxed at 18%. This proportion is used on the intermediate consumption for the two sectors.

Amount at reduced rate:

incl.VAT. Banking/insurance,

Intermediate consumption (4%): 2.87 (68.57*4.19%=2.87)

Intermediate consumption (8%): 10.73 (68.57*15.65%=10.73)

excl. VAT. Banking/Insurance

Intermediate consumption (4%): 2.87/1.04= 2.76

(8%): 10.73/1.08=9.93

Total : **12.7**

Amount at the standard rate:

Incl. VAT. Banking/insurance,

Intermediate consumption (18%): 54.97 (68.57*80.16%=54.97)

Investment : 48.92

Total : 103.89

Total (excl. VAT) : 103.89/1.18=**88.05**

Table 6.5 also shows estimates of the efficiency of VAT collection of the exempted financial sectors in Greece over the period 1989-1998, comparing the effective VAT rate *(t_e)* to the average statutory rate *(t_s)*. It is worth-noting here that in Greece a number of financial services are subject to VAT (i.e. leasing, factoring, credit card and advisory services etc.) or are zero-rated, thus giving right for deductions, when they are supplied to third countries (outside the EU Member States). It is also meaningful to measure this efficiency. The data used for the calculation of the effective VAT rate for the financial sectors are derived from the input-output (economic) tables for the total financial sector, namely the consumption of fixed capital and the VAT base (input-output tables, Appendix 1).

Table 6.5. Efficiency of VAT collection of the exempted financial sectors.

Year	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**
t_e	3.41	3.39	3.58	3.7	4.03	4.31	3.94	4.24	4.33	4.32
t_s	12.24	13.41	14.05	13.91	13.48	13.52	14.5	13.29	13.32	13.51
e	27.85	25.27	25.48	26.59	29.89	31.87	27.17	31.9	32.5	31.97
Estimated average efficiency, 1989-1998 : 29.04 %										

The estimated efficiency of VAT collection *(e)* of the exempted sectors (29.04 %-mean) is very low. This can best be explained by the low percentage of deductions for the financial sector in Greece (1-2%)[39] and the high amounts of financial sectors inputs (0.8% as a percentage of VAT revenues, table 6.4). This low efficiency of VAT collection of the exempted sectors can reduce the whole efficiency of the VAT system, depending on the importance of the financial sector for the VAT base, and give rise for non-neutralities relative to other taxed goods and services.

Finally in Appendix 1, table a_1-a_{10} we show the procedures for the estimation of financial sector's VAT base, presented as input-output (economic) tables for the period 1989-1998 and the yield from taxing the financial services under the VAT system at current prices. Appendix 1, table b_1-b_{10} contains the detailed calculations of the Average Weighted VAT Rate (AWVR) of the Greek VAT system for each year.

[39] Hellenic Banks Association and Greek Ministry of Finance (1998): working document No 999 21 8 1998 and OECD/CFA, 1998.

6.5 Concluding remarks

This chapter has outlined some of the problems of taxing financial services in Greece. The main issue considered is the estimation of the economic effect of taxing financial services under the Greek VAT system on VAT and total tax revenues. According to the general principles of VAT, there is no firm information when the tax authorities impose the tax, that this will result in a positive effect on VAT revenues depending on the dispersion of the rates and the deductible amounts of tax on financial institutions' inputs.

In our analysis we estimated the economic effect based on the financial sector's VAT base, which will arise in the hypothetical case of taxing financial services under the VAT system. The mechanisms discussed in this chapter were developed in previous research projects. However, we developed some modifications with special reference to Greek VAT system, for first time in Greece, which in our opinion can easily be implemented for other EU countries as well. We obtained an estimate of average 5.51% of VAT revenue over the period 1989-1998 for the fiscal revenue loss of exempting financial sectors from VAT in Greece. These results do not differ much from the results obtained by Genser and Winker (1997) for Germany. The small difference between the results can be explained by the inclusion in our estimation of the insurance services and the absence of the option to apply VAT on financial services in Greece. It should be noted here that this fiscal revenue effect has been calculated on a ceteris-paribus basis i.e. ignoring changes of the input-output structure, which are likely to be induced by a change in VAT rates. It is however beyond the scope of this thesis to provide numerical estimates of the price elasticities of banking services or to embed the analysis in a general equilibrium framework.

Finally the empirical evidence provides support to the view that the taxation of financial services under VAT system in Greece is a policy measure able to increase the VAT and the total tax revenues, despite the high amounts of inputs of financial sectors and the right for deduction which will be given to them under VAT system (for example we got 68.5 billion GDR of net revenue effect for year 1998). On other hand, the "cascade effect" will be reduced primarily because the firms using financial services, as inputs will now be able to claim the VAT they pay on these inputs.

CHAPTER 7: THE VARIABILITY AND ECONOMIC PERFORMANCE OF VAT AND INDIRECT FINANCIAL TAXES IN GREECE. EMPIRICAL EVIDENCE AND COMPARISONS WITH SPAIN AND PORTUGAL.

7.1 Introduction

The introduction and harmonisation of VAT in the EU enabled the adjustment of indirect taxes as well. These adjustments resulted in a change in tax structures in Member States (e.g. relation between direct and indirect taxes). Such adjustments have been documented in the literature (Tait, 1991a,b; EC, 1996a). However, the revenue productiveness and the elasticity of VAT, or the elasticity of consumption taxes, has not been estimated. Our focus in this chapter will be to examine empirically, with special reference to Greece, the above-mentioned parameters and to compare with those that will be derived for Spain and Portugal [*Research question* ***R4***, Table 4.1 p.100]. In addition the estimation of the revenue productiveness and elasticity of the indirect financial taxes (including the estimation of average effective tax rates) will provide us with empirical evidence about the structure of the cascade indirect financial taxes and their potential as a revenue-raising instrument. This empirical evidence will help us to reach some conclusions about the VAT system in the three countries and to deepen our analysis and knowledge of the existing system of taxing financial services.

Finally, in this part of the present thesis we also examine some basic hypotheses about the key features of VAT and the revenues' performance in Greece, Spain and Portugal. The objective is to answer our research question on the empirical relationship emerging from the existing data on VAT revenues, VAT base and VAT rates for the period 1986-1998, gaining a better understanding on the impact of exemptions (i.e. financial exemptions) on VAT base and VAT revenues' performance [*Research question* ***R4***, Table 4.1 p.100].

7.2 Methodology and data

7.2.1 Methodology for the estimation of elasticities

The elasticity of a tax on income is derived from the following formula [James and Nobes, (1997)]:

$$\boxed{e=\frac{dT/T}{dY/Y}=\frac{dT}{dY}*\frac{Y}{T}=b\frac{Y}{T}}$$

where T is the revenue from taxation (expressed in a simple linear regression model as $T=a+bY$ as mentioned above), Y the National Income and b the marginal productiveness of taxation. Alternatively if we express the above-mentioned model in logarithmic form then we get:

$$\ln T= a + b*\ln Y+u, \quad (1)$$

where ln is the natural log to the base $e=2.718$. In common logarithm, thus log to the base 10 (which we use in practice), the model can also expressed as: $\log T=a +b*\log Y +u$ (in this case $\ln eX=2.3026\log_{10}X$). One of the features of this log-linear model is that the slope coefficient b measures the elasticity of tax revenues on National Income (Gujarati, 1995). However, the elasticity obtained from the log-linear model does not coincide with the elasticity obtained by using the above formula. This elasticity is often an estimate of the average elasticity of the variables and is computed at the mean, or the average values of the variables. In addition, using the actual tax revenues in the equation (1) eliminates any problems with measuring tax rates and their changes and because the data are aggregated across countries it eliminates any problems of country business cycles differing from the national cycle. **Following Groves and Kahn, (1952), and Sobel and Holcombe, (1996), the income elasticity *b* serves as a proxy for both the long run growth and the short run variability of taxes with respect to the national income.**

The above model has been widely used to estimate the income elasticity of tax revenues of different taxes. In this case the coefficient b represents the income elasticity of revenues of this particular tax. As Sobel and Holcombe, (1996) argue, depending on the econometric properties of the variables in equation (1), the estimates of a and b may be subject to different problems. The important characteristic of the variables is whether they are stationary (a stationary variable is one that tends to return to some mean value through time) or not. Many time series (especially time series representing tax revenues) are nonstationary. With nonstationary variables the problem in estimation of equation (1) is

that the coefficients should be inconsistently estimated. The error term is clearly correlated through time. This serial correlation in the error term results in the coefficient estimate being biased and also results in an inconsistent estimation of the standard error of the coefficient. Therefore, to avoid regressing one nonstationary time series on another nonstationary time series (obtaining spurious or dubious results) we regress the variables in first-differenced form (stationary versions). Within the present context the change form is simply the annual growth rate of the variable. Thus the correct form in this case of the regression to obtain the elasticity is given by:

$$\Delta \ln T = a + b^{*}\Delta \ln Y + u, \quad (2)$$

We have to note here that in this case the coefficient *b* in equation (2) measures the short run relationship (annual change) and is insensitive to the long run relationship (Sobel and Holcombe, 1996).

Following Sobel and Holcombe, (1996) the VAT revenues, are firstly related to the series of the Net National Income (NNI) by using regression techniques for the period 1987-1998 (Greece introduced VAT in 1987). We estimate first linear versions, using the Ordinary Least Squares (OLS) technique (in Microfit 4.0), of the general model $\Delta T = a + b\Delta Y$, where T is representing the VAT revenues, and Y the Net National Income (in first differences). The slope coefficient b in this case measures the marginal productivity (annual change) of VAT on National Income. Then we estimate the log-linear form of the above equation thus $\Delta \ln T = a + b^{*}\Delta \ln Y$. In this case the slope coefficient b measures the short run elasticity of VAT on National Income. The concept of Net National Income (NNI) does not include indirect taxes and is derived from the Gross Domestic Product (GDP) by adding income from abroad to and subtracting depreciation from the latter. We have preferred (NNI) to other concepts since it is the best index for showing changes in National Income through time. The Gross National Income (GNI) figure incorporates depreciation, thus overestimating the real means that finance consumption expenditures (and indirect tax revenues). On the other hand, the GDP figure does not include income from abroad which, nevertheless, does contribute to consumption stream. Likewise, Gross National Product (GDP), being derived by subtracting net borrowing and net transfers from the rest of the world from the total of the available means, is unsatisfactory, since it includes indirect taxes, i.e. the dependent variable. Lastly, personal disposable income and consumption expenditures do not accurately reflect the tendencies prevailing in the economy, since the

direct tax structure and the propensity to consume, respectively, may vary from year to year quite independent of the total production effort.

Due to our small sample (13 observations for VAT) we strengthen our investigation (comparing the results) using the above methodology for consumption and indirect financial taxes for which data are available for the period 1965-1998. The same methodology is applied for the examination of the VAT and consumption tax system for Spain and Portugal for the same period (1965-1998) to gain a better understanding of the similarities and differences among these systems. In addition, in our analysis we use the consolidated value of total tax revenues (this include taxes paid to the central government and local authorities), and total consumption (private and government), using the above mentioned regression analysis, in order to estimate and compare the marginal productiveness and elasticity with those derived for consumption taxes under the period 1965-1998. One can question here the inclusion of government consumption in our research by assuming that its exclusion could sharpen the ability of the study to detect inefficiencies and differences. In general one expects a smaller incentive for government purchase of VAT liable goods and services to evade the tax. Therefore including them would reduce the power of any research to detect erosion or differences between VAT systems in general. Given the special conditions during the years of estimation seem that the exclusion of the calculations of the government consumption does not hold. The continued dominant presences of the Public sector in key economic activities in the three countries of our investigation lead us to include the above-mentioned variable in our estimations (Joumard and Varoudakis 2000; Bronchi 2001; Bronchi and Gomes-Santos 2001). Furthermore, in a comparative study, an important issue is the extent to which possible errors in estimation are common in all countries. If the estimations are equally biased (not individually biased) in all countries then comparative ratings are unaffected, and the information derived is still useful.

The data (annual time series) for the present analysis (including the analysis of VAT revenues' performance and the estimation of the average effective rates), are obtained from OECD (VAT, total revenues, consumption taxes) "Revenue statistics", 2000 edition (disc format). The period under study is 1986-1998 for VAT, and 1965-1998 for total tax revenues, consumption and financial taxes. The data in "Revenue Statistics" are presented

in a standardised framework based upon the OECD classification of taxes and interpretative guide, which was revised in 1984. The information for the most part of the data has been provided by delegates to working party 2 on "Tax policy, analysis and Tax Statistics" of the Committee on fiscal affairs. It is worth noting here that there are some differences and limitations in the collection methods because of the aggregation in macroeconomic data collection in OECD "Revenue Statistics" (Sampling or measuring errors). Because of this limitation data on the cascade indirect financial taxes are derived from the code 5126 (for both banking and insurance taxes), without including other taxes (e.g. taxes on gambling) from OECD "Revenue Statistics-2000 edition". However, the sample size is mainly determined by the availability of information for the three countries (Greece, Spain and Portugal) which is important for the estimation of elasticities. From IMF we obtained data on Net National Income, total consumption and GDP deflator, "International Financial Statistics, Yearbook 2001". All variables have been deflated by using the GDP deflator and are finally expressed at 1995 prices (in billions of national currencies).

7.2.2 Methodology and Model for VAT revenues' performance

VAT has become a major tax instrument world-wide. The global trend to introduce VAT in more countries is continuing. VAT has also become an indispensable component of the tax advice and tax reforms in developing countries. As we have already discussed in our literature chapters the growing practice of VAT is reflected in the extensive literature on technical, economic, and distribution dimensions of VAT, and there is a growing consensus on the "best practice" and desirable features required of a good VAT system. However, very few studies have empirically tested some basic hypotheses about key features and the performance of VAT as a revenue-raising instrument. In this second part of the present chapter we will empirically test some basic hypotheses about the key features and the performance of VAT in Greece, Spain and Portugal, for the period 1986-1998, as a revenue-raising instrument. In particular, revenue performance and its determinants have been an issue of special relevance for fiscal authorities. **The emerging conventional wisdom, based largely on practice and numerous country case studies (Bogetic and Hassan, 1993; World bank, 1991; Gillis, 1990) suggests that a simple rate VAT, with very few exemptions and, therefore, a broad base is superior to a**

VAT with multiple rates and many exemptions which reduce its base and complicate administration.

In our analysis we investigate, taking into account the above-mentioned assumption, the empirical relationship emerging from the existing data on VAT revenues, VAT rates and VAT base. By doing this we deepen our understanding and answer our research question on the impact of exemptions (including financial exemptions) on VAT revenues' performance in Greece comparing the results with those for Spain and Portugal to examine whether there is any statistically significant difference [*Research question **R4***]. To this end we provide further quantitative background regarding VAT. The above mentioned countries have been chosen because of the similarities in indirect tax system (same period of VAT introduction, not many differences in VAT base etc.). In our analysis we look at the relationship emerging from the existing time series data (1986-1998) on VAT revenues, VAT base and VAT rates in Greece, Spain and Portugal. The strength of this relationship will allow us to get a better understanding of the impact of exemptions (VAT base) and rates on VAT revenues' performance as measured by a VAT/GDP ratio. **The stronger the relationship is, between VAT base and VAT revenues' performance, the higher the impact of the exemptions on VAT revenues' performance (a broad base will give more revenues).**

Because of the multiple rate system applied in the three countries (Appendix 2c) we create a new variable to capture the impact of VAT rates on VAT revenues. This is the difference (in percentage) between the highest and the lowest VAT rate applied in three Countries. Tait (1988) pointed out that administrative and compliance costs rise dramatically as the number of VAT rates increases. Thus differentiation, through higher costs, may adversely affect revenues. Furthermore, a single rate is almost always revenue superior to multiple rates with little rate dispersion. Therefore, when countries use more than one rate, rate dispersion tends to be substantial. Consequently, it may be that it is the dispersion of rates, rather than the number of rates per se, that may adversely affect VAT revenue. This is the main reason for the introduction of the above new variable. The comprehensive VAT is typically levied on a broad base, which includes all goods and services. However, countries vary in their coverage of the base, particularly with regard the treatment of services (e.g. financial services). In our case we do not have to distinguish among the three

VAT regimes and to calculate the true VAT base because these countries do not differ in the coverage of the VAT base; the three countries apply the EU transitional VAT regime with a uniform scheme of exemptions following the 6th VAT Directive. We therefore use the total consumption as a simple variable to measure the size and the relation of exemptions to VAT base. In addition, total consumption includes the financial services, which will strength our research on the impact of financial services on VAT base and VAT revenues' performance (this approach assures that the VAT base in three countries comprises all goods and services). In total consumption we include government consumption for the reasons we mentioned above (the size of the Public sector in three countries etc.). Therefore we postulate the following general model: Increases in VAT revenues are due to increases in VAT rates and the coverage and the size of the tax base, while rate differentiation raises costs and thus negatively affects revenue. That is:

$$REV=f(Base^{+},Rate^{+},Range^{-})$$

where *REV* is defined as the VAT revenues to GDP ratio, *Base* is the total consumption and *Range* is a measure of rate dispersion. We estimate linear versions of the above general model using Ordinary Least Square techniques for the three countries. Non-nested tests show a better fit for the model with the variables in logarithmic form. In this case the above mentioned model may be expressed in logarithmic form as:

$$\ln REV = a + b_1 * \ln Base + b_2 * \ln Rate + b_3 * \ln Range + u_t$$

The rate variable uses the standard rate in all countries (situation at 1st May 2000)[40]. The weighted average VAT rate for these countries would be clearly preferable, but there are not official data available for Spain and Portugal. Such a calculation as we show in our chapter about the impact on VAT base of taxing financial services under the VAT system in Greece demands a detailed knowledge of the VAT legislation applicable in the country, the availability of data about the intermediate consumption of each sector and the specific rate applied.

7.2.3 Methodology for the calculation of the average effective tax rates on consumption

Over the past 15 years, tax reforms (i.e. reforms of the indirect tax systems) have profoundly changed the shape of EU tax systems and rekindled interest in measuring effective tax rates. Indeed, in order to understand past reforms or to evaluate the tax

[40] VAT rates applied in the Member States of the European Community (DOC/2206/2000-EN-see Appendix 2c).

policies of particular countries, it is necessary to go beyond statutory rates since these sometimes bear little relation to rates actually paid. An alternative approach, suggested by Mendoza, Razin and Tesar, (1994) is to relate realised tax revenues directly to the relevant macroeconomic variables in the National Accounts. The resulting estimates, known as "average effective tax rates" (AETRs) or "implicit tax rates" take into account the overall tax burden from the major taxes and are consistent with the concept of aggregate tax rates at the National level. The AETR on consumption t_c is calculated as the sum of general Consumption taxes on goods and services and excise taxes divided by the sum of private consumption (Mendoza, 1994; OECD, 2000a).

Mendoza excludes government wages expenditures from the consumption tax base on the grounds that they are not subject to indirect tax. However, many of the services provided by the government sector, such as education and medical care, are not subject to indirect tax either when they are privately provided. Consequently, failure to include government wages in the tax base would result in AETR on consumption being overstated in countries where these (labour intensive) services are publicly provided relative to the countries where they are private provided. In order to enhance cross-country comparability the AETR in consumption is calculated in the following equation using total final expenditures as the base. The other change in equation is to express the tax base in gross returns (i.e., including indirect taxes). This enhances comparability with the other AETRs (i.e. indirect financial taxes).

$$t_c = \frac{General\ consumption\ taxes\ +\ Excises}{Private\ consumption + Public\ consumption}$$

General consumption taxes (derived from the code 5110 from OECD, Revenue Statistics, 2000) over the period 1965-1998 include all taxes, other than import and export duties and indirect financial taxes, levied on the production, leasing, transfer delivery or sales of a wide range of goods and/or the rendering of a wide range of services, irrespective of whether they are domestically produced or imported and irrespective of the stage of production or distribution at which they are levied. It thus covers value-added taxes, sales taxes and multi-stage cumulative taxes. The data on final consumption are taken from International Financial Statistics (IMF, 2001). A factor to bear in mind when interpreting estimates of the AETR on consumption based in the above equation is that these expressions include indirect taxes on investment goods in the numerator. In the case of

VAT this occurs for VAT exempt industries that supply inputs to produce investment goods. As we discussed in the literature chapter neither the purchaser of these inputs nor the tax-exempt suppliers themselves are able to claim back the VAT paid on the VAT-exempt industries' inputs. This problem does not affect government or the non-profit sector, as their inputs are classified as final consumption in the National Accounts. For general indirect taxes, other than VAT (such as sales tax and turnover tax) which are only levied in few countries (i.e. Greece), the problem is more direct, in that such taxes may apply to investment expenditures more generally. However, is not possible to adjust the above-mentioned equation for this problem in either case. Data are not generally available on VAT paid by exempt sectors that supply inputs to produce investment goods or on the proportion of their outputs that are inputs to produce investment goods. With respect to other general indirect taxes, data are not readily available on the proportion of such taxes that relate to consumption goods. Allocating such taxes to consumption and investment in proportion to the share of each in GDP is unlikely to be a satisfactory solution because rates are generally lower on investment goods. Thus the above equation overstates the AETR on consumption by including indirect taxes on investment in the numerator. However, the degree of overstatement is unlikely to be great, especially as the countries of interest (i.e. Greece, Spain and Portugal) tend to have either a VAT or other general indirect taxes but not both.

Moreover, we make an additional estimation over the same period 1965-1998 of the average effective rate on consumption attributed to the indirect financial taxes by using as numerator in the relevant equation the revenues from indirect financial taxes (derived from the code 5126 of the OECD Revenue Statistics, 2000) and as denominator the total (final) consumption in order to examine further and to enhance our previous findings, estimating the elasticities, about the position of these taxes in consumption tax system in the three countries.

7.3 Findings

7.3.1 The elasticity of the Greek VAT system (Estimation period 1987-1998)

As shown in Table 7.1-7.2, the insignificant intercept term in the regression of VAT revenues on National Income (in first differences) makes VAT less burdensome at low levels of income, although VAT is collected in the strictly theoretical case of a negative

National Income. This aspect of VAT is explained by the fact that it is not imposed at a uniform rate on all transactions. Here is the case that even if the Nation as a whole produces no income it must survive by dissaving or borrowing, thus giving rises to consumption expenditure taxable by VAT. It means that the tax does not ensure adequate funds to the government when National Income is low without borrowing or dissaving. On the other hand the low elasticity of VAT on National Income (0.41) shows that VAT fails to equip the government with the potential to enlarge its share of National Income as the latter grows, at least to the extent that present indirect taxes permit. It implies that VAT alone is not able to make up for the budget losses caused by inflation. We have to note here that the "inflation cushion" capacity of VAT is manifested in two directions. Firstly VAT is suitable to correct automatically the distribution of real income that tends to be distorted by inflation in favour of the upper income groups and profit earners. This is the strongest point of a multiple rate system of VAT thus its ability to cushion the adverse effects of inflation on income distribution. Secondly, as during inflation, VAT does not succeed in supplying the tax authorities with adequate real yield. The Greek government therefore is compelled to employ other indirect taxes more intensively. As we can see from the results in table 7.1 our finding that the National Income elasticity of VAT revenues is less than unity may be explained by the multiple rate VAT system (VAT taxation hits more spending on non-basic needs). The low elasticity of the existing VAT system causes built in flexibility in two contrasting ways: on one hand when National Income increases, the ability to pay of the community as a whole rise and ideas about the desirable level of public expenditure alter in a way which compels the government to search for additional sources of revenues and: on the other hand when National Income falls, the relief of the tax burden to consumers may be a decisive factor in speeding up recovery but is difficult for the government to avoid trouble resulting from readjustments in tax structure. Notwithstanding that the concept of National Income elasticity of tax revenues cannot be a gauge of revenue productivity, it is an index for measuring the progressive (or regressive) nature of a tax system, something which can hardly be done by the regression coefficient. Since VAT on average absorbs a decreasing portion of changes in National Income as the latter increases, we find that the Greek VAT system is regressive over time in absolute terms. This cannot be easily explained if we take into account the multiple rate system used in Greece and the exemptions applied (threshold for small businesses, specific exemptions such as health and education services etc.). Finally, the regression of total

consumption on National Income gives an average elasticity of 0.82 that does not coincide with the elasticity index of VAT revenues. The difference between the two indexes (0.4) cannot be explained only by changes during this period in tax-rates (e.g. abolishing of the increased rate 36% for luxury goods in 1990) and VAT base, but probably by erosion of the tax base as well.

Table 7. 1. Variability of the Greek VAT system (1987-1998)

Variables	*Marginal productiveness*	*Elasticity on National Income*
VAT revenues	0.08	0.41
Total consumption	0.73	0.82

Table 7.2. (OLS) Regressions for Greece. Estimation period (1987-1998)

Dependent variable	*Regressors*	*intercept*	*Regression coefficient*	
VAT revenues (Δvr)	*Net National Income(ΔNI)*	410.35** (173.79)	0.08 (0.01)	R^2: 0.22 *SER*: 98.82 *DW*: 1.64
(Δlnvr)	*(ΔlnNI)*	0.08* (0.03)	0.41 (0.2)	R^2: 0.30 *SER*: 0.05 *DW*: 1.4
Total consumption (Δtc)	*Net National Income(ΔNI)*	486.59** (308.36)	0.73 (0.12)	R^2: 0.76 *SER*:273.8 *DW*: 1.8
(Δlntc)	*(ΔlnNI)*	0.02* (0.01)	0.82 (0.06)	R^2: 0.80 *SER*: 0.01 *DW*: 1.8

No major problems suggested from the diagnostic tests (standard errors are expressed in brackets). In the regression of VAT revenues on National Income the results have been adjusted for heteroscadasticity.

7.3.2 Elasticities of the Spanish and Portuguese VAT system

From the plot of the relevant variables (National income and VAT revenues), figure 7.1-7.4, for the three countries it seems that these variables have shown a strong upward trend in the estimated period (1986-1998).

** Non-significant at 5% and 10% critical level. * significant at 10% critical level; otherwise significant coefficient at 5% critical level.

There is also an indication of a change in VAT revenues upward trend in 1993 for both Portugal and Spain (a possible effect of the Single Market). However, the systems seem to resume an upward trend very quickly.

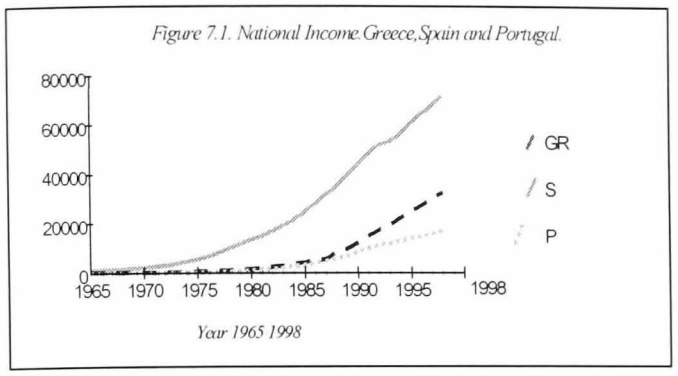


Figure 7.1. National Income Greece, Spain and Portugal.

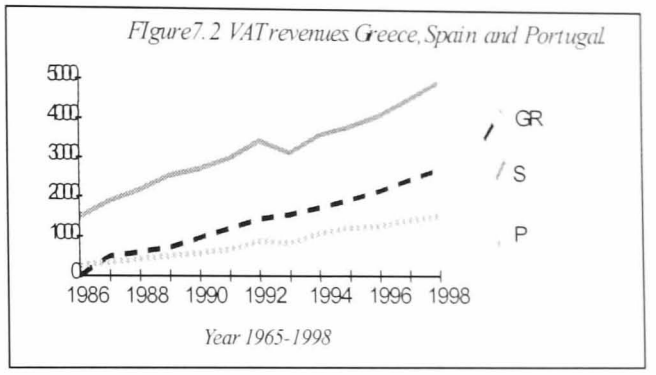


FIgure7.2 VAT revenues Greece, Spain and Portugal

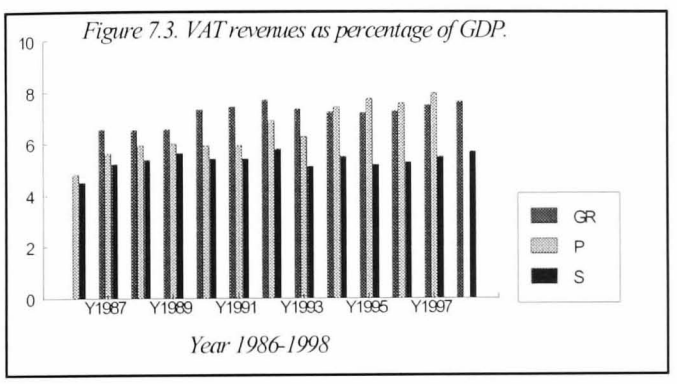


Figure 7.3. VAT revenues as percentage of GDP.

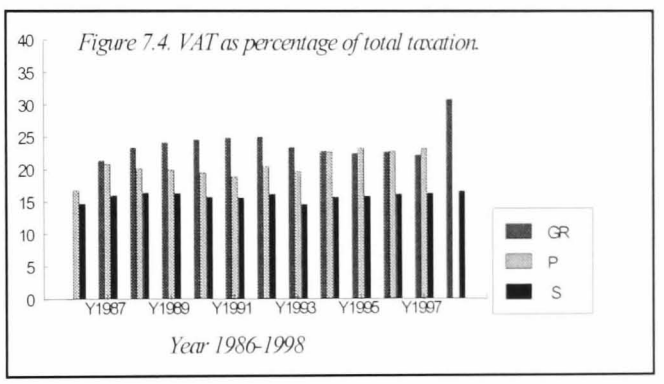


Figure 7.4. VAT as percentage of total taxation.

Data: OECD Revenue Statistics, 2000.

Applying the same methodology as described above, to Spain and Portugal for the estimated period 1986-1998 (both countries introduced VAT in 1986), we obtain the following results presented in table 7.3-7.6. It appears that the marginal revenue productiveness of VAT revenues for Spain is approximately double that of the existing marginal productiveness in Greece (Table 7.3). For Spain we see an insignificant intercept term making, like Greece, VAT less burdensome at low levels of income (multiple rate VAT system). On the other hand the high elasticity of VAT on National Income (1.72), higher than the Greek VAT elasticity, shows a greater "inflation cushion" capacity of the VAT system in Spain. In other words it seems that the VAT structure in Spain is different from the Greek one. The elasticity of total consumption on National Income (0.89) does not coincide with the elasticity of VAT revenues. This difference is relatively high (0.83) which cannot be explained only by changes during this period in tax rates (e.g. abolishing of the increased rate 28% in 1992) and VAT base. This suggests of VAT base erosion, different structure in consumption, VAT controls etc.

Table 7.3. Variability of the Spanish VAT system (1986-1998)

Variables	*Marginal productiveness*	*Elasticity on National Income*
VAT revenues	0.13	1.72
Total consumption	0.6	0.89

Table 7.4. (OLS) Regressions for Spain. Estimation period (1986-1998)

Dependent variable	*Regressors*	*intercept*	*Regression coefficient*	
VAT revenues (Δvr)	*Net National Income (ΔNI)*	-76.66** (204.95)	0.13 (0.05)	R^2:0.54 *SER*:165.81 *DW*: 1.68
Δln*vr*	Δln*NI*	-0.033** (0.054)	1.72 (0.65)	R^2: 0.40 *SER*: 0.06 *DW*: 1.7
Total consumption (Δtc)	*Net National Income (ΔNI)*	1009.4* (560.1)	0.6 (0.14)	R^2: 0.53 *SER*:460.76 *DW*: 1.4
(Δlntc)	*(Δln NI)*	0.007** (0.008)	0.89 (0.09)	R^2: 0.88 *SER*:0.01 *DW*=1.44

In addition the marginal productiveness for the VAT system in Portugal (Table 7.5) is quite high (the Greek one is 1/6 of the Portuguese). Portugal seems to have higher elasticity of VAT on National Income than Greece. This makes the VAT system applied in Portugal more progressive in comparison to that applied in Greece. On the other hand, the elasticity of total consumption on National Income almost coincides with the elasticity index of VAT revenues. The marginal difference between the two-index (0.1), well below the Greek (0.4) and Spanish (0.83), can be explained by changes in VAT rates (e.g. the abolition of the high rate of 30% in 1992) and VAT base.

Table 7.5. Variability of the Portuguese VAT system (1986-1998)

Variables	*Marginal productiveness*	*Elasticity on National Income*
VAT revenues	0.53	1.2
Total consumption	0.79	1.1

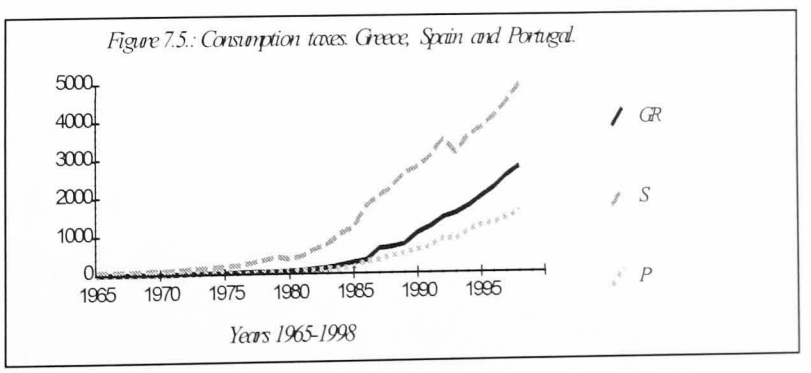
* Significant at 10% level, ** non-significant at 5% and 10% critical level.

Table 7.6. (OLS) Regressions for Portugal. Estimation period (1986-1998)				
Dependent variable	***Regressors***	***intercept***	***Regression coefficient***	
VAT revenues (Δvr)	***Net National Income (ΔNI)***	136.82** (96.32)	0.53* (0.24)	R^2:0.39 SE: 67.86 *DW*: 1.9
(Δln*vr*)	***(Δln*NI*)***	0.01** (0.06)	1.2 (0.48)	R^2:0.38 SE:0.08 *DW*:2
Total consumption (ΔTc)	***Net National Income (ΔNI)***	191.56** (159.98)	0.79 (0.14)	R^2: 0.72 SE:135.6 *DW*:2.2
(Δln*Tc*)	***(Δln*NI*)***	-0.01** (0.014)	1.13 (0.1)	R^2:0.90 SE:0.02 *DW*:1.9

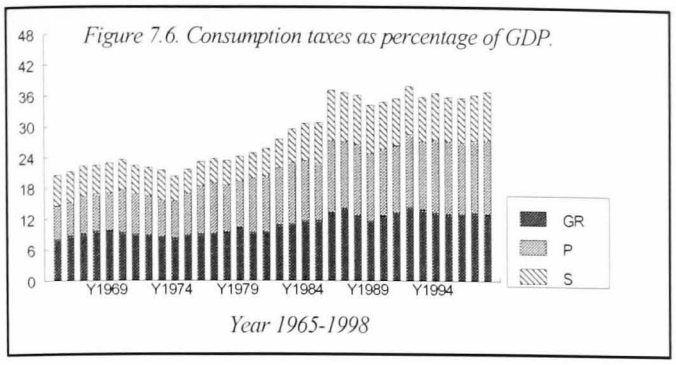
No major problems suggested from the diagnostic tests in the above equations for Portugal (standard errors are expressed in brackets). The equation of total consumption in logarithmic form has been adjusted for heteroscedasticity.

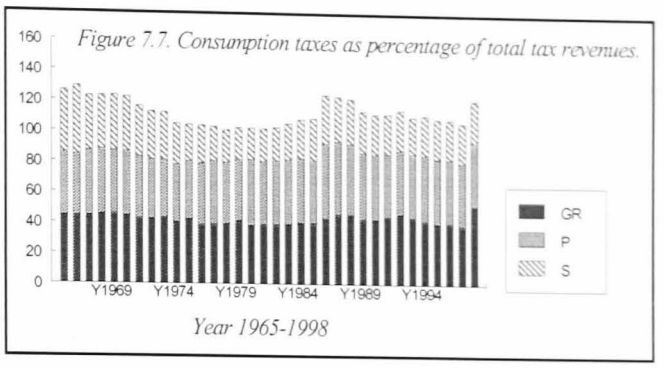
7.3.3 The elasticities of Consumption taxes in Greece, Spain and Portugal (Estimation period 1965-1998)

The plot of consumption tax revenues, (Figure 7.5-7.7), for the three countries show that these variables have shown a strong upward trend during the estimated period (1965-1998). The change in the upward trend in 1993 for VAT revenues for Spain and Portugal is shown for the consumption tax revenues as well. Likewise, the systems seem to resume the upward trend very quickly.



** non-significant at 5% and 10% critical level, * significant at 10% critical level.





Data: OECD Revenue Statistics, 2001.

The summary statistics displayed in table 7.7 suggest that Portugal has enjoyed a higher growth in revenues from consumption taxes than Greece and Spain over the 1965-1998 period. The tax revenues from consumption taxes have grown in Portugal around 18.49 per cent per annum, compared to an average annual rate of 6.96 and 4.81 per cent for Greece and Spain respectively.

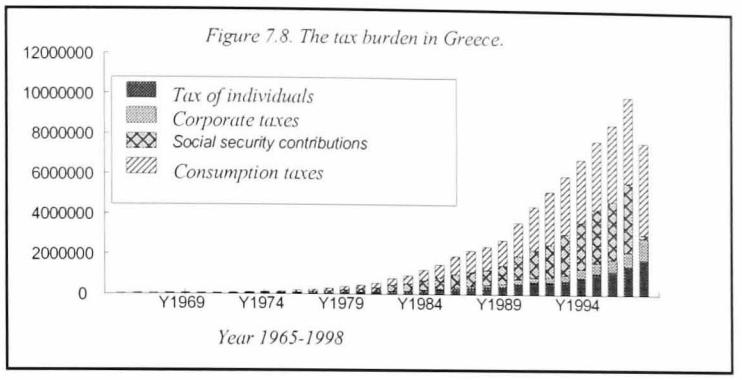
Table 7.7: Summary statistics for growth rate of Consumption taxes.

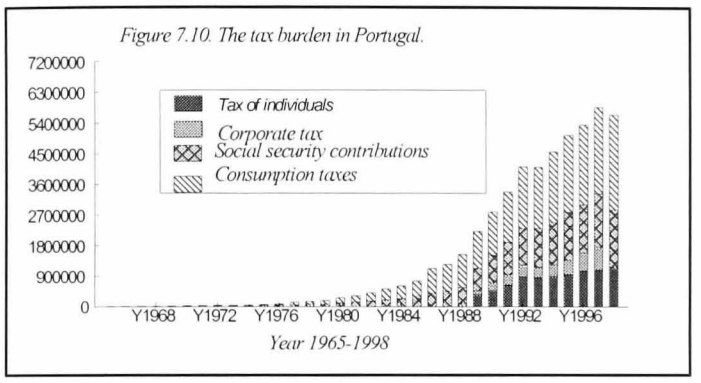
Sample period :1966 to 1998
Variable(s): *Rate of growth of Consumption taxes*

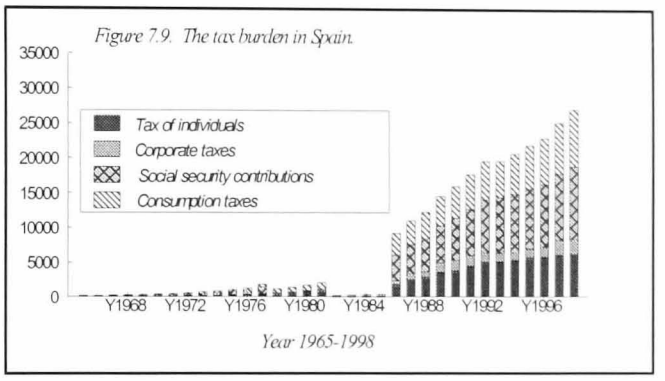
Country	***GR***	***S***	***P***
Maximum:	62.32	32.68	333.36
Minimum:	-24.66	-21.18	-10.28
Mean:	6.96	4.81	18.49
Std. Deviation:	15.01	10.54	57.88

Estimating the marginal productiveness of consumption tax revenues and elasticity on National income using OLS techniques, we obtain the results shown in Table 7.8-7.10 (all equations are reported in Appendix 2b). In addition, we estimate here for the same period (1965-1998) the elasticity of total tax revenues on National Income comparing the results with those derived for consumption taxes. Greece appears with the lowest marginal productiveness of consumption taxes in relation to the one derived for total taxation (1/9). The same relation for Spain is (1/6) and for Portugal (1/3). This suggests that, among the three countries, Portugal relies more on consumption taxes in fiscal policy to generate revenues (see also the following figure 7.8-7.10, presenting the tax burden in the three countries and Appendix 2a on the functional form of taxation in Spain and Portugal). Portugal also appears with the more progressive consumption tax system shown the higher elasticity (1.36), among the three countries. Greece on the other hand is the country that

appears to be more dependent on consumption taxes (shown a higher elasticity of consumption taxes), to be able to generate revenues as National Income grows, with a very small elasticity (0.46), the smallest among the three countries, of total tax revenues.







Data: OECD Revenue Statistics, 2000.

The relatively high elasticities of total consumption on National income show that spending is at high levels in three countries for the estimated period 1965-1998 as National income grows and do not coincide with the elasticity index of consumption tax revenues for Greece and Portugal. The difference between the two indexes is (0.5) for both countries and, as in the case for VAT revenues for Greece, cannot be explained only by changes in consumption tax rates or tax base. Taking into account the high elasticity for consumption tax revenues and the upward trend for the National income for the same period, it seems that the consumption tax base erosion can be the possible source for these differences. As a difference Spain does not appear to have this problem in the whole consumption tax structure (there is a marginal difference of just 0.05) as it was the case for VAT.

Table 7.8. Variability of the Consumption taxes in Greece (1965-1998)

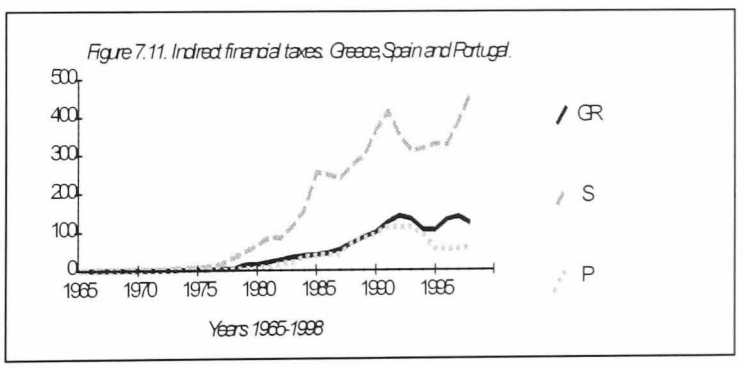
Variables	*Marginal productiveness*	*Elasticity on National Income*
Consumption taxes	0.07	1.19
Total tax revenues	0.69	0.46
Total consumption	0.91	0.65

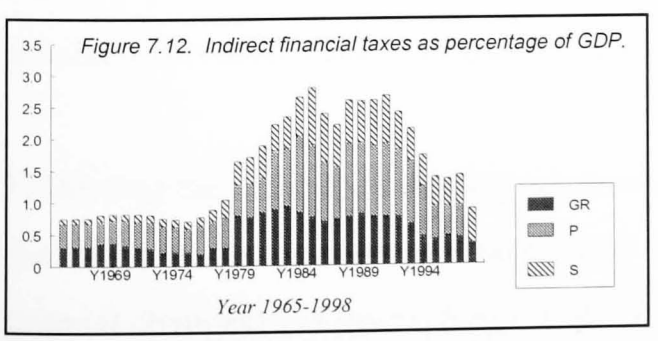
Table 7.9. Variability of the Consumption taxes in Spain (1965-1998)		
Variables	***Marginal productiveness***	***Elasticity on National Income***
Consumption taxes	0.09	0.9
Total tax revenues	0.55	1.12
Total consumption	0.84	0.85

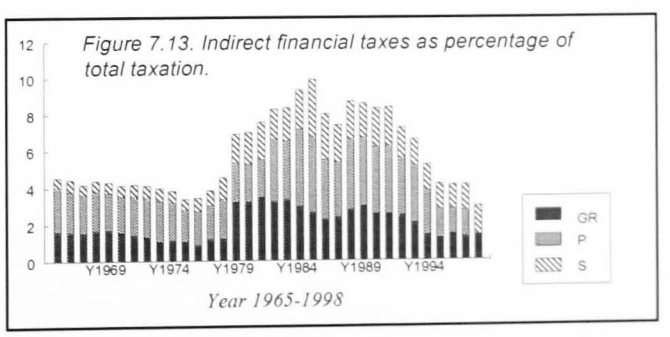
Table 7.10. Variability of the Consumption taxes in Portugal (1965-1998)		
Variables	***Marginal productiveness***	***Elasticity on National Income***
Consumption taxes	0.1	1.36
Total tax revenues	0.42	0.77
Total consumption	0.94	0.81

7.3.4 The elasticities of the cascade (indirect) taxes on financial services in Greece, Spain and Portugal (Estimation period 1965-1998)

From the plot of the indirect (cascade) taxes on financial services (Figure 7.11-7.13), it appears that the indirect financial taxes in three countries show an upward trend for the period of estimation. This trend has changed in 1990s (decrease). The system seems to regain the upward trend only in Spain. On the contrary in Greece and Portugal there is a tendency for fewer revenues resulting from these taxes.







Data: OECD Revenue Statistics, 2000.

The summary statistics displayed in table 7.11 suggest that Spain has enjoyed a higher growth in revenues from indirect financial taxes than Greece and Portugal over the 1965 to 1998 period. The tax revenues from indirect financial taxes have grown in Spain by around 10.98 per cent per annum as compared to an average annual rate of 5.53 and 6.81 per cent for Greece and Portugal respectively.

Table 7.11. Summary statistics for the growth rate of indirect financial taxes.

Sample period: 1966 to 1998

Variable(s): Growth of indirect financial taxes

Country	*GR*	*S*	*P*
Maximum:	194.49	65.95	83.12
Minimum :	-29.53	-20.77	-43.88
Mean :	5.53	10.98	6.81
Std. Deviation:	36.69	21.82	21.97

Generally, the comparison of the available data on indirect financial taxes in the three countries with the data on consumption taxes reveals that the former taxes are designed to tax non-basic needs in contrast to consumption taxes which seems to burden all consumptions. Simple observation of the data for the three countries reveal that the tax to income ratio is higher for consumption taxes than for the indirect financial taxes at low levels of National income. In other words, the consumption tax revenues are more stable over time than the indirect financial tax revenues as they are less affected by the income fluctuations. This happens because consumption taxes are levied on total consumption spending which keeps an average rate of growth very close to that of GDP. Consequently, the resulting revenues are more evenly spread over time than the revenues from the indirect financial taxes that falls on expenses for non-basic needs (banking, insurance and auxiliary services) which increase at a faster rate.

Following the same methodology as in the case of VAT revenues and consumption taxes, we estimate the revenue productiveness and the elasticity of the indirect financial taxes (annual changes) in Greece, Spain and Portugal for the period 1965-1998 (all equations are reported in Appendix 2b). The results presented in Table 7.12 show that the revenue productiveness of the indirect financial taxes in Greece is low and is only 1/70 of the existing marginal productiveness of consumption taxes. In addition elasticity is less than

unity despite the uniform way of application of these taxes (single rate and no right for deduction). Both parameters reveal that these taxes fail to equip the government with the potential to enlarge their share of National income as the latter grows (contrary to consumption taxes). It seems that although these taxes in absolute terms raised revenues, their significance in the tax system (in comparison to the consumption taxes) can be questioned. Furthermore for Spain and Portugal we estimate elasticities greater than unity (Spain appears with the highest elasticity (2.23)) which suggest a progressive way of application of these taxes. However, the very low marginal revenue productivity for Spain and Portugal, suggests a weak relation with the changes in National income. These taxes, (despite the right for deduction being disallowed in the three countries), seem to be insignificant as revenue raising instruments in the whole consumption tax system.

Table 7.12. Variability of the indirect financial taxes in Greece, Spain and Portugal (1965-1998)

Country	***Marginal productiveness***	***Elasticity on National Income***
Greece	0.01	0.96
Spain	0.007	2.2
Portugal	0.004	1.34

7.3.5 Findings on VAT revenues' performance for Greece, Spain and Portugal

The results seem to provide empirical evidence about the VAT revenues' performance in Greece, Spain and Portugal. However, they do not support all the theoretical arguments mentioned above. As we can see from the results presented in table 7.13, Tait's (1988) argument that official administrative costs and traders' compliance cost rise sharply as the number of rates multiplies, leading to potential revenue losses, does not seem to hold for the three countries. We see insignificant regression coefficient for VAT rates dispersion for the three countries. It seems that the multiple rate system in these countries has been used mainly as a measure to reduce the regressivity of tax rather than to regulate the VAT revenues' performance. The results of the regression for Greece confirm partial by the conventional views of VAT performance. The regression coefficient for VAT rate (at 5% and 10% critical level) and for VAT base (at 10% critical level) is significant. The results show that a change of 10 per cent in VAT rate has a 6 per cent positive effect on average on VAT revenues' performance pointing to a quite strong relation. On the other hand a 10

per cent change on average of VAT base (including the financial services) has an average positive effect of 0.8 per cent on VAT revenue performance.

The base coefficients are significant and with the expected positive sign in all estimating equations indicating the robustness of the estimates. For Spain and Portugal stronger relationship exists for the VAT base (including financial services) and VAT revenue performance. A change of 10 per cent of the Spanish VAT base (significant at 5% and 10% critical level) generates an average change of 31.4 per cent in VAT revenues' performance. In Portugal a change of 10 per cent of the VAT base (significant at 5% and 10% critical level) generates a change of 27.8 per cent in VAT revenues' performance. **The important deduction from these results is that the three countries seem to depend on VAT base to generate VAT revenues.** These support our previous arguments about the importance of exemptions on VAT base. A broader VAT base thus with fewer exemptions applied in VAT system appears to have a positive impact on VAT revenues' performance. That means that financial services, which constitute one of the major components of all exemptions[41] applied in three countries, could play a key role in the improvement of VAT revenues' performance. This conclusion is very important for Spain and Portugal where the relation of VAT rate to VAT revenues' performance seems to be weak. Despite the similarities in VAT systems among the three countries, VAT rate seems to be more important for policy makers in Greece. This can easily be understood by the different geographical features of the application of VAT in Greece. Greece applies a preferential VAT rate system. The statutory VAT rates are reduced by 30% (Appendix 2c) for specific geographical departments (e.g. remote islands) which seems that helped the system to avoid erosion of the tax base (and to weaken its impact on VAT revenues' performance) where these rates are applicable. However, this additional potential for tax administration in Greece to generate additional VAT revenues through changes in VAT rates is very limited. The harmonisation of VAT rates in EU since 1992 and the already preferential VAT rate system applied reduce the above mentioned ability.

[41] According to the 6th VAT Directive (77/388/EEC) the exemptions applied in EU Member States are clearly specified in article 13.The more important exemptions provided are education, health and financial services.

Table 7.13. Regressions for the VAT revenues' performance. Estimated period 1986-1998)

Member State	*Dependent variable*	*Intercept*	*Regressors and regression coefficients*			
			VAT base	*VAT rate*	*Range*	
Greece	**ln*(VAT/GDP)***	-2.31* (0.57)	0.08** (0.03)	0.6* (0.25)	0.3*** (0.04)	R^2:0.70 *SER*:0.03 *DW*:1.3
Spain	**ln*(VAT/GDP)***	-6.74* (2.5)	0.31* (0.13)	-0.32*** (0.48)	0.1*** (0.12)	R^2:0.52 *SER*:0.04 *DW*:1.76
Portugal	**ln*(VAT/GDP)***	-5.46* (0.36)	0.27* (0.04)	-0.01*** (0.01)	-0.1*** (0.06)	R^2:0.86 *SER*:0.05 *DW*:2

No major problems suggested from the diagnostic tests (standard errors are expressed in brackets). The equation for Spain has been adjusted for heteroscedasticity.

7.3.6 Estimates of the Average effective rates

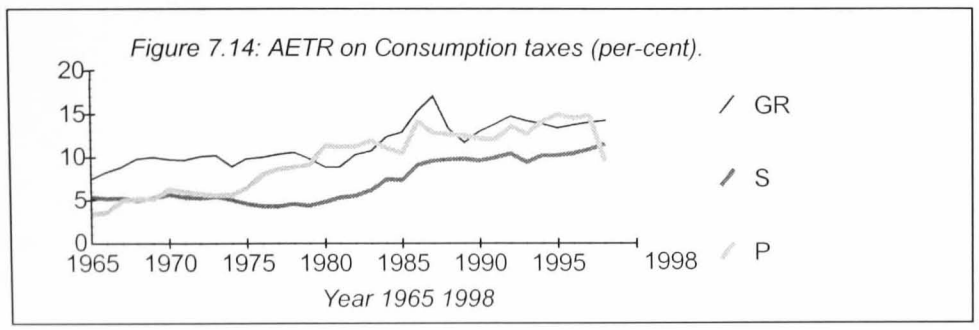
The estimates of AETRs suggest that the effective rates on consumption have on average increased at a faster rate than those on indirect financial taxes (Table 7.14-7.15 and Figure 7.14-7.15). On average Greece and Portugal focused the increase in the overall tax burden on consumption. The trend increased in AETR on consumption was particularly larger in Portugal and Greece. In Portugal it exceeded the Spanish average by more than one standard deviation. The overall estimations confirm our previous findings on the indirect tax system in the three countries. The higher AETR on consumption in Greece and Portugal show the dominant position of these taxes in the two countries in relation to Spain. In addition the low AETR attributed to the indirect financial taxes, confirm the weak position of these taxes as a revenue-raising instrument in the three countries. However, these taxes show a greater AETR for Greece and Portugal. On average the AETR on consumption and indirect financial taxes were higher for Greece than for Spain and Portugal. This suggests that consumption taxes in Greece have played a key role as a revenue-raising instrument over the period considered.

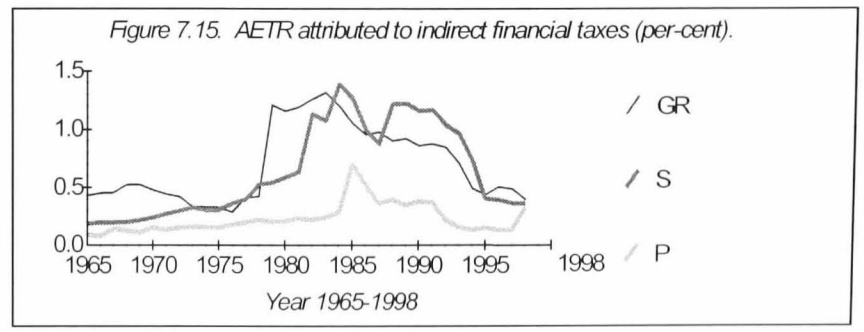
* significant at 5% and 10% critical level,** significant at 10% critical level, *** insignificant coefficient.

Table 7.14 : Average effective tax rates (AETR), per-cent.														
	1965-1970		1971-1975		1976-1980		1981-1985		1986-1990		1991-1995		1996-1998	
Country	Consumption taxes	Indirect financial taxes	Consumption taxes	Indirect financial taxes	Consumption taxes	Indirect financial taxes	Consumption taxes	Indirect financial taxes	Consumption taxes	Indirect financial taxes	Consumption taxes	Indirect financial taxes	Consumption taxes	Indirect financial taxes
Greece	9	0.5	9.7	0.3	9.9	0.6	11	1.2	14	0.9	14	0.6	13.9	0.4
Spain	5.3	0.1	5.1	0.1	4.4	0.2	6.3	0.3	9.5	0.4	10	0.2	10.9	0.1
Portugal	4.7	0.2	5.8	0.3	9.1	0.4	11.9	1	12.8	1	13.4	0.8	12.9	0.3

Table 7.15 : Summary Statistics for Average effective tax rates (Period 1965-1998).						
	AETR on Consumption			AETR on Indirect financial taxes		
	Greece	Spain	Portugal	Greece	Spain	Portugal
Mean	11.45	7.13	9.7	0.69	0.22	0.63
Std.dev.	2.38	2.47	3.5	0.32	0.13	0.39

Data: OECD Revenue Statistics, 2000, and International Financial Statistics, 2001.





These results are not greatly affected by cyclical factors. None of the AETRs on consumption is significantly affected by the output rate of growth (insignificant coefficient). Cyclical factors appear to be significant for the AETR attributed to indirect financial taxes in Portugal (Table 7.16).

Table 7.16. Influence of the business cycle on AETRs

	AETR on Consumption	***AETR on indirect financial taxes***
Greece	*insignificant*	*insignificant*
Spain	*insignificant*	*insignificant*
Portugal	*insignificant*	*weakly significant*[42]

The influence of the cyclical factor on AETRs was tested using the following regression equation over the period 1965-1998: $t_{AETR}=a+bt_{AETR(-1)}+cGr(-1)+u_t$, where t_{AETR} is the average effective rate and *Gr* is the rate of growth of output (GDP). Using the OLS technique, and testing the significance of coefficients, we obtain the following equations (standard errors are expressed in brackets):

Greece:

- *Consumption taxes*

$t_{AETRc}=1.55+0.86\,t_{AETRc(-1)}+0.93\,Gr_{(-1)}$, R^2: 0.75
(1.39) (0.13) (3.52) DW:1.61

- *Indirect financial taxes*

$t_{AETRift}=-0.038+0.81t_{AETRift(-1)}+0.99Gr_{(-1)}$, R^2: 0.90
(0.09) (0.94) (0.58) DW:1.8

Spain:

- *Consumption taxes*

$t_{AETRc}=1.02+0.95\,t_{AETRc(-1)}-3.84\,Gr_{(-1)}$, R^2:0.90
(0.73) (0.58) (2.65) DW:1.97

- *Indirect financial taxes*

$t_{AETRift}=0.077+0.7t_{AETRift(-1)}-0.0076Gr_{(-1)}$, R^2: 0.50
(0.59) (0.13) (0.32) DW:1.83

[42] Significant coefficient at 10% critical level.

Portugal

- *Consumption taxes*

$$t_{AETRc}=0.95+\underset{(0.06)}{0.86}\,t_{AETRc(-1)}+\underset{(3.31)}{3.14}\,Gr_{(-1)}\,,\quad R^2:0.83,\ DW:1.92$$
$$\qquad\qquad (0.93)$$

- *Indirect financial taxes*

$$t_{AETRift}=\underset{(0.07)}{-0.026}+\underset{(0.07)}{0.861}\,t_{AETRift(-1)}+\underset{(0.38)}{0.68}\,Gr_{(-1)},\quad R^2:0.85,\ DW:2$$

7.7 Concluding remarks

In this chapter we deepened our analysis on the structure of VAT and indirect financial taxes for the period 1965-1998. We undertook our analysis with special reference to Greece but comparing the results with the case of Spain and Portugal. We chose these countries because of the similarities in their indirect tax system. These countries introduced VAT around the same time (1986/87), abolishing the old turnover taxes. In addition, they apply cascade indirect taxes on financial services uniformly.

In our analysis we used regression techniques (OLS) to estimate and compare two simple indexes: the marginal revenue productiveness and the elasticity of different taxes (annual changes) on National income (VAT, total tax revenues, consumption and indirect financial taxes). The empirical evidence suggests that, in general, the three countries apply a similar consumption tax system showing at the same time a high level of spending as the National income grows. For Spain and Portugal, VAT seems to be an important revenue-raising instrument. On the other hand, Greece appears to count on other indirect taxes as well (higher elasticity for consumption taxes). Greece shows many similarities in the whole tax system with Portugal. On the contrary, Spain has a different tax structure. Namely it seems that Spain accounts on other than indirect taxes as well. Greece and Portugal seem to face the same problem with the application of consumption taxes: base erosion or a compliance problem in general for consumption taxes seems to be the case.

In addition, in the three countries the cascade indirect financial taxes, despite the same way of application, appear to show a very weak relation with the National income and to be insignificant as a revenue raising instrument in the whole consumption tax system. This evidence has been supported by the estimation of the average effective tax rates on

consumption and indirect financial taxes as well. This relation is stronger when we regress the variables in logarithmic form (annual changes), which is natural for a consumption type tax. Despite the stronger relation for the variables in logarithmic form for the three countries, in the case of Greece the less than unity elasticity suggests for insufficient way of application of the indirect financial taxes.

Moreover from our analysis of VAT revenues' performance it appears that in the three countries there is a "weak" relationship between VAT rates dispersion and VAT revenues' performance. This suggests that there are other important characteristics of VAT revenues' performance in three countries. The empirical evidence suggests that the VAT revenues in three countries as a per cent of GDP rise with increase in the coverage and the size of the tax base. Consequently, the VAT exemptions (including financial services) seem to be very important for the improvement of VAT revenues' performance. Finally a statistically significant difference among the three countries is the importance of tax rate for the Greek VAT system. It seems that the relationship between VAT rate and VAT revenues' performance emerging from our time series data is very strong. However, this additional potential to influence the VAT revenues' performance is limited due to the harmonisation of VAT rates in EU. On the other hand, the "weaker" but statistically significant relation between the VAT base and the VAT revenues' performance in Greece can be attributed to the inadequacy of the available data as a precise measure of the true VAT base. There is often a tax gap between potential and declared taxes, between declared taxes and paid taxes, and between taxes paid to those that are received by the treasury[43]. All these make it difficult for policy makers, just as with Spain and Portugal, not to rely on VAT base to be able improve the VAT revenues' performance.

[43] "A survey of the compliance cost in the Greek tax system" Greek Ministry of Finance and Centre of Planning and Economic Research (1998).

CHAPTER 8: CAUSAL RELATIONSHIPS IN FISCAL POLICY IN GREECE, SPAIN AND PORTUGAL: THE EFFECTS OF INDIRECT FINANCIAL TAXES ON TOTAL TAX REVENUES AND EXPENDITURES.

8.1 Introduction

In the previous chapter we examined the revenue productiveness and the elasticity as well as the average effective tax rates on consumption, of the different indirect taxes (e.g. consumption and indirect financial taxes). This provided us with empirical evidence about the structure of these taxes in Greece, Spain and Portugal and their potential as a revenue-raising instrument.

In this chapter we examine, by employing a multivariate time-series methodology, the impact on total tax revenues and expenditures of indirect taxes applied in Greece over the period 1965-1998 and over 1965-1999 for Spain and Portugal (data were not available for Greece for the year 1999). First, we seek to provide empirical evidence about the causal relationships (in short and long run) among the three variables of interest (total tax rate, consumption and financial taxes) and how they interact in a system. Few empirical studies have examined the revenue potential of different taxes and their impact on the average total tax rate of the economy (e.g. Bogetic and Hassan, 1993; OECD, 1997c). According to these results total tax rate is related (positively or negatively) to the revenue potential of different taxes (direct and indirect taxes), through tax base and different tax rates or via their effects on capital and labour markets, and on human capital formation. However the above empirical results are focused more on direct taxes than on indirect taxes. From their findings, they asserted that their results support a view that the level of revenues (i.e. direct taxes) Granger cause the average total tax rate of the economy (expressed as a share of total tax revenues to GDP).

In addition we wish to provide empirical evidence about the causal relationship and long run trends between the different indirect taxes (consumption and financial taxes) and expenditures over the same period stated above. In the literature, a number of studies examine the expenditure-taxes relationship with mixed results. Owoye, (1994) applying a

cointegration and error-correction model in G7 countries over the period 1961 to 1990 (annual data), concluded that the error correction models indicated that bi-directional causality exists between taxes and expenditures in five of the G7 countries. This implies that the fiscal authorities jointly make tax and spending decisions in five of the seven countries. Manage and Marlow, (1986) concluded that their results support cases of unidirectional causality from taxes to expenditures. In contrast Anderson, (1986) using the same technique (testing for cointegration) concluded that government expenditures Granger causes government taxes. However, non-of the above studies examined the particular relationship between indirect taxes and expenditures.

Finally, we investigate the long run structural stability of the indirect tax system by examining the role and the impact of the introduction of VAT on the long-run relationship among the above variables [*Research question* ***R5***, Table 4.1 p.100]. The results may enrich our empirical knowledge on the characteristics that are unique to each country in the field of indirect taxation and its impact on fiscal policy.

8.2 The data

To assess the impact of the different indirect taxes on the average total tax rate of the economy and expenditures in the three countries, we use time series data from the three countries over the period 1965-1998 for Greece and 1965-1999 for Spain and Portugal. As we said in our previous chapter, we chose these particular countries because of the similarities in the indirect tax system and their common characteristics. Therefore, the results should also provide evidence for and against indirect tax policies adopted by these EU countries. Ideally, we should include more countries in our analysis or more variables which may have an impact on the average total tax rate of economy (e.g. direct taxes on corporations and individuals, excise taxes or other macroeconomic variables) but the completely different tax structure in other EU countries and data unavailability are the major constraint which create problems of an econometric nature. To proxy the average total tax rate of the economy most studies use the share of the total tax revenues to GDP (Jack, 1996; Bogetic and Hassan, 1993; OECD, 1997c). In fact, these tax-to-GDP ratios may be affected by statistical distortions and therefore may be a poor proxy for assessing tax distortions at macro-level. It is also known that as the tax/GDP ratio does not include the excess burden arising from behavioural responses (e.g. differences in tax evasion), it may understate the total effect of taxation (OECD, 1997c). **However, this ratio is the best**

comparable approach to assess the overall average tax rate of tax system/economy in the particular countries (Greece, Spain and Portugal), bearing in mind the similarities in their tax system (similarities in categories of taxes applied, same classification of benefits, transfers and social contributions, tax credits etc.). Therefore, we use the share of the total tax revenues (direct and indirect taxes) to GDP (tax rate) as a proxy for the overall average tax rate of the economy in three countries (OECD, 1997c; OECD Revenue Statistics, 2000).

As we mentioned before, the total average tax rate of the economy (*tr*) is a function of the revenues *(Rev)* presently accruing to the government from the existing taxes (OECD, 1997c), i.e.:

$$tr=f(Rev)$$

In our analysis for the different indirect taxes (Revenues) we use (derived from the OECD Revenue Statistics, 2000) data representing: (a) the general consumption taxes and (b) the indirect financial taxes for Greece, Spain and Portugal. The general consumption taxes include all taxes, other than import and export duties, levied on the production, leasing, transfer, delivery or sales of a wide range of goods and/or rendering of wide range of services, irrespective of whether they are domestically produced or imported and irrespective of the stage of production or distribution at which they are levied. Included are taxes collected on import as part of a general tax on goods and services or on excise applicable to both imported and domestically produced goods. It thus covers value-added taxes (harmonised taxes in EU Member States) and sales taxes. The indirect financial taxes cover multi-stage cumulative taxes where tax is levied each time a financial transaction takes place without deduction for the tax paid on inputs, and also those general consumption taxes where elements of value-added, sales or cascade tax on financial services are combined. These data are derived from the code 5126 in OECD classification of taxes. However in these taxes we do not include other indirect taxes on specific services (e.g. taxes on gambling services classified under the same code in the case of Portugal or taxes on financial and capital transactions classified under the code 4400 thus as direct taxes). **The main difference in the above categories of taxes is that, although both are levied on a given base, the first category falls only on final consumption through the deduction of the tax on intermediate and investment goods, while the latter does not fall only on final consumption but may be shifted forward along the production and the distribution channels (i.e. taxation of intermediate and investment goods).** In

addition, to examine the causal relationship between the expenditures and the different indirect taxes we use annual data on the total government expenditures derived from the International financial Statistics (IMF) edition 2001. Finally all variables are deflated by the GDP deflator and are finally expressed in logarithmic form at constant (1995) prices.

8.3 Empirical methodology

8.3.1 Testing for stationarity

Analytically, to provide a valid empirical evidence about the causal relationships among the variables of interest and to the issue of the structural stability of consumption tax policy (fiscal policy) it is important to address the time-series properties of the variables of interest, because any empirical analysis from which valid inferences could be drawn must ensure that all series are of the same order of integration in order to avoid the problem of spurious relationships and erroneous conclusions. Several studies that have examined time-series properties of variables concluded that most macroeconomic time-series data follow random walks. Phillips and Ouliaris, (1990) among others demonstrated that if the time–series variables are non-stationary all regression results with non-stationary series will differ from the conventional shown of the regression with stationary series. Put another way, regression coefficients with non-stationary series will be misleading. Moreover, if we run the regression $X_t = \rho X_{t-1} + u_t$ and actually find that $\rho = 1$ then we can say that the stochastic variable X_t has a unit root. In time–series econometrics, a time–series that has a unit root is known as a random walk, and a random walk is an example of non-stationary time-series.

Consequently the first step in the analysis is to test for stationarity of the relevant variables. A process is said to be stationary if its mean and variance are independent of time. In this case, a time series (X_t) with mean $E(X_t)$ and variance $E[X_t\text{-}E(X_t)]^2$ will be stable for any sub-period of the sample period. Instead, if a series (X_t) is non-stationary then, its mean and variance will change over time. This has both economic and statistical implications. If a series is non-stationary the effect of any shock in the series is permanent. Establishing stationarity is important in econometrics because unless the variables involved in a model are all of the same order of integration, then the resulting regression would be spurious. If non-stationary series are differenced one or more times they usually become stationary. Depending on how many times we have to difference a series we refer

to the series order of integration. If we have to difference a series once to make it stationary then this series is said to be of first order. Notationally we use the symbol I *(d)*, where *d* is the order of integration. Thus, the notation for a first order series is I*(1)*. Most economic series are I*(1)*. To determine the order of a series the most common test is the Dickey-Fuller tests (DF) proposed by Dickey and Fuller, (1979, 1981). The simplest form of the DF tests amounts to estimating:

$$X_t = \rho X_{t-1} + u_t \quad (1)$$

and testing whether $\rho = 1$. Alternatively we test whether $\rho^* = \rho - 1 = 0$ against $\rho^* < 0$. This alternative test simplifies matters if a more complicated autoregressive process is considered (Harris, 1995). The above equation (1) assumes that the data generating process is a simple first order autoregressive process with no trend component, zero mean and that the first observation is also zero. Since these assumptions hardly satisfy any empirical series, the test commonly used is:

$$\Delta x_t = a + \beta t + \rho^* x_{t-1} + u_t, \quad (2)$$

where t is the time trend. Equation (2) assumes that the series follows a first order autoregressive process. If this is not true, the residuals u_t will be autocorrelated and the DF test will be invalidated because the DF distributions are based on the assumption that the residual is white noise. For this reason the test should have sufficient lags to ensure that the residuals are not correlated. This results in the augmented DF test. In the presence of units roots, the estimates of the autoregressive parameters have a non-standard distribution and the critical values for the usual tests *(t, F)* cannot be used. Instead, we use the distributions estimated by Dickey and Fuller. The critical values for their distributions have been computed using Monte Carlo techniques and are much larger than those in the F table. The null hypothesis is the existence of a unit root, which implies non-stationarity. **If the null is rejected (i.e. if the F test is larger than the critical value) then there is no unit root and the process is stationary.**

8.3.2 Cointegration

As we mentioned before, the notion of cointegration refers to the case where two or more variables move together over time and the difference between them is stable over time. Consider two variables x_t and y_t where x_t is *I(1)* and y_t is *I(0)*. Then any linear combination of these variables will be *I(1)*. Regressions where variables of different orders of integration are involved can often lead to spurious results. Consider now two variables x_t

and y_t where they are both *I(1)*. Generally, linear combinations of these two variables will be also *I(1)*. However, there are cases where linear combinations of two or more variables of the same order of integration are of a lower order of integration. For example, if x_t and y_t are both *I(1)* and $z_t = y_t - \alpha - \beta x_t$ is *I(0)*, then x_t and y_t are said to be cointegrated of order *CI(1,1)* (Engle and Granger, 1987). One of the most important implications of cointegration is the Granger representation theorem (Granger, 1983; Engle and Granger, 1987). The theorem states that if two or more variables are cointegrated of order 1, then error correction models can represent the data, these models for two variables x_t and y_t are:

$$\Delta x_t = \alpha_1 + \beta_1 z_1 + lags(\Delta x_t, y_t) + u_{xt} \quad ,(3)$$

$$\Delta y_t = \alpha_2 + \beta_2 z_2 + lags(\Delta y_t, x_t) + u_{yt} \quad ,(4)$$

where (u_{xt}, u_{yt}) is bivariate white noise and at least one of β_1 and β_2 is non-zero. If x_t and y_t are cointegrated then z_t is *I(0)* and each one of the two equations is *I(0)*. If this is the case, then the two variables move closely together over time and difference between them will be stationary. This means that there is a long run equilibrium between the variables to which the system converges over time. There are two methodologies to test for cointegration: the Engle and Granger, (1987) methodology and the Johansen, (1988) methodology. The latter has several advantages over the Engle and the Granger methodology, of which the main is that it can estimate the number of cointegrating vectors in the system. **In addition, this methodology is particularly relevant because we wish to investigate not only how the variables of interest are related, but also which of the variables are endogenous to the cointegrating vector.** Therefore for the present analysis we utilise the Johansen methodology. However, for comparison purposes we also run a VAR model of the same order as in the Johansen procedure, applying the Engle and Granger methodology in order to strengthen our results and to identify possible differences.

8.3.3 The Johansen methodology

The Johansen (1988, 1991) methodology is rather complicated and by now well known in the academic literature. Here we give only a brief overview of the approach. The first step is the construction of a multiregressive model of the form:

$$z_t = A_1 z_{t-1} + A_2 z_{t-2} + \ldots + A_k z_{t-k} + u_t \ , \quad u_t \sim \mathrm{IN}(0, \Sigma) \quad (5)$$

where z_t is a *(n x 1)* matrix of n potentially endogenous variables and each of the A_i is a (n x n) matrix of parameters. Equation (3) can be reformulated into a vector error correction form:

$$\Delta z_t = \Gamma_1 \Delta z_{t-1} + ... + \Gamma_{k-1} \Delta z_{t-k-1} + \Pi z_{t-k} + u_t, \quad u_t \sim (0, \Sigma) \quad (6)$$

where $\Gamma_i = -(I - A_1 - ... - A_i), (i = 1,...,k-1)$ and $\Pi = -(I - A_1 - ... - A_k)$, with I being the identity matrix. The vector error correction form gives us information about the short and the long run via the estimates of Γ_i and Π respectively. It can be shown that $\Pi = a\beta'$, where α is the speed for adjustment to disequilibrium and β is a vector of long run coefficients. Johansen proposes to regress Δz_t and z_{t-k} on a constant and the z_t lagged differences to obtain the residual vectors R_{0t} and R_{kt} respectively. These residual vectors are then used to form residual matrices:

$$S_{ij} = T^{-1} \sum_{i=1}^{T} R_{it} R'_{jt} \qquad i, j = 0, k \qquad (7)$$

The eigenvectors which correspond to the r largest eigenvalues from solving the equation

$$\left| \lambda S_{kk} - S_{k0} S_{00}^{-1} S_{0k} \right| = 0 \qquad (8)$$

are the maximum likelihood estimate of β. This procedure gives n eigenvalues $\hat{\lambda}_1 > \hat{\lambda}_2 > ... > \hat{\lambda}_n$ and the corresponding eigenvectors $\hat{V} = (\hat{v}_1, ..., \hat{v}_n)$. The r elements in the $\hat{V}$ are the cointegrating vectors. Furthermore, Johansen shows that $\hat{a} = S_{0k} \hat{\beta}$ from which we obtain estimates of α. Once we have estimates of a and β and test for restrictions, we then estimate equations (3), (4) by OLS to obtain the full model.

8.3.4 The long run equations

We use *Microfit 4.0* Software (Pesaran and Pesaran, 1997) to choose the appropriate order of VAR (lag length) and cointegration rank and the model for deterministic components. First we run the VAR model for several different lag lengths and choose the appropriate lag length according to the log-likelihood ratio statistic. We run specification tests on the model with the chosen lag length. If the model suffers from any problems (e.g. serial correlation), we use a higher order model. We then run tests for cointegration using different specifications with regards to deterministic components. If we find cointegration under different specifications, we determine rank and model specification simultaneously using the Pantula principle (Harris, 1995). We estimate three models: one with restricted intercepts and no trends, one with unrestricted intercepts and no trends and one with

unrestricted intercepts and restricted trends. We then compare the trace and max-eigenvalue statistics with their critical values starting from the first model through to the third model for each different rank. We stop the first time the null hypothesis is not rejected and we choose the model for which the null hypothesis was not rejected and the appropriate rank. When the two tests (trace and max-eigenvalue) do not choose the same model, we choose the one proposed by the trace statistic because it is more robust to both skewness and kurtosis in the residuals than the max-eigenvalue statistic (Harris, 1995). In order to construct the long-run equations, once we determine the number of cointegrating vectors in our models we run restrictions to obtain the best specification not rejected by the data. Once we establish which variables are exogenous to the system, we impose the restriction in further estimation. The next step is to find which variables in the cointegrating vector(s) are significant. These tests are carried out sequentially and when the tests do not reject the null, the variable is dropped from the estimation. Finally, in order to establish which of the variables is endogenous to which vector, we run the error correction regressions explaining the first differences of the variables and examine the significance of each error correction model using the t-ratio. In the cases where only one cointegration vector was found (as in our case), the error correction regressions are run to verify the endogeinity tests for the reduced cointegration vector. Once we establish the endogeinity of a variable to a vector, the vector is then normalised on this variable and presented in equation form containing the endogenous variables.

8.4 Cointegration analysis of the average total tax rate and different indirect taxes relationship

8.4.1 Greece

As we said before, in this section, we employ a multivariate (trivariate) cointegrating VAR model for the period 1965-1998. We use in the model the share of total tax revenues to GDP (average total tax rate) *(tr),* sales tax and VAT revenues for consumption taxes (*ct*), and turnover taxes, stamp duties and cascade indirect taxes on financial services for indirect financial taxes *(ft)*. We also add a dummy (*DGR)* for the presence of outliers in data set due to the introduction of VAT in Greece in 1987, which takes the value of unity for 1987 and zero elsewhere. Non-nested tests indicate that the logarithmic transformation is to be preferred over the level equation.

The tests for cointegration are done in two steps. The first step is to test whether average total tax rate *(tr)* consumption taxes *(ct)* and financial taxes *(ft)* (in logarithmic form) are integrated of order zero, *I(0)*, that is, whether there are common stochastic trends present among the variables. This means that each series contain a unit root that is non-stationary. This is accomplished by performing the Dickey-Fuller (DF) and the augmented Dickey-Fuller (ADF) tests. The ADF test is based on the following regression equations of the form:

$$\Delta \ln tr_t = \gamma_0 + \theta_1 \ln tr_{t-1} + \sum_{i=1}^{n} \lambda_i \Delta \ln tr_{t-i} + \varepsilon_t$$

$$\Delta \ln ct_t = \gamma_1 + \theta_2 \ln ct_{t-1} + \sum_{k=1}^{p} \mu_k \Delta \ln ct_{t-k} + u_t$$

$$\Delta \ln ft_t = \gamma_2 + \theta_3 \ln ft_{t-1} + \sum_{\xi=1}^{m} \varphi_\xi \Delta \ln ft_{t-\xi} + v_t$$

The difference between the DF and the ADF test is that in the former $\sum_{i=1}^{n} \lambda_i = \sum_{k=1}^{p} \mu_k = \sum_{\xi=1}^{m} \varphi_\xi = 0$. In all equations the null hypothesis is that ln*tr*, ln*ct*, and ln*ft* have unit roots, that is $\theta_1 = \theta_2 = \theta_3 = 1$. The alternative hypothesis is that the variables are integrated of order zero *I(0)*. We reject the null hypothesis if $\theta_1, \theta_2,$ and θ_3 are significantly negative and the t statistics are less (or greater in absolute values) than the critical values for the given augmented Dickey-Fuller Statistic. Alternatively in the above equations included a linear trend as well. The results reported in table 8.1 indicate that in no case we could reject the hypothesis that the logs of series contain a unit root.

Table 8.1: Dickey-Fuller* unit root tests results (Greece)

Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*tr*	-1.05**	-2.34**	-5.17	-5.08
ln*ct*	-1.54**	-2.96**	-6.56	-6.44
ln*ft*	-1.49**	-2.62**	-5.76	-5.65

The ADF statistics (for *p=1 or p=2)* are in absolute value below their asymptotic value (95% critical value). Therefore, it is not possible to reject the null hypothesis for a unit root for the variables in levels (log form).

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* $\Delta X_t = a_0 + a_1 t + a_2 X_{t-1} + \sum_{i=1}^{n} b_i \Delta X_{t-i}$. Optimal number of lags is chosen by Akaike's Information Criterion (AIC), and Schwarz-Bayesian Criterion (SBC). The values shown in the table 8.1 denote the t-statistics of X_t. X_t=lntr_t, lnct_t, and lnft_t).

** The null hypothesis of the unit root is not rejected at 5% level of significance.

On the other hand, for the first differences of the variables, irrespective of the order of the augmentation chosen for the ADF test, the absolute values of the ADF statistics are well above the 95% critical value given for the augmented Dickey-Fuller statistic (for all models, with and without a linear trend). Hence, the hypothesis that the relevant variables in first differences have a unit root is firmly rejected (stationary series). Thus the series are of the same order *I(1)* and candidates for cointegration with the variable representing the total tax rate of the tax system. This suggests that we can treat the variables (ln*tr*, ln*ct*, ln*ft*) as Granger causal. In the first step of our analysis, we determined that the variables are *I(1)*. In the second step we can now look for the possibility that they are cointegrated, thus that the contained unit-roots have long-run relationships and the variables are moving together over time. **This will suggest that changes in one variable will have permanent and not transitory effects on the other variables.** In this case the Granger representation theorem states that, the first differences of the variables might be considered to be generated by error correction models of the form:

$$\Delta \ln X_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta \ln X_{t-i} + \sum_{i=1}^{\kappa} \varphi_{2i} \Delta \ln Y_{t-i} + \sum_{i=1}^{\rho} \varphi_{3i} \Delta \ln \Psi_{t-i} + \delta Z_{t-1} + u_t$$

For cointegration analysis we follow the maximum likelihood estimation approach (Johansen, 1988; Johansen and Juselius, 1992). The error correction models for Greece are presented as VAR model, following the equation above, with the first and second differences of the variables in logarithmic form, and error-correction terms. The general error-correction models equations are used to test for causal relationships between the total tax rate (ln*tr),* consumption (ln*ct*) and financial taxes (ln*ft).* The inclusion of the error correction terms in the above general form of the equations in a trivariate ECM introduces additional channels through which causality could emerge and equilibrium could be re-established in the event of shocks of the variables.

To select the order of VAR we specify a trivariate unrestricted VAR model in ln*tr*, ln*ct*, and ln*ft* containing an intercept term and the Dummy variable *(DGR)* as its deterministic component. We make an initial estimation of a maximum order of VAR to 5 (Table 8.2). The Akaike Information Criterion (AIC) suggests a VAR of order 3, and Schwarz Bayesian Criterion (SBC) and adjusted LR test of order 1. In such situations, it is important to check the residuals of individual equations in VAR for possible serial correlation. If we choose a VAR of order one (or two) the inspection of results suggests a problem of serial correlation in all individual equations in the error correction model

(ECM). Hence for the case of Greece we choose a VAR of order 3 despite the short time-series (34 observations).

Table 8.2: Determining the order of VAR (Greece)

Based on 29 observations from 1970 to 1998. Order of VAR = 5
List of variables included in the unrestricted VAR:
ln*tr* ln*ct* ln*ft*
Deterministic and/or exogenous variables:
C *DGR*

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	107.8200	56.8200	21.9540	------	------
4	98.1014	56.1014	27.3882	CHSQ(9)= 19.4373[.022]	8.0430[.530]
3	90.4409	**57.4409**	34.8805	CHSQ(18)= 34.7582[.010]	14.3827[.704]
2	75.3299	51.3299	34.9223	CHSQ(27)= 64.9803[.000]	26.8884[.470]
1	72.2847	57.2847	**47.0300**	CHSQ(36)= 71.0706[.000]	**29.4085[.773]**
0	-.27573	-6.2757	-10.3776	CHSQ(45)= 216.1915[.000]	89.4585[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

To test for cointegration among the three variables we apply a cointegrating VAR (3) procedure with restricted intercepts and no trend option chosen via the Pantula principle (see Harris, 1995). Based on the results displayed in Table (8.3) both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among ln*tr*, ln*ct,* and ln*ft* (namely r=0) but do not reject the hypothesis that there is one cointegrating relation (vector) (i.e. r=1) among the variables. Reported in the same table 8.3 Model selection criteria give different results. Akaike Information Criterion (AIC) favours two cointegrating relations between the variables and Schwarz Bayesian Criterion (SBC) one. We accept that there is one cointegrating relation following the maximal eigenvalue and trace statistics[44].

Table 8.3: Cointegration Tests: VAR(3) with Dummy (Greece)

Cointegration with restricted intercepts and no trends in the VAR
31 observations from 1968 to 1998. Order of VAR = 3.
List of variables included in the cointegrating v ector:
ln*tr* ln*ct* ln*ft* Intercept
List of I(0) variables included in the VAR: *DGR*
Eigenvalue Test (Order of VAR=3
List of eigenvalues in descending order:
.66466 .33653 .11459 .0000

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	33.8709	22.0400	19.8600
r<= 1	r = 2	**12.7185**	**15.8700**	**13.8100**
r<= 2	r = 3	3.7730	9.1600	7.5300

Trace Test (Order of VAR=3)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	50.3624	34.8700	31.9300

[44] When the two tests (trace and max-eigenvalue) do not choose the same model, we choose the one proposed by the trace statistic because is more robust to both skewness and kurtosis in the residuals than the max-eigenvalue statistic (Harris, 1995).

r<= 1	r>= 2	**16.4915**	**20.1800**	**17.8800**
r<= 2	r = 3	3.7730	9.1600	7.5300

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	71.5794	50.5794	35.5225	45.6712
r = 1	88.5148	61.5148	**42.1560**	55.2043
r = 2	94.8741	**63.8741**	41.6473	56.6287
r = 3	96.7606	63.7606	40.0998	56.0478

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

The findings of one cointegrating vector are not sensitive to changes in specification. When the *DGR* dummy is not included or other dummies are included in its place (such as a dummy equal to 1 for 1993 and zero elsewhere, capturing the dynamics of the introduction of the transitional VAT regime in Greece), there is still evidence of cointegrating relations in data. Moreover in order to identify the cointegrating relations, we obtained estimates of the cointegrating coefficients of the variables in the cointegrating vector, thus $(ECM)Z=1.61\ln tr + 0.02\ln ct - 0.31\ln ft + 3.39$, which make us to expect one cointegrating relation among the three variables that is:

$$\ln tr - \ln ct - \ln ft, \; DGR \sim I(0).$$

When we specified the exactly cointegrating relation by normalising on the coefficient for total tax rate $(\ln tr)$ (A1=1) the cointegrating vector estimated in the Johansen procedure is (standard errors are expressed in brackets):

$$\ln tr = -0.01 \ln ct + 0.19 \ln ft - 2.1$$
$$(0.12) \quad (0.15) \quad (0.7)$$

The ECM equations for $\Delta\ln tr$, $\Delta\ln ct$, and $\Delta\ln ft$ variables with the lagged first and second differences and error-correction terms are given in table 8.4:

Table 8.4: Estimates of ECMs for* Δlntr, Δlnct *and* Δln*ft*,1965-1998 *for Greece.

Variables	Δln*tr*	Δln*ct*	Δln*ft*
Intercept	-	-	-
Δln*tr (-1)*	-0.01(0.25)	1.21(0.44)	0.33(0.95)
Δln*tr(-2)*	0.51(0.3)	0.87(0.48)	-1(1.22)
Δln*c t(-1)*	-0.16(0.09)	-0.43(0.15)	0.22(0.41)
Δln*c t(-2)*	-0.23(0.11)	-0.29(0.14)	0.45(0.51)
Δln*ft (-1)*	-0.08(0.05)	-0.22(0.08)	0.08(0.17)
Δln*ft (-2)*	-0.15(0.09)	-0.25(0.08)	0.39(0.41)
Z_{t-1}	-0.38(0.17)*	-0.62(0.15)*	0.17(0.4)**
DGR	0.30(0.02)	0.44(0.09)	-0.017(0.07)
DW	1.83	1.22	1.84
R^2	0.41	0.64	0.12
SER	0.06	0.09	0.25

* significant at 5% level,** not-significant

Generally, the diagnostic test statistics indicated that there is a good fit in model. Examining the results, all the ECMs pass the tests for first order serial correlation at 5% significance level, but not the equation for consumption taxes *(*$\Delta\ln ct$*)* which fails on first order serial correlation (although it passes the test at 10% significance level). The equations for financial taxes *(*$\Delta\ln ft$*)* and total tax rate *(*$\Delta\ln tr$*)* fail on normality and heteroscedasticity at the 5% level of significance. The new adjusted estimations are presented in the above equations. Cusum and Cusum squared tests indicate that the above equations are structurally stable[45]. In the normalised cointegrating vector the coefficient on *(*$\ln ct$*)* seems to be insignificant. Indeed, when we impose a zero restriction (A2=0) on *(*$\ln ct$*)*, this restriction cannot be rejected by the LR statistic (A joint likelihood ratio test for the exclusion of the consumption taxes variable) which is given as $\chi^2(1)= 0.016$ with a P-value of 0.89. Therefore, the new cointegrating vector with this over-identifying restriction is:

$$(ECM)Z=1.000\ \ln tr-0.00\ln ct-0.19\ln ft \quad (0.02)$$

This means that the cointegrating relation has been reduced to the one expressed as:

$$\ln tr-\ln ft,\ DGR\sim I(0),$$

The new ECM estimates for the over-identified system are displayed in table 8.5:

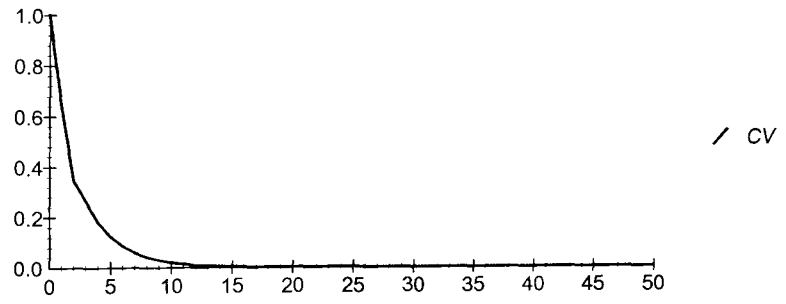
Table 8.5: Estimates of ECMs for* $\Delta\ln tr$*,* $\Delta\ln ct$ *and* $\Delta\ln ft$*,1965-1998 for Greece.			
Variables	$\Delta\ln tr$	$\Delta\ln ct$	$\Delta\ln ft$
Intercept	-	-	-
$\Delta\ln tr(-1)$	0.004(0.24)	1.23(0.44)	0.33(0.95)
$\Delta\ln tr(-2)$	0.53(0.3)	0.88(0.49)	-1(1.22)
$\Delta\ln ct(-1)$	-0.16(0.09)	-0.43(0.15)	0.22(0.41)
$\Delta\ln ct(-2)$	-0.24(0.11)	-0.29(0.14)	0.45(0.51)
$\Delta\ln ft(-1)$	-0.08(0.05)	-0.22(0.08)	0.08(0.17)
$\Delta\ln ft(-2)$	-0.15(0.09)	-0.25(0.08)	0.39(0.41)
Z_{t-1}	-0.41(0.17)*	-0.65(0.16)*	0.18(0.42)**
DGR	0.31(0.02)	0.44(0.1)	-0.017(0.08)
DW	1.85	1.22	1.84
R^2	0.41	0.63	0.12
SER	0.06	0.09	0.25

[45] This test was proposed by Brown (1975) and is based on the test statistic $S_t=\frac{\sum_{r=k+1}^{t} w_r^2}{\sum_{r=k+1}^{n} w_r^2}$ $t=k+1,k+2,\ldots,n$ where s is the standard error of the regression fitted to all i sample points and w^2 is the squared recursive residuals. The mean value line giving the expected value of this test statistic under the parameter stability is $E(S_t)=\frac{t-k}{n-k}$ which goes from zero at $t=k$ to unity at $t=n$. Microfit displays two graphs, one giving the plot of CUSUM statistic, and the other giving the plot of the CUSUMSQ statistic. Each graph also displays a pair of straight lines drawn at 5% significant level. If either of the lines is crossed, the null hypothesis that the regression equation is correctly specified must be rejected at 5% significant level.

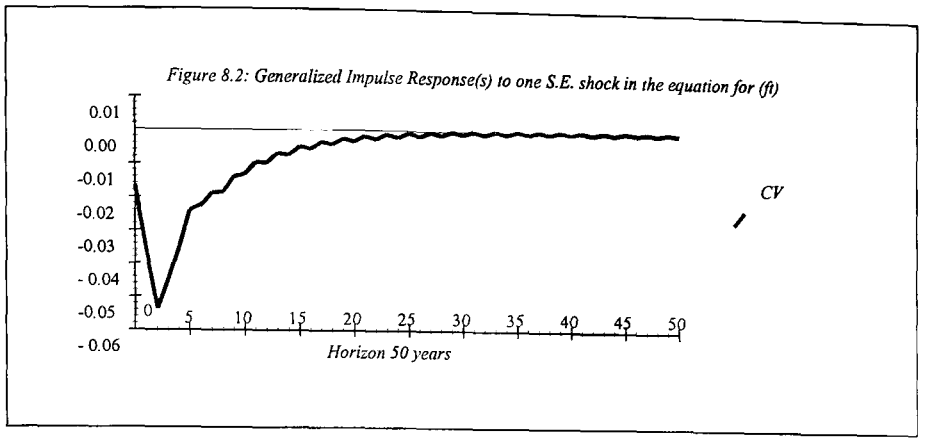
* significant at 5% level , ** not-significant.

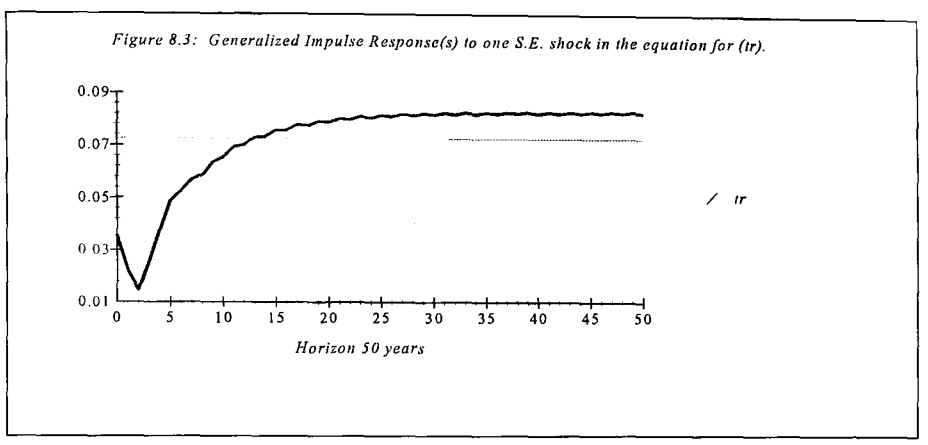
Similar results follow from the diagnostic statistics tests for the new ECMs above. The ECM for consumption taxes still fails on serial correlation at 5% significance level, and the ECMs for total tax rate *(*Δln*tr)* and financial taxes *(*Δln*ft)* fails on normality and heteroscedasticity at the 5% level. The new adjusted estimations are presented in the above equations. As before Cusum and Cusum squared tests indicate that the above equations are structurally stable as well. In addition as we can see from the results it appears to be that the coefficients and standard errors in the new ECM equations, with and without over-identifying restriction, are very similar. The coefficients of the error-correction terms, which measure the speed at which any disequilibrium of the system is removed (speed of adjustment), are significant at 5% level in the equation for the total tax rate *(*Δln*tr)* and consumption taxes *(*Δln*ct)* and also relatively high, suggesting that it would not take long time for the total tax rate and consumption taxes equations to return to the equilibrium once the system has been shocked (in fact the "economic agents" removed 41% and 65% of the resulting disequilibrium each period, for the equation of Δln*tr* and Δln*ct* respectively) (see also figure 8.1 on persistence profile of the effect of a system-wide shock to contegrating vector). There seems to be a degree of overreaction, represented by the negative coefficients on the ECMs equations and on the error correction term. However, the convergence back to equilibrium is relatively slow and moderate, with adjustment complete in about ten years.

Figure 8.1: Persistence Profile of the effect of a system shock to CV (Greece).



Investigating how the dynamic system is hit by shocks (variable-specific shock or system-wide shocks), the impulse response of the system is relatively fast and has the right feedbacks. Choosing for example to shock the indirect financial taxes *(*ln*ft)*, the effects on the cointegrating relation's die out (see figure 8.2). In addition, using the generalised IR option the impact effect of a unit shock to financial taxes *(*ln*ft)* on the average total tax rate is relatively large and fast (see also figure 8.3).





As we mentioned above, we use the error-correction models to test the causal relationship, in short and long run, among total tax rate *(*ln*tr),* consumption taxes *(*ln*ct)* and financial taxes (ln*ft)*. For the first difference of total tax rate of tax system *(*Δln*tr)* only the lagged value of the second differenced (growth) of consumption taxes has short run (negative) effects at the 5% significance level. **The last result is expected since typically a period of time is necessary for the economy to adjust to a new fiscal policy.** There is a negative short run effect of the growth of the indirect financial taxes on the growth of the total tax rate *(*Δln*tr)* at 10% level of significance only in the second set of equations (in the over-identified system). In addition there is a positive short run effect in the second set of equations (ECMs) on the growth of the total tax rate of the tax system *(*Δln*tr*) of the second differences of the growth of the same variable (two years lags) at 10% significance level. The total tax rate (Δln*tr*) and financial taxes (Δln*ft*) have a short run effect on the consumption taxes (Δln*ct*). However, the short run effect from indirect financial taxes *(*Δln*ft)* has a negative sign in the two sets of equations (ECMs) of consumption taxes (Δln*ct*). On the other hand, in the two sets of equations of consumption taxes (Δln*ct*) the growth of the total tax rate of the tax system (Δln*tr*) has a positive short run effect (in second differences) on the growth of consumption taxes at 10% level of significance. In addition the dummy variable *DGR* is significant at 5% significant level in both set of equations for consumption taxes *(*Δln*ct)* suggesting an important short-run effect of the

introduction of VAT in consumption tax system. When we imposed additional restrictions on coefficients for the dummy variable *DGR,* using the Wald test, the null hypothesis that the coefficients were equal to zero was rejected only for the equation for consumption taxes *(*Δln*ct)*, [$\chi^2(1)$=20.21 with a P-value about 0.00]. **This reform appears not to have any short-run effect on the total tax rate of tax system (Δln*tr*) or on financial taxes (Δln*ft*).**

As the results from the cointegrating VAR analysis suggest, the total tax rate, consumption and financial taxes are cointegrated, thus that they move together over time. However, only one long run relationship can be established, namely the one between the total tax rate of tax system and financial taxes. In short-run, the error-correction models suggest bi-directional causation: positive from total tax rate towards consumption taxes, and negative from consumption taxes towards total tax rate; and a negative uni-directional relationship from financial taxes *(*ln*ft)* to consumption taxes *(*ln*ct)* as well. On the other hand, financial taxes *(*ln*ft)* have a positive long run effect (the long-run elasticity, derived from the long run equilibrium, is 0.19) on the total tax rate *(*ln*tr)* of the Greek tax system. On the basis of the results (based on the significance of the error correction coefficient in individual equations), we can conclude that there is a unidirectional Granger causal relationship from financial taxes towards the average total tax rate of the Greek economy.

ln*ft*→ln*tr*

The above results can be attributed to the way the above-mentioned taxes were applied in Greece over the period of estimation (no deductions for inputs in the case of financial taxes, limited VAT base, introduction of VAT relatively recently etc).

8.4.2 Spain

Likewise to the case of Greece, we employ a multivariate (trivariate) cointegrating VAR model for the period 1965-1999. As we said before, definite data for 1999 are available for Spain. Again in our model we use the share of total tax revenues to GDP (*tr*), as a proxy for the average total tax rate of the economy, sales tax and VAT revenues for consumption taxes (*ct*), and turnover taxes, stamp duties and cascade indirect taxes on financial services for indirect financial taxes (*ft*). We also add a dummy *DS* for the introduction of VAT in Spain in 1986, which takes the value of unity for 1987 and zero elsewhere. Non-nested tests indicate that the logarithmic transformation is to be preferred over the level equation.

As in the case of Greece we use Dickey-Fuller (DF) and augmented Dickey-Fuller (ADF) to determine whether each time series contain a unit root that is non-stationary. The results reported in Table (8.6) indicate that in no case could we reject the hypothesis that the log of series contains a unit root. On the other hand, first differences of the variables are clearly stationary, and thus the series are *I(1)* and candidates for cointegration.

Table 8.6: Dickey-Fuller unit root tests results (Spain)

Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*tr*	-0.18**	-1.67**	-4.29	-4.26
ln*ct*	-0.14**	-2.16**	-5.04	-4.94
ln*ft*	-1.22**	-0.56**	-4.70	-4.64

In order to determine the order of VAR in cointegration analysis, we make an initial estimation of maximum order of VAR to 5, (table 8.7). The relevant statistic tests (Adjusted likelihood ratio (LR), Schwarz-Bayesian Criterion (SBC), the Akaike Information Criterion (AIC) and unadjusted LR tests) indicate a first order of VAR. However, checking the residuals of individual equations in VAR for possible serial correlation suggests a problem of serial correlation in all individual equations. Hence, we choose a higher order of VAR (2).

Table 8.7: Determining the order of VAR (Spain)

Based on 30 observations from 1970 to 1999. Order of VAR = 5
List of variables included in the unrestricted VAR:
ln*tr* ln*ct* ln*ft*
Deterministic and/or exogenous variables:
C DS

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	149.5939	98.5939	62.8634	------	------
4	132.6309	90.6309	61.2058	CHSQ(9)= 33.9260[.000]	14.7013[.099]
3	129.5446	96.5446	73.4248	CHSQ(18)= 40.0987[.002]	17.3761[.497]
2	122.3607	98.3607	81.5463	CHSQ(27)= 54.4665[.001]	23.6021[.652]
1	116.4741	**101.4741**	**90.9651**	CHSQ(36)= 66.2397[.002]	**28.7039[.801]**
0	15.0165	9.0165	4.8129	CHSQ(45)= 269.1548[.000]	116.6337[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

To test for cointegration among the three variables we apply a cointegrating VAR (2) procedure with unrestricted intercepts and no trend option chosen via Pantula principle.

** The null hypothesis of the unit root is not rejected at 5% level of significance.

Based on the results displayed in Table (8.8), both the maximum and the trace eigenvalue statistics had to a rejection of the null hypothesis at 5% significance level, namely that there is no cointegration among the variables (r=1); but the hypothesis that there is one cointegrating relation (vector) among the variables is not rejected. In the same table 8.8 Model selection criteria give different results. Akaike Information Criterion (AIC) favours three cointegrating relations between the variables and Schwarz Bayesian Criterion (SBC) one. We accept that there is one cointegrating relation following the maximal eigenvalue and trace statistics.

Table 8.8: Cointegration Tests: VAR(2) with Dummy(Spain)

Cointegration with unrestricted intercepts and no trends in the VAR
33 observations from 1967 to 1999. Order of VAR = 2.
List of variables included in the cointegrating vector:
ln*tr* ln*ct* ln*ft*
List of I(0) variables included in the VAR: *DS*

Eigenvalue Test (Order of VAR=2)

List of eigenvalues in descending order:
.67185 .16453 .096782

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	36.7716	21.1200	19.0200
r<= 1	r = 2	**5.9320**	**14.8800**	**12.9800**
r<= 2	r = 3	3.3591	8.0700	6.5000

Trace Test (Order of VAR=2)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	46.0628	31.5400	28.7800
r<= 1	r>= 2	**9.2911**	**17.8600**	**15.7500**
r<= 2	r = 3	3.3591	8.0700	6.5000

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	106.0157	91.0157	79.7919	87.2392
r = 1	124.4015	104.4015	**89.4364**	99.3662
r = 2	127.3675	104.3675	87.1577	98.5769
r = 3	129.0471	**105.0471**	87.0890	99.0047

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

The findings of one cointegrating vector are not sensitive to changes in specification. When the dummy is not included or other dummies are included in its place (such as a dummy equal to 1 for 1993 and zero elsewhere, capturing the dynamics of the introduction of the transitional VAT regime in Spain), as in the case of Greece, there is still evidence of cointegrating relations in data set. The estimates of the cointegrating coefficients of the variables in the cointegrating vector, are: $(ECM)Z=4.43\ln tr-0.77\ln ct-0.86\ln ft$, which make us to expect one cointegrating relation among the three variables that is:

$$\ln tr-\ln ct-\ln ft,\ DS\sim I(0).$$

Normalising on the coefficient for the tax rate of the economy *(*ln*tr)* (A1=1) the cointegrating vector (long run equilibrium) estimated in the Johansen procedure in the case of Spain is as under (standard errors are expressed in brackets):

$$\ln tr = \underset{(0.02)}{0.17}\ln ct + \underset{(0.01)}{0.19}\ln ft$$

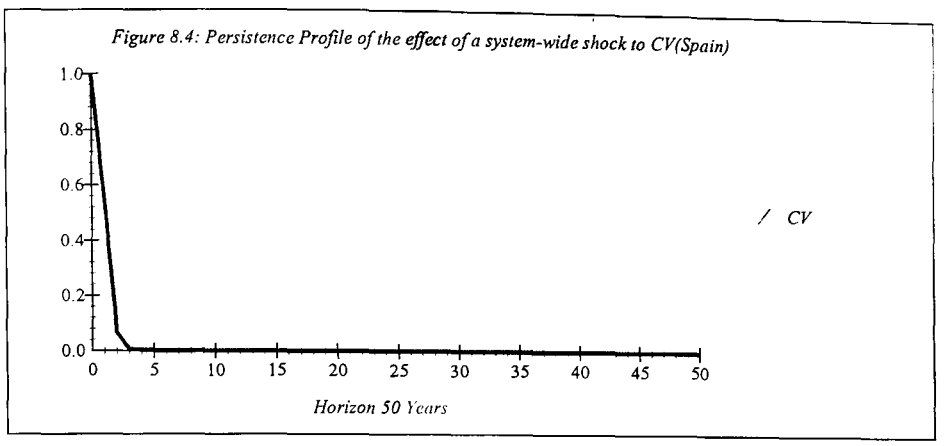
The ECM equations for Δln*tr*, Δln*ct* and Δln*ft* variables with the lagged first differences and error-corrections terms are given in table 8.9:

Table 8.9: Estimates of ECMs for* Δln*tr*, Δln*ct* *and* Δln*ft*, *1965-1999 for Spain.			
Variables	Δln*tr*	Δln*ct*	Δln*ft*
Intercept	-2.51(0.58)	3.05(1.4)	-0.17(3.2)
Δln*tr(-1)*	-0.23(0.15)	-0.17(0.38)	-0.54(0.84)
Δln*c t(-1)*	0.01(0.06)	0.18(0.16)	0.29(0.36)
Δln*ft (-1)*	-0.02(0.04)	0.02(0.11)	0.23(0.24)
Z_{t-1}	-0.68(0.15)*	0.81(0.4)*	-0.06(0.88)**
DS	-0.02(0.03)	0.3(0.1)	-0.32(0.22)
DW	1.67	1.97	1.95
R^2	0.55	0.31	0.10
SER	0.03	0.09	0.19

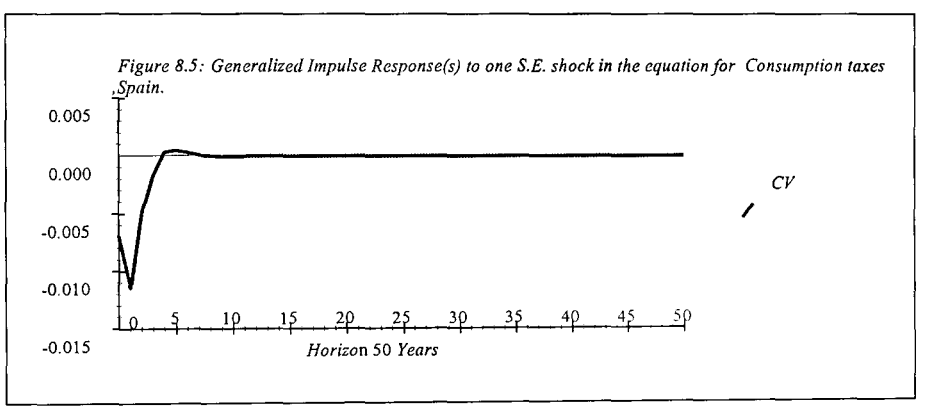
The diagnostic test statistics indicate that there is a good fit in the model. All ECMs pass the tests for first order serial correlation, functional form and heteroscedasticity at 5% significance level. However, the ECM for consumption taxes *(*ln*ct)* fails on normality. Cusum and Cusum squared tests show that the above equations are correctly specified. Unlike in the case of Greece, in the normalised cointegrating vector the coefficient on *(*ln*ct)* and *(*ln*ft)* are significant. Indeed, when we impose a zero restriction (A2=0) on (ln*ct)* or (A3=0) on *(*ln*ft)* both are rejected by the LR statistic which is given as $\chi^2(1)=27.39$ with a P-value about 0.00 and $\chi^2(1)=24.66$ with a P-value about 0.00 respectively, suggesting endogeinity of the variables to the cointegrating vector.

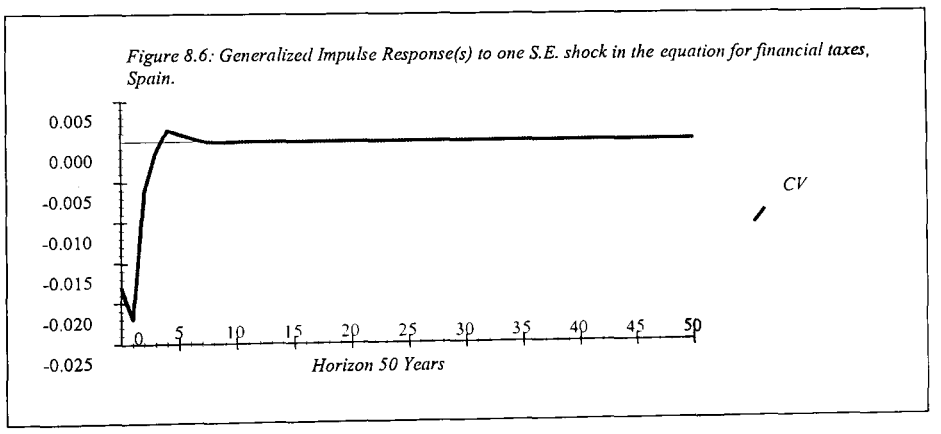
The results for Spain are more obvious. The coefficients of the error correction terms (speed of adjustment), are significant at 5% level of significance for the total tax rate *(*ln*tr)* and consumption taxes *(*ln*ct)* and also high, suggesting that it would not take long time for the total tax rate and consumption taxes equations to return to the equilibrium once the system has been shocked. The convergence back to the equilibrium is very fast, with adjustment complete in about three years (figure 8.4).

* significant at 5% level,** not-significant



The impulse response of the system is fast and has the right feedback. Choosing for example to shock the consumption taxes *(*ln*ct)* and financial taxes *(*ln*ft)* the effects on the cointegrating relation die out (figure 8.5-8.6).





In addition using the generalised IR option, the impact effect of a unit shock to consumption taxes *(*ln*ct)* on total tax rate *(*ln*tr)* and financial taxes *(*ln*ft)* is relatively large and fast. However the impact effect on financial taxes *(*ln*ft)* seems larger (figure 8.7-8.8). Moreover, the impact effect of a unit shock to financial taxes *(*ln*ft)* on total tax rate and on consumption taxes *(*ln*ct)* is fast as well with larger impact on consumption taxes *(*ln*ct)* (negative feedback).

Figure 8.7: Generalized Impulse Response(s) to one S.E. shock in the equation for consumption taxes, Spain.

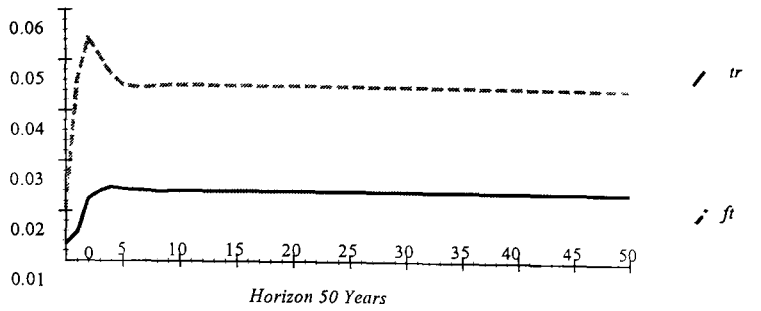
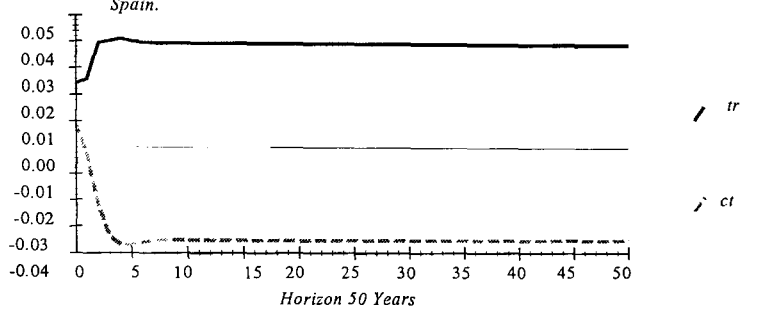


Figure 8.8: Generalized Impulse Response(s) to one S.E. shock in the equation for financial taxes, Spain.



The results from the cointegrating VAR analysis suggest that in the case of Spain the total tax rate of the economy, consumption and financial taxes are cointegrated. In addition the individual equations, in short run, suggest a unidirectional causation, from consumption taxes and financial taxes towards the total tax rate. On the other hand, in long run, we can support the hypothesis that there is a positive relationship between the average total tax rate, consumption and indirect financial taxes in Spain. The long run elasticity for financial taxes is equal to the one found for Greece (0.19) indicating that a 1% change (increase) in financial taxes (in logs) generates an (0.19%) increase of the share of total tax revenues to GDP. **Contrary to the findings for Greece, consumption taxes have a positive long run effect on total tax rate *(*ln*tr)* (endogenous to cointegrating vector) for Spain.** The long-run elasticity is (0.17), indicating effective revenue collection if we take into account the method of the application of these taxes (deductions for inputs, many exemptions applied etc.). Based on the significance of the error correction coefficient in individual equations we can conclude that there is a bi-directional Granger causal relationship between the average total tax rate (ln*tr*) and consumption taxes (ln*ct*) and a unidirectional Granger causal relationship from financial taxes (ln*ft*) towards the average total tax rate (ln*tr*):

ln*tr* ←→ ln*ct*, and ln*ft*→ln*tr*

In addition the dummy variable *DS* is significant at 5% significant level in the equation explaining the consumption taxes *(*ln*ct)*. This suggests an important short run effect of the introduction of VAT in consumption tax system. Like in the case of Greece, when we impose additional restrictions on coefficients for the dummy variable *DS,* using the Wald test, the null hypothesis that the coefficient is equal to zero is rejected only for the equation for consumption taxes (Δln*ct*) [$\chi^2(1)=9.27$ with a P-value of 0.002].

8.4.3 Portugal

Likewise to the case of Greece and Spain, we use a multivariate (trivariate) cointegrating VAR model for the period 1965-1999. As a difference to Greece and Spain an additional modification in data set is necessary for Portugal. In indirect financial taxes we do not include other indirect taxes on specific services (e.g. taxes on gambling services) classified, in the case of Portugal, under the same code (i.e. code 5126). Like Greece and Spain a dummy (*DP)* was added for the introduction of VAT in Portugal in 1986. As in the case of Greece and Spain, non-nested tests indicated that the logarithmic transformation was preferred over the level equation. To determine whether each series contain a unit root, that is non-stationary, we use the Dickey-Fuller (DF) and augmented Dickey-Fuller (ADF) and the results reported in the following Table (8.10) suggest that we can treat the variables (ln*tr,* ln*ct,* ln*ft*) as Granger causal (the series are *I (1)*).

Table 8.10: Dickey-Fuller unit root tests results (Portugal)

Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*tr*	-1.09**	-2.70**	-6.82	-6.74
ln*ct*	-1.13**	-2.11**	-6.03	-6.21
ln*ft*	-1.89**	-0.10**	-4.15	-4.90

To choose the order of VAR we make an initial estimation of maximum order of VAR to (5) (Table 8.11). The relevant statistic tests [(Adjusted likelihood ratio (LR), Schwarz-Bayesian Criterion (SBC), and unadjusted LR tests)] indicate a first order of VAR, though the Akaike Information Criterion (AIC) suggests longer lags. Checking the residuals of individual equations in a first order VAR for possible serial correlation suggests a problem of serial correlation in all individual equations. Hence we choose a higher order of VAR (2).

** The null hypothesis of the unit root is not rejected at 5% level of significance.

Table 8.11: Determining the order of VAR(Portugal)

Based on 30 observations from 1970 to 1999. Order of VAR = 5
List of variables included in the unrestricted VAR:
ln*tr* ln*ct* ln*ft*
Deterministic and/or exogenous variables:
C *DP*

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	149.5804	**98.5804**	63.7144	------	------
4	140.2006	98.2006	69.4874	CHSQ(9)= 18.7596[.027]	7.7626[.558]
3	129.3714	96.3714	73.8110	CHSQ(18)= 40.4181[.002]	16.7248[.542]
2	113.2128	89.2128	72.8053	CHSQ(27)= 72.7352[.000]	30.0973[.310]
1	101.8309	86.8309	**76.5762**	CHSQ(36)= 95.4990[.000]	**39.5168[.316]**
0	2.9851	-3.0149	-7.1168	CHSQ(45)=293.1906[.000]	121.3203[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

To test for cointegration among the three variables we apply a cointegrating VAR (2) procedure with restricted intercepts and no trend option chosen via Pantula principle. The results displayed in Table (8.12) both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among the variables (namely r=1) but do not reject the hypothesis that there is one cointegrating relation (vector) among the variables. Reported in the same table Model selection criteria give different results. Akaike Information Criterion (AIC) favours two cointegrating relations between the variables and Schwarz Bayesian Criterion (SBC) one. We accept that there is one cointegrating relation following the maximal eigenvalue and trace statistics.

Table 8.12: Cointegration Tests : VAR (2) with Dummy(Portugal)

Cointegration with restricted intercepts and no trends in the VAR
33 observations from 1967 to 1999. Order of VAR = 2.
List of variables included in the cointegrating vector:
ln*tr* ln*ct* ln*ft* Intercept
List of I(0) variables included in the VAR: *DP*

Eigenvalue Test (Order of VAR=2)

List of eigenvalues in descending order:
.57759 .22399 .048636 .0000

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	27.5766	22.0400	19.8600
r<= 1	r = 2	**8.1149**	**15.8700**	**13.8100**
r<= 2	r = 3	1.5955	9.1600	7.5300

Trace Test (Order of VAR=2)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	37.2870	34.8700	31.9300
r<= 1	r>= 2	**9.7104**	**20.1800**	**17.8800**
r<= 2	r = 3	1.5955	9.1600	7.5300

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	93.1325	81.1325	72.3380	78.2174
r = 1	106.9208	88.9208	**75.7291**	84.5481
r = 2	110.9782	**88.9782**	72.8551	83.6339

r = 3	111.7760	87.7760	70.1871	81.9458

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

Again the findings of one cointegrating vector are not sensitive to changes in specification. When the dummy is not included or other dummies are included in its place, as in the case of Greece and Spain, there is still evidence of cointegrating relations. The estimates of the cointegrating coefficients of the variables in the cointegrating vector are: (ECM)Z=-*2.75*ln*tr*+0.66ln*ct*-0.005ln*ft*-7.63, which make us to expect one cointegrating relation among the three variables that is:

$$\ln tr\text{-}\ln ct\text{-}\ln ft,\ DP\sim I(0)$$

After normalising on the coefficient for total tax rate of economy (ln*tr)* (A1=1) the cointegrating vector (long run equilibrium) estimated in the Johansen procedure in the case of Portugal is as follows (standard errors are expressed in brackets):

$$\ln tr = \underset{(0.02)}{0.24}\ln ct - \underset{(0.02)}{0.001}\ln ft - \underset{(012)}{2.77}$$

The ECM equations for Δln*tr,* Δln*ct,* and Δln*ft* variables with the lagged first differences and error-corrections terms are given in table 8.13:

Table 8.13: Estimates of ECMs for* Δln*tr,* Δln*ct and* Δln*ft, 1965-1999 for Portugal.

Variables	Δln*tr*	Δln*ct*	Δln*ft*
Intercept	-	-	-
Δln*tr(-1)*	0.15(0.14)	0.51(0.37)	0.89(0.75)
Δln*c t(-1)*	-0.07(0.02)	-0.06(0.07)	-0.15(0.14)
Δln*ft (-1)*	-0.007(0.03)	0.006(0.08)	0.14(0.17)
Z_{t-1}	-0.48(0.1)*	-0.82(0.26)*	-1.03(0.53)**
DP	0.06(0.03)	0.44(0.09)	-0.2(0.19)
DW	2.1	2.02	2.22
R^2	0.39	0.32	0.22
SER	0.03	0.09	0.19

The diagnostic test statistics indicate that there is a good fit in the model. The ECMs pass the tests for first order serial correlation and heteroscedasticity at 5% significance level. However, the ECM for financial taxes *(*ln*ft)* fails on normality and functional form. Cusum and Cusum squared tests support the view that the above equations are correctly specified. Unlike to the case of Greece and Spain, in the normalised cointegrating vector the coefficient on *(*ln*ft)* seems to be insignificant while the coefficient on consumption taxes

* significant at 5% critical level,** significant at 10% critical level

(ln*ct*) is significant. When we impose a restriction, that the coefficient on (ln*ct*) is equal to zero (A2=0), this is rejected by the LR statistic which is given as $\chi^2(1)=7.35$ with a P-value of 0.007, suggesting endogeinity of the variable to the cointegrating vector. On the contrary, the restriction that the coefficient on financial taxes *(*ln*ft)* is equal to zero (A3=0) could not be rejected by the LR statistic given as $\chi^2(1)=0.005$ with a P-value of 0.94. Therefore, the new cointegrating vector with this over-identifying restriction is:

$$(ECM)Z=\ln tr-0.23\ln ct+\underset{(0.17)}{0.00}\ln ft+\underset{(0.12)}{2.77}$$

This means that the cointegrating relation has been reduced to the one expressed as:

$$\ln tr-\ln ct,\ DP\sim I(0)$$

The new ECM estimates for the over-identified system are displayed in table 8.14:

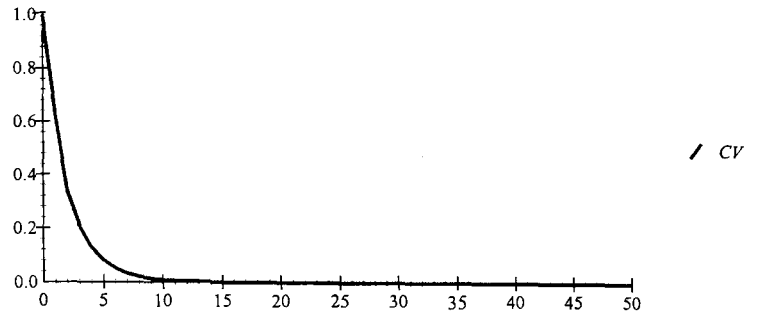
Table 8.14: Estimates of ECMs for* Δln*tr*, Δln*ct* *and* Δln*ft*, *1965-1999 for Portugal.			
Variables	Δln*tr*	Δln*ct*	Δln*ft*
Intercept	-	-	-
Δln*tr(-1)*	0.15(0.14)	0.52(0.37)	0.9(0.75)
Δln*c t(-1)*	-0.07(0.02)	-0.06(0.07)	-0.15(0.14)
Δln*ft (-1)*	-0.008(0.03)	0.006(0.08)	0.13(0.17)
Z_{t-1}	-0.49(0.1)*	-0.83(0.26)*	-1.04(0.53)**
DP	0.06(0.03)	0.44(0.09)	-0.2(0.19)
DW	2.1	2.02	2.22
R^2	0.39	0.32	0.22
SER	0.03	0.09	0.19

Similar results follows from the diagnostic statistic tests for the new ECM above. The ECM for financial taxes *(*ln*ft)* fails on normality and functional form at 5% significance level. Cusum and Cusum squared tests indicate that the above equations are structurally stable as well. The coefficients and standard errors in the ECM representations with and without over-identifying restrictions do not differ much. The coefficients on the error correction terms, are significant at 5% level for the total tax rate *(*ln*tr)* and consumption taxes *(*ln*ct)* and weakly significant for financial taxes *(*ln*ft)* at 10% significance level and also high, suggesting that that it would not take long time for the equations to return to the equilibrium once the system has been shocked. There seems to be a degree of overreaction, represented by the negative coefficients on the ECMs equations and error correction terms (as in the case of Greece). However, the convergence back to the

* significant at 5% level, ** significant at 10% critical level

equilibrium is moderate, with adjustment complete in about seven years (faster than Greece and slower than Spain) (Figure 8.9).

Figure 8.9: Persistence Profile of the effect of a system-wide shock to CV(Portugal)



The impulse response of the system is fast and as in the case of Greece and Spain has the right feedback. Choosing to shock the consumption taxes *(*ln*ct)* and financial taxes *(*ln*ft)* the effects on the cointegrating relations dies out (figure 8.10-8.11), relatively fast.

Figure 8.10: Generalized Impulse Response(s) to one S.E. shock in the equation for consumption taxes (Portugal)

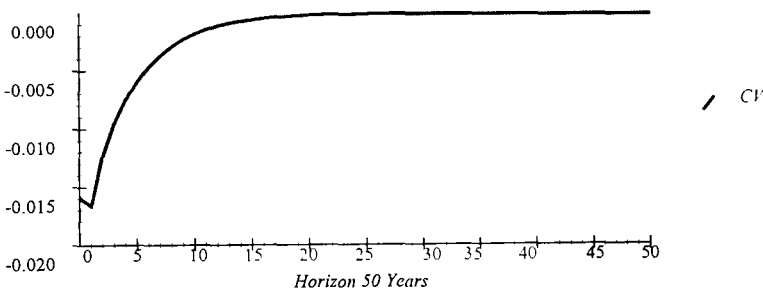
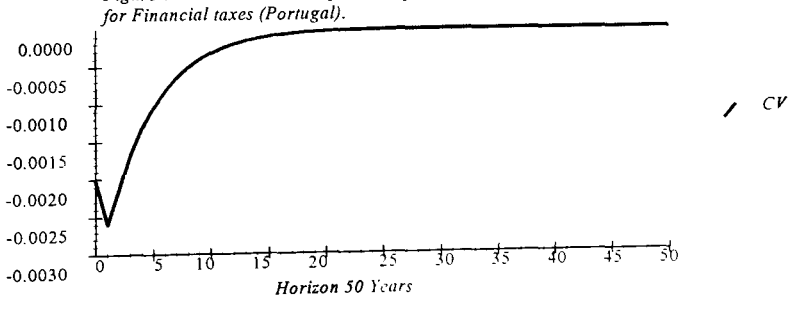
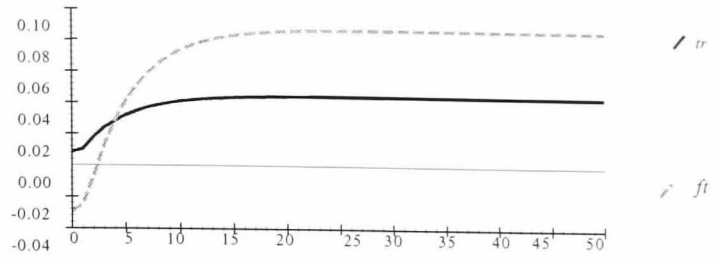


Figure 8.11: Generalized Impulse Response(s) to one S.E. shock in the equation for Financial taxes (Portugal).



In addition using the generalised IR option, the impact effect of a unit shock to consumption taxes *(*ln*ct)* on total tax rate *(*ln*tr)* and financial taxes *(*ln*ft)* is relatively large (but smaller than in case of Spain) and fast. However, the impact effect on financial taxes *(*ln*ft)* seems larger (Figure 8.12).

Figure 8.12: Generalized Impulse Response(s) to one S.E. shock in the equation for consumption taxes (Portugal)



As the results from the cointegrating VAR analysis suggest, in the case of Portugal only one long run relationship can be established, namely the one between total tax rate and consumption taxes. In the short run, the error correction equations, as in the case of Greece and Spain, do not suggest any bi-directional causation between total tax rate and consumption taxes or between total tax rate *(*ln*tr)* and financial taxes *(*ln*ft)*. In addition, the individual equations suggest a unidirectional causation, in short run, from consumption taxes *(*Δln*ct)* towards the total tax rate (Δln*tr*). Furthermore, financial taxes have a small negative short run effect on total tax rate. Unlike in Greece, but similar to Spain, consumption taxes *(*ln*ct)* have an important long run effect on the average total tax rate of the economy. The long run elasticity (0.23*)* for consumption taxes *(*ln*ct*) is relatively high (higher than the one found for Spain, 0.19%) indicating that a 1% change in growth of consumption taxes (in logs) generates an (0.23%) increase of the share of total tax revenues to GDP.

On the basis of the cointegration results we can support the hypothesis that the average total tax rate (ln*tr*) and consumption taxes (ln*ct*) are Granger causal. From the results in individual equations (based on the significance of the error correction term coefficient) we can conclude that there is a bi-directional Granger causal relationship (similar to Spain) between the total tax rate (ln*tr*) and the consumption taxes (ln*ct*) in Portugal:

$$\ln tr \leftrightarrow \ln ct$$

The dummy variable *DP* is significant at 5% significance level in equation explaining the consumption taxes *(*ln*ct)*, suggesting an important short-run effect of the introduction of VAT in consumption tax system in Portugal as in the cases of Greece and Spain. When we impose additional restrictions on coefficients for the dummy variable *DP*, using the Wald test, the null hypothesis that the coefficient is equal to zero is rejected only for the equation for consumption taxes *(*ln*ct)* [$\chi^2(1)=21.68$ with a P-value about 0.00]. **Contrary**

to the results for Greece and Spain, we found a weakly significant (at 10% significance level) coefficient for the dummy variable *DP* in the equation explaining the total tax rate ($\Delta \ln tr$) [$\chi^2(1)=2.72$ with a P-value of 0.09], indicating that the reform appears to have a (weak and short-lived) short-run effect on total tax rate of tax system as well.

8.5 Granger type causality tests for Greece, Spain and Portugal for the average total tax rate and indirect taxes relationship.

For comparison purposes we perform the Engle and Granger causality tests in order to re-examine the causal relationships among the three variables in the three countries by estimating an unrestricted VAR[46] model in differences of variables with the dummy for the introduction of VAT as its deterministic variable. On the whole we obtain quite similar results as in Johansen procedure (Table 8.15). However, some differences have been identified. Consumption taxes are a causal variable for Greece and the total tax rate of the economy a non-causal variable for Spain and Portugal. Finally, as in the Johansen procedure the additional restriction that the coefficient of the dummy variable is zero is rejected only in the equations explaining the consumption taxes in three countries.

Table 8.15: Granger type tests based on OLS equation for Greece, Spain and Portugal (tax rate and indirect taxes relationship).

Variable	ln*tr*		ln*ct*		ln*ft*		Dummy for VAT reform (Wald test)	
Country	LR statistic	causal	LR statistic	causal	LR statistic	causal	LR statistic	significant at 5% critical level in
Greece	$\chi^2(6)=7.38$ (0.27)	No	$\chi^2(6)=17.69$ (0.007)	Yes	$\chi^2(6)=26.92$ (0.00)	Yes	$\chi^2(1)=15.75$ (0.00)	(ln*ct*)
Spain	$\chi^2(4)=5.54$ (0.23)	No	$\chi^2(4)=15.6$ (0.004)	Yes	$\chi^2(4)=17.82$ (0.001)	Yes	$\chi^2(1)=6.47$ (0.011)	(ln*ct*)
Portugal	$\chi^2(1)=1.94$ (0.74)	No	$\chi^2(1)=16.9$ (0.002)	Yes	$\chi^2(1)=2.75$ (0.59)	No	$\chi^2(1)=13.51$ (0.00)	(ln*ct*)

[46] Actually in this methodology one considers several endogenous variables together. But each endogenous variable is explained by its lagged, or past, values and the lagged values of all other endogenous variables in the model; usually, there are no exogenous variables in the model (Gujarati, 1995).

8.6 Cointegration analysis of total government expenditures and the different indirect taxes relationship.

A first investigation of the data on expenditures in three countries show that spending has increased intensively over the period 1965-1999. The summary statistics reported in Table 8.16 suggest that Portugal is the country with the highest percentage growth of expenditures (per annum) (6.53%), while Greece and Spain appear with quite similar percentage growth (4.67%) and (4.57%) respectively.

Table 8.16: Summary statistics of the growth of expenditures (1965-1999).

Country	*Greece*	*Spain*	*Portugal*
Mean	4.67	4.57	6.53
St. Dev	9.81	7.37	16.27

Again to provide empirical evidence to the issue of tax and spend relationship we follow the same methodology we used before to examine the relationship between the average total tax rate and the different taxes. We address first the time-series properties of the variables (different indirect taxes and expenditures) and then we test for cointegration by using the Johansen methodology.

8.6.1 Greece

As we did in the investigation of the total average tax rate and the different indirect taxes relationship, we employ a multivariate (trivariate) cointegrating VAR model for the period 1965-1998. We use the total expenditures (*ex*), sales tax and VAT revenues for consumption taxes (*ct*), and turnover taxes, stamp duties and cascade indirect taxes on financial services for indirect financial taxes *(ft)*. We also add the dummy *(DGR)* for the introduction of VAT in Greece in 1987. Non-nested tests indicate that the logarithmic transformation is to be preferred over the level equation. In the first step of testing for cointegration we performed the Dickey-Fuller (DF) and the augmented Dickey-Fuller (ADF) tests in order to verify the presence of common stochastic trends among the variables. The results reported in table 8.17 indicate that the series are of the same order *I(1)* of integration and candidates for cointegration with the variable representing the total expenditures.

Table 8.17: Dickey-Fuller unit root tests results (Greece)				
Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*ex*	-1.42**	-1.72**	-6.49	-6.53
ln*ct*	-1.54**	-2.96**	-6.56	-6.44
ln*ft*	-1.49**	-2.62**	-5.76	-5.65

In the second step we look for the possibility that the above variables are cointegrated. In this case the Granger representation theorem states that, the first differences of the variables may be considered to be generated by error correction models of the same form we used to investigate the average total tax rate and different taxes relationship. For cointegration analysis we follow the maximum likelihood estimation approach as in (Johansen, 1988) and (Johansen and Juselius, 1992). To select the order of VAR we specify a trivariate unrestricted VAR model in ln*ex*, ln*ct,* and ln*ft* containing an intercept term and the Dummy variable *(DGR)* as its deterministic component. We make an initial estimation of a maximum order of VAR to 5 (Table 8.18). The Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) and adjusted LR test suggest a VAR of order 1. Therefore we choose a VAR of order 1.

Table 8.18: Determining the order of VAR (Greece)

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model
Based on 29 observations from 1970 to 1998. Order of VAR = 5
List of variables included in the unrestricted VAR:
ln*ex* ln*ct* ln*ft*
List of deterministic and/or exogenous variables:
C *DGR*

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	97.5121	46.5121	11.6460	------	------
4	83.4608	41.4608	12.7476	CHSQ(9)= 28.1026[.001]	11.6287[.235]
3	79.5481	46.5481	23.9877	CHSQ(18)= 35.9279[.007]	14.8667[.671]
2	72.1424	48.1424	31.7349	CHSQ(27)= 50.7393[.004]	20.9956[.786]
1	68.4649	**53.4649**	**43.2101**	CHSQ(36)= 58.0944[.011]	**24.0391[.936]**
0	-14.5451	-20.5451	-24.6469	CHSQ(45)= 224.1143[.000]	92.7369[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

To test for cointegration among the three variables we apply a cointegrating VAR (1) procedure with unrestricted intercepts and no trend option chosen via the Pantula principle. Based on the results displayed in Table (8.19), both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among ln*ex*, ln*ct,* and ln*ft* (namely r=0) but do not reject the hypothesis that there is one cointegrating relation (vector) (i.e. r=1) between the variables. Reported in the

** The null hypothesis of the unit root is not rejected at 5% level of significance.

same table 8.19 Model selection criteria give the same results indicating one cointegrating relation between the variables.

Table 8.19: Cointegration Tests: VAR(1) with Dummy(Greece)

Cointegration with unrestricted intercepts and no trends in the VAR
33 observations from 1966 to 1998. Order of VAR = 1.
List of variables included in the cointegrating vector:
ln*ex* ln*ct* ln*ft*
List of I(0) variables included in the VAR: *DGR*
Eigenvalue Test (Order of VAR=1)
List of eigenvalues in descending order:
.53694 .076069 .052606

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	25.4069	21.1200	19.0200
r<= 1	r = 2	**2.6109**	**14.8800**	**12.9800**
r<= 2	r = 3	1.7833	8.0700	6.5000

Trace Test (Order of VAR=1)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	29.8011	31.5400	28.7800
r<= 1	r>= 2	**4.3942**	**17.8600**	**15.7500**
r<= 2	r = 3	1.7833	8.0700	6.5000

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	62.5735	56.5735	52.0839	55.0629
r = 1	75.2769	**64.2769**	**56.0461**	61.5075
r = 2	76.5823	62.5823	52.1068	59.0576
r = 3	77.4740	62.4740	51.2502	58.6975

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

The findings of one cointegrating vector are not sensitive to changes in specification. When the *DGR* dummy is not included or other dummies are included in its place, as before, there is still evidence of cointegrating relations in data. The estimates of the cointegrating coefficients of the variables in the cointegrating vector are: *(ECM)Z= 1.13*ln*ex-1.0*ln*ct-0.231*ln*ft,* which make us to expect one cointegrating relation among the three variables that is:

ln*ex*-ln*ct*-ln*ft*, *DGR~I(0).*

Normalising on the coefficient for total expenditures *(*ln*ex)* (A1=1) the cointegrating vector (long-run equilibrium) estimated in the Johansen procedure is (standard errors are expressed in brackets):

$$\ln ex = \underset{(0.07)}{0.88}\ \ln ct + \underset{(0.05)}{0.20}\ \ln ft$$

The ECM equations for Δln*ex,* Δln*ct,* and Δln*ft* variables with the error-correction terms are given in table 8.20:

Table 8.20: Estimates of ECMs for **Δln*ex*, Δln*ct* *and* Δln*ft*, *1965-1998 for Greece.***			
Variables	Δln*ex*	Δln*ct*	Δln*ft*
Intercept	0.09(0.16)**	-0.63(0.15)*	-0.14(0.41)**
Z_{t-1}	-0.03(0.10)**	0.45(0.10)*	0.10(0.27)**
DGR	0.009(0.09)**	0.42(0.09)*	0.02(0.24)**
DW	2.3	1.79	1.88
R^2	0.03	0.59	0.05
SER	0.09	0.08	0.23

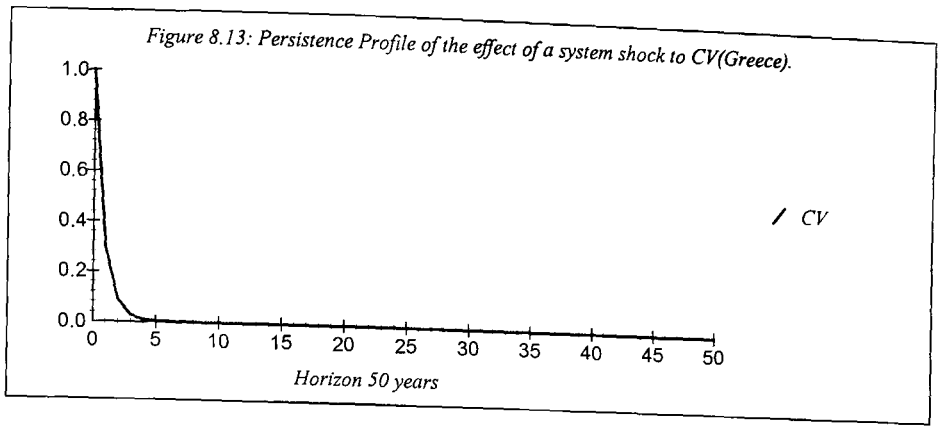
The diagnostic test statistics show that there is a good fit in model. All the ECMs pass the tests for first order serial correlation at 5% significance level. The equation for financial taxes *(*Δln*ft)* fails on normality at 5% level of significance. In the normalised cointegrating vector the coefficients on *(*ln*ct)* and ln*ft* are significant. Indeed, when we impose a zero restriction (A2=0) on *(*ln*ct)*, and (A3=0) on (ln*ft*) these restrictions are rejected by the LR statistic which is given as $\chi^2(1)=23.17$ with a P-value about 0.00 and $\chi^2(1)=7.28$ with a P-value of 0.007 respectively. As the results from the cointegrating VAR analysis suggest, we can infer that the expenditures, consumption and financial taxes are cointegrated thus that they move together over time. On the basis of the results (based on the significance of the error correction coefficient in individual equations) we can conclude that there is a unidirectional Granger causal relationship from expenditures towards the consumption taxes.

ln*ex*→ln*ct*

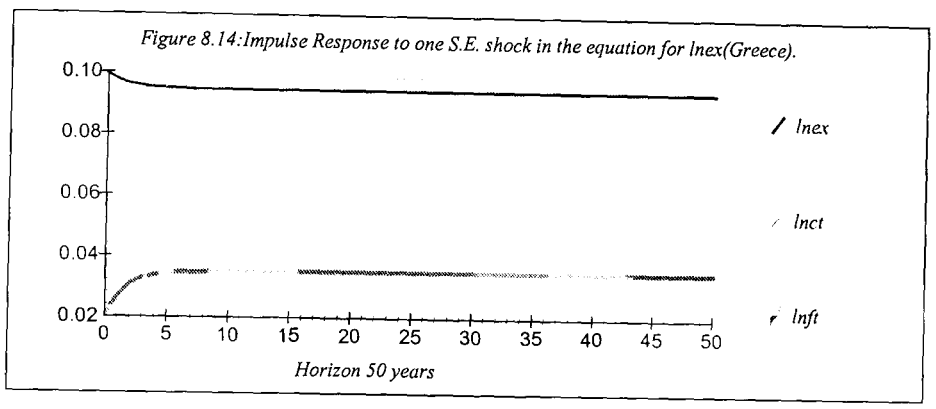
Based on the above results we can conclude that the findings support the view that the political system in Greece somehow determines how much to spend and then looks for revenues from taxing the final consumption to finance a part of that level of spending.

On the other hand, the long run equilibrium indicates that an increase of consumption and indirect financial taxes by 1% increases the level of expenditures by 0.88% and 0.20% respectively. The coefficient of the error correction term in the equation explaining the growth of consumption taxes is positive and high, indicating a fast adjustment to the equilibrium once the system is shocked. Convergence back to equilibrium is fast with adjustment complete in about four years (figure 8.13).

* significant at 5% level, ** not-significant



In addition the impulse responses have the right feedback. For example the impact effect of a unit shock to expenditures on consumption taxes is quite large and is larger than the effect on expenditures itself. The results given in the figure 8.14 suggest an important cyclical effect of an expenditure shock on consumption taxes, with consumption taxes responding very strongly to an expenditure shock and then increasing very sharply.



8.6.2 Spain

For Spain we employ the same model as in Greece for the period 1965-1999. We also add a dummy *(DS)* for the introduction of VAT in Spain in 1986. Non-nested tests indicated that the logarithmic transformation is to be preferred over the level equation. The results reported in table 8.21 (the Dickey-Fuller (DF) and the augmented Dickey-Fuller (ADF) tests) indicate that the series are of the same order *I(1)* of integration and candidates for cointegration.

Table 8.21: Dickey-Fuller unit root tests results (Spain)

Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*ex*	-1.09**	-0.33**	-4.93	-5.19
ln*ct*	-0.14**	-2.16**	-5.04	-4.94
ln*ft*	-1.22**	-0.56**	-4.70	-4.64

** The null hypothesis of the unit root is not rejected at 5% level of significance.

For cointegration analysis we follow the same procedure as before. To select the order of VAR we specify a trivariate unrestricted VAR model in ln*ex*, ln*ct*, and ln*ft* containing an intercept term and the Dummy variable *(DS)* as its deterministic component. We make an initial estimation of a maximum order of VAR to 5 (Table 8.22). The Akaike Information Criterion (AIC), Schwarz Bayesian Criterion (SBC) and adjusted LR test suggest a VAR of order 1. Therefore we choose a VAR of order 1.

Table 8.22: Determining the order of VAR (Spain)

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model
Based on 30 observations from 1970 to 1999. Order of VAR = 5
List of variables included in the unrestricted VAR:
ln*ex* ln*ct* ln*ft*
List of deterministic and/or exogenous variables:
C *DS*

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	137.5939	86.5939	50.8634	------	------
4	123.2034	81.2034	51.7783	CHSQ(9)= 28.7810[.001]	12.4718[.188]
3	117.5202	84.5202	61.4004	CHSQ(18)= 40.1474[.002]	17.3972[.496]
2	110.3829	86.3829	69.5685	CHSQ(27)= 54.4220[.001]	23.5829[.653]
1	106.9969	**91.9969**	**81.4879**	CHSQ(36)= 61.1940[.005]	**26.5174[.876]**
0	-17.5633	-23.5633	-27.7669	CHSQ(45)= 310.3144[.000]	134.4696[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

As before to test for cointegration among the three variables we apply a cointegrating VAR (1) procedure with restricted intercepts and no trend option chosen by the Pantula principle. Based on the results displayed in Table (8.23) both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among ln*ex*, ln*ct*, and ln*ft* (namely r=0) but do not reject the hypothesis that there is one cointegrating relation (vector) (i.e. r=1) between the variables. Reported in the same table Model selection criteria support the hypothesis that there is one cointegrating relation between the variables.

Table 8.23: Cointegration Tests: VAR(1) with Dummy(Spain)

Cointegration with restricted intercepts and no trends in the VAR
34 observations from 1966 to 1999. Order of VAR = 1.
List of variables included in the cointegrating vector:
ln*ex* ln*ct* ln*ft* *Intercept*
List of I(0) variables included in the VAR: *DS*
Eigenvalue Test (Order of VAR=1)
List of eigenvalues in descending order:
.58542 .30681 .075379 0.00

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	29.9365	22.0400	19.8600
r<= 1	r = 2	**12.4596**	**15.8700**	**13.8100**
r<= 2	r = 3	2.6646	9.1600	7.5300

Trace Test (Order of VAR=1)

Null	Alternative	Statistic	Critical Value 95%	90%
r = 0	r>= 1	45.0607	34.8700	31.9300
r<= 1	r>= 2	**15.1242**	**20.1800**	**17.8800**
r<= 2	r = 3	2.6646	9.1600	7.5300

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	77.2863	74.2863	71.9968	73.5055
r = 1	92.2546	**85.4844**	**76.3859**	80.9122
r = 2	98.4844	83.2546	75.5630	82.1009
r = 3	99.8167	84.8167	73.3690	80.9127

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

There is no sensitivity again to changes in specification. When the *DS* dummy is not included or other dummies are included in its place there is still evidence of cointegrating relations in data. The estimates of the cointegrating coefficients of the variables in the cointegrating vector, are: *(ECM)Z=-0.11*ln*ex-0.24*ln*ct+0.12*ln*ft+2.41*, which make us to expect one cointegrating relation among the three variables that is:

ln*ex*-ln*ct*-ln*ft*, *DS~I(0)*.

Normalising on the coefficient for total expenditures *(*ln*ex)* (A1=1) the cointegrating vector (long run equilibrium) estimated in the Johansen procedure is (standard errors are expressed in brackets):

$$\ln ex = -2.2\ \ln ct + 1.13\ \ln ft + 21.52$$
$$(8.92)\quad (2.86)\quad (58.12)$$

The ECM equations for Δln*ex*, Δln*ct*, and Δln*ft* variables with the error-correction terms are given in table 8.24:

Table 8.24: Estimates of ECMs for* Δln*ex*, Δln*ct and* Δln*ft*, *1965-1998 for Spain.

Variables	Δln*ex*	Δln*ct*	Δln*ft*
Intercept	-	-	-
Z_{t-1}	-0.032(0.007)*	-0.02(0.01)*	-0.06(0.02)*
DS	0.01(0.06)**	0.23(0.09)*	-0.27(0.19)**
DW	2.03	1.70	2
R^2	0.17	0.17	0.08
SER	0.06	0.09	0.18

The diagnostic test statistics indicate that there is a good fit in model. All the ECMs pass the tests for first order serial correlation at 5% significance level. The equation for financial taxes *(*Δln*ct)* fails on normality at 5% level of significance. In the normalised cointegrating vector the coefficients on *(*ln*ct)* and ln*ft* seem insignificant. When we impose

* significant at 5% level, ** not-significant

a zero restriction (A2=0) on *(*ln*ct)*, this is not rejected by the LR statistic which is given as $\chi^2(1)=1.45$ with a P-value of 0.22. On the other hand when we imposed a zero restriction (A3=0) on the coefficient of (ln*ft*) this restriction is rejected by the LR statistic which is given as $\chi^2(1)=7.04$ with a P-value of 0.03. The new over-identified long run equilibrium is:

$$\ln ex = 0.42 \ln ft - 7.26$$
$$(0.05) \quad (0.32)$$

The new ECM equations for Δln*ex,* Δln*ct,* and Δln*ft* variables with the error-correction terms are given in table 8.25:

Table 8.25: Estimates of ECMs for* Δln*ex,* Δln*ct and* Δln*ft, 1965-1998 for Spain.

Variables	Δln*ex*	Δln*ct*	Δln*ft*
Intercept	-	-	-
Z_{t-1}	-0.15(0.03)*	-0.07(0.05)**	-0.24(0.10)*
DS	-0.03(0.06)**	0.23(0.10)*	-0.27(0.20)**
DW	1.88	1.68	1.99
R^2	0.24	0.12	0.09
SER	0.06	0.09	0.19

The results in the over-identified system are slightly different (insignificant coefficient for the error correction term in the equation explaining the growth of consumption taxes). The equation explaining the growth of indirect financial taxes still fails on normality at 5% significance level. As the results from the cointegrating VAR analysis suggest, expenditures, consumption and financial taxes are cointegrated thus that they move together over time. On the basis of the results (based on the significance of the error correction coefficient in individual equations) we can conclude that in the case of Spain there is a bi-directional Granger causal relationship between expenditures and financial taxes.

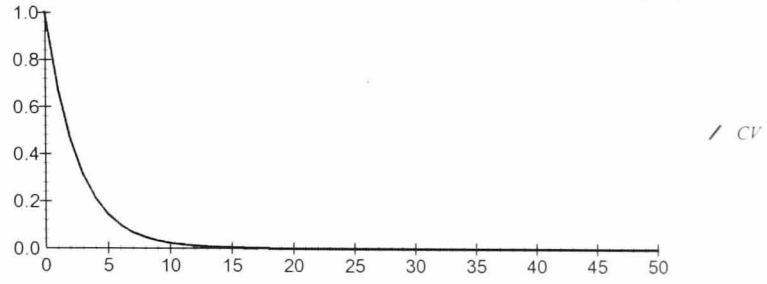
$$\ln ex \leftrightarrow \ln ft$$

Hence, for Spain indirect financial taxation and spending decisions are jointly made by fiscal authorities. On the other hand, the long run equilibrium indicates that an increase of indirect financial taxes by 1% increases the level of expenditures by 0.42%.

* significant at 5% level, ** not-significant

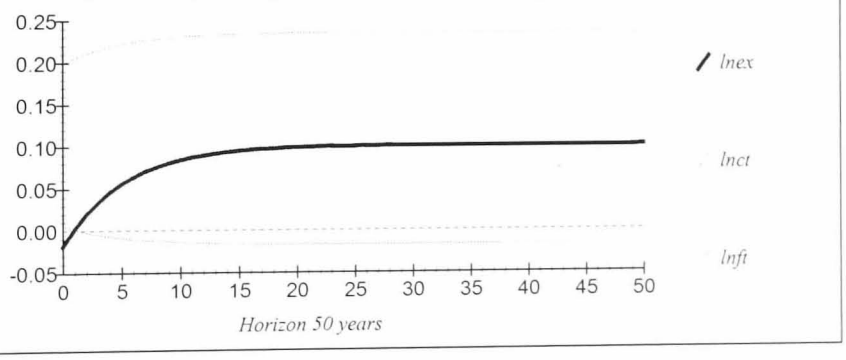
The coefficient of the error correction term in the equation explaining the growth of indirect financial taxes is negative (indicating overreaction to shocks of the equation) and low indicating a moderate adjustment to the equilibrium once the system is shocked. Convergence back to equilibrium is moderate with adjustment complete in about ten years (figure 8.15).

Figure 8.15: Persistence Profile of the effect of a system shock to CV(Spain).



In addition the impulse responses had the right feedback. For example the impact effect of a unit shock to indirect financial taxes on expenditures is quite large and is larger than the effect on indirect taxes itself. The results given in the figure 8.16 suggest an important cyclical effect of an indirect financial taxes shock on expenditures with expenditures responding strongly to an indirect financial shock and then increasing sharply.

Figure 8.16:Impulse Response to one S.E. shock in the equation for lnft (Spain).



8.6.3 Portugal

For Portugal, we again use the same model as in the case of Greece and Spain for the period 1965-1999. We also add a dummy (*DP)* for the introduction of VAT in Portugal in 1986, which takes the value of unity for 1986 and zero elsewhere. Non-nested tests indicate that the logarithmic transformation is preferred over the level equation. The results reported in table 8.26 (The Dickey-Fuller (DF) and the augmented Dickey-Fuller

(ADF) tests) indicate that the series are of the same order *I(1)* of integration and candidates for cointegration.

Table 8.26: Dickey-Fuller unit root tests results (Portugal)

Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*ex*	-1.34**	-1.05**	-4.35	-4.50
ln*ct*	-1.13**	-2.11**	-6.03	-6.21
ln*ft*	-1.89**	-0.10**	-4.15	-4.90

For cointegration analysis, as before, we follow the maximum likelihood estimation approach (Johansen, 1988) and (Johansen and Juselius, 1992). To select the order of VAR we specify a trivariate unrestricted VAR model in ln*ex*, ln*ct*, and ln*ft* containing an intercept term and the Dummy variable *(DP)* as its deterministic component. The procedure is similar to the previous cases. We make an initial estimation of a maximum order of VAR to 5 (Table 8.27). The Schwarz Bayesian Criterion (SBC) and adjusted LR test suggest a VAR of order 1 while Akaike Information Criterion (AIC) of order 3. Checking the residuals of individual equations in a VAR model of order 1 there is no indication of serial correlation. Therefore we choose a VAR of order 1.

Table 8.27: Determining the order of VAR (Portugal)

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model
Based on 30 observations from 1970 to 1999. Order of VAR = 5
List of variables included in the unrestricted VAR:
ln*ex* ln*ct* ln*ft*
List of deterministic and/or exogenous variables:
DP *C*

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	96.0766	45.0766	9.3461	------	------
4	88.8944	46.8944	17.4692	CHSQ(9)= 14.3645[.110]	6.2246[.717]
3	87.5035	**54.5035**	31.3837	CHSQ(18)= 17.1463[.513]	7.4300[.986]
2	77.0862	53.0862	36.2719	CHSQ(27)= 37.9808[.078]	16.4583[.944]
1	68.8869	53.8869	**43.3780**	CHSQ(36)= 54.3793[.025]	**23.5644[.945]**
0	-55.1107	-61.1107	-65.3143	CHSQ(45)= 302.3747[.000]	131.0290[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

To test for cointegration among the three variables we apply a cointegrating VAR (1) procedure with unrestricted intercepts and restricted trend. The results displayed in Table (8.28) show that both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among ln*ex*, ln*ct*, and ln*ft* (namely r=0) but do not reject the hypothesis that there is one cointegrating relation

** The null hypothesis of the unit root is not rejected at 5% level of significance.

(vector) (i.e. r=1) among the variables. Reported in the same table Model selection criteria give different results. The Akaike Information Criterion (AIC) favours two cointagrating relations while Schwarz Bayesian Criterion (SBC) one. We assume in the following that there is one cointegrating relation between the variables.

Table 8.28: Cointegration Tests: VAR(1) with Dummy (Portugal)

Cointegration with unrestricted intercepts and restricted trends in the VAR
34 observations from 1966 to 1999. Order of VAR = 1.
List of variables included in the cointegrating vector:
ln*ex* ln*ct* ln*ft* *Trend*
List of I(0) variables included in the VAR: ***DP***
Eigenvalue Test (Order of VAR=1)
List of eigenvalues in descending order:
.50476 .25519 .22340 0.00

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	25.4200	23.8926	23.1000
r<= 1	r = 2	**10.0175**	**19.2200**	**17.1800**
r<= 2	r = 3	8.5961	12.3900	10.5500

Trace Test (Order of VAR=1)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	42.5061	42.3400	39.3400
r<= 1	r>= 2	**18.6136**	**25.7700**	**23.0800**
r<= 2	r = 3	8.5961	12.3900	10.5500

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	26.5267	20.5267	15.9476	18.9651
r = 1	38.4730	26.4730	**17.3148**	23.3498
r = 2	43.4817	**27.4817**	15.2708	23.3175
r = 3	47.7798	29.7798	16.0425	25.0950

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

When the *DP* dummy is not included or other dummies included in its place, as in the previous cases, there is still evidence of cointegrating relations in data showing no sensitivity to changes in specification. The estimates of the cointegrating coefficients of the variables in the cointegrating vector, are *(ECM)Z=-0.21*ln*ex+0.47*ln*ct +0.16*ln*ft-0.01*Trend,* which make us to expect one cointegrating relation among the three variables that is:

$$\ln ex - \ln ct - \ln ft,\ DS \sim I(0).$$

After normalising on the coefficient for total expenditures *(*ln*ex)* (A1=1) the cointegrating vector (long run equilibrium) estimated in the Johansen procedure (long-run equilibrium) is (standard errors are expressed in brackets):

$$\ln ex = 2.22\ \ln ct + 0.80\ \ln ft - 0.65 * Trend$$
$$(2.15) \qquad (0.32) \qquad (0.22)$$

The ECM equations for $\Delta \ln ex$, $\Delta \ln ct$, and $\Delta \ln ft$ variables with the error-correction terms are given in table 8.29:

Table 8.29: Estimates of ECMs for* Δlnex, Δlnct *and* Δlnft, *1965-1998 for Portugal.			
Variables	$\Delta \ln ex$	$\Delta \ln ct$	$\Delta \ln ft$
Intercept	-0.55(0.24)*	1.57(1.24)***	-0.63(0.36)**
Z_{t-1}	-0.08(0.02)*	0.16(0.13)***	-0.07(0.03)**
DP	0.06(0.13)***	0.25(0.08)*	-0.27(0.19)***
DW	1.4	2.17	2
R^2	0.22	0.30	0.08
SER	0.12	0.22	0.18

The diagnostic test statistics indicate that there is a good fit in model. Examining the results, all the ECMs pass the tests for first order serial correlation at 5% significance level. The equation for financial taxes *(*$\Delta \ln ct$*)* fails on normality at the 5% level of significance. The equation explaining the growth of consumption taxes has been adjusted for heteroscedasticity. In the normalised cointegrating vector the coefficients on *(*$\ln ct$*)* and ($\ln ft$) are significant. When we impose zero restrictions (A2=0) on *(*$\ln ct$*)*, and (A3=0) on the coefficient of ($\ln ft$) both are rejected by the LR statistic given as $\chi^2(1)=11.35$ with a P-value of 0.001 and $\chi^2(1)=23.62$ with a P-value about 0.000 respectively. Hence for the case of Portugal it is not possible to estimate any over identified system.

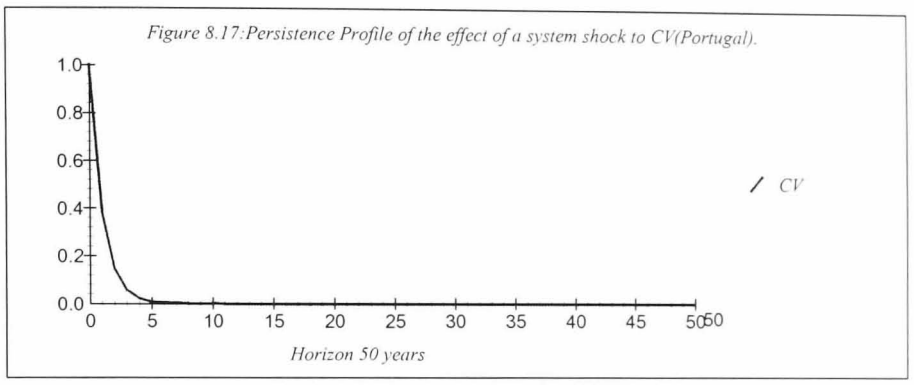
The results from the cointegrating VAR analysis show that the expenditures, consumption and financial taxes are cointegrated. On the basis of the results (based on the significance of the error correction coefficient in individual equations) we can conclude that there is a bi-directional Granger causal relationship between expenditures and financial taxes as in the case of Spain. However the error correction coefficient in the equation explaining the growth of financial taxes is weakly significant at 10% significance level. In addition there is a unidirectional Granger causal relationship from consumption taxes towards the expenditures.

$$\ln ex \leftrightarrow \ln ft \text{ and } \ln ct \rightarrow \ln ex$$

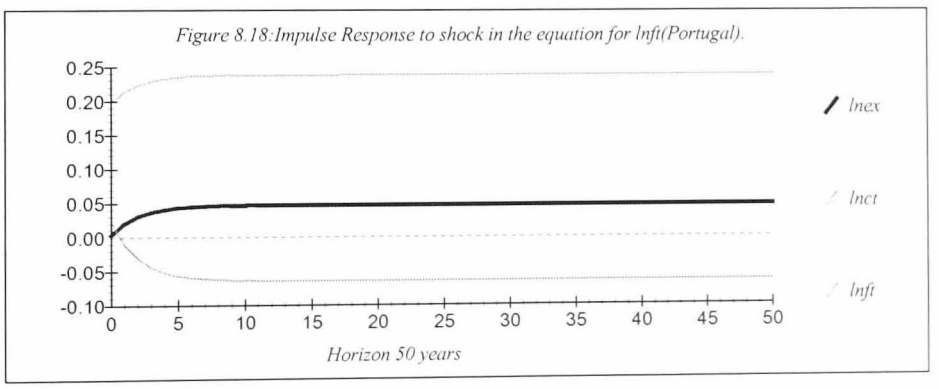
Based on the above results we can conclude that the findings support the view that in Portugal, similarly to Spain, indirect financial taxation and spending decisions are

* significant at 5% level, ** significant at 10% critical level, ***not-significant.

jointly made by fiscal authorities. In addition the decisions to spend depend on tax revenues derived from final consumption as well. On the other hand the long-run equilibrium indicates that an increase of consumption and indirect financial taxes by 1% increases the level of expenditures by 2.22% and 0.80% respectively. The convergence back to equilibrium is relatively fast with adjustment complete in about five years (figure 8.17).



In addition the impulse responses have the right feedback. The results illustrated in the figure 8.18 suggest a cyclical effect of an indirect financial taxes shock on expenditures with expenditures responding to an indirect financial shock (increase).



Lastly the dummy variable which captures the dynamics of the VAT introduction in Portugal, similar to the case of Greece and Spain, is insignificant in the equations explaining the growth of expenditures and the growth of indirect financial taxes while it is significant in the equations explaining the growth of consumption taxes.

8.7 Granger type causality tests for Greece, Spain and Portugal for the expenditures and indirect taxes relationship.

For comparison purposes we perform the Engle and Granger causality tests in order to re-examine the causal relationships among the three variables in three countries by estimating an unrestricted VAR model in differences of variables with the dummy for the introduction of VAT as its deterministic variable. As it appears from table 8.30 we obtain similar results as in Johansen procedure.

Table 8.30: Granger type tests based on OLS equation for Greece, Spain and Portugal (expenditures and indirect taxes relationship).

varibles	ln*ex*		ln*ct*		ln*ft*	
Country	LR statistic	causal	LR statistic	causal	LR statistic	causal
Greece	$\chi^2(2)=10.93$ (0.004)	Yes	$\chi^2(2)=0.57$ (0.75)	No	$\chi^2(2)=5.70$ (0.05)	No
Spain	$\chi^2(2)=7.099$ (0.02)	Yes	$\chi^2(2)=4.43$ (0.10)	No	$\chi^2(2)=10.89$ (0.004)	Yes
Portugal	$\chi^2(2)=11.5$ (0.003)	Yes	$\chi^2(2)=8.07$ (0.01)	Yes	$\chi^2(2)= 10.89$ (0.004)	Yes

8.8 Conclusions

In this chapter we provided empirical evidence in order to answer our research question on how changes in consumption tax policy (i.e. changes in consumption taxes and indirect financial taxes) affect the whole tax structure in Greece (i.e. the impact on total tax revenues and expenditures) comparing the results with those derived for Spain and Portugal [*Research question **R5***]. This has been accomplished by looking at the average total tax rate of the economy and indirect taxes (consumption and financial taxes) as well as the expenditures and indirect taxes relationship. Using annual OECD data, we applied a trivariate VAR model to test for cointegration and to consider short and long run relationships between the variables of interest both across countries (Greece, Spain and Portugal) and over time. To strengthen and to compare our results we re-examined the causal relationships between the variables by using the Engle and Granger cointegration tests in an unrestricted VAR model in differences of the variables with the dummy variable of the introduction of VAT as its deterministic component. On the basis of the results we can support the hypothesis that there is a positive long run relationship between the average total tax rate of the economy and indirect financial taxes in Greece. Surprisingly the empirical results do not support the hypothesis that there is a long run relationship between consumption taxes (sales taxes and VAT) and total tax rate. Greece appears to be the only country not showing a long run relationship between consumption

taxes and the average total tax rate. On the contrary the long run relationship between total tax rate and financial taxes is strong showing relatively high long run elasticity. In addition, the results of the study on the short run effects of the system were quite problematic. The last results suggested a negative short run effect from consumption taxes to tax rate and a positive effect from total tax rate towards consumption taxes indicating a problematic way of application and low efficiency collection of revenues as well. **These results on Greece support the view that although financial taxes are levied on a given base and may be shifted forward along the production and distribution chain they affect the total tax rate of tax system more than consumption taxes.**

Spain on the other hand appears with more balanced indirect tax system. The results provide evidence that both consumption and financial taxes have affected, in the long run, the total tax rate of tax system (high long-run elasticities). The short run effects do not differ much from those of Portugal. In all cases we found a clear unidirectional short run effect from consumption and financial taxes towards average total tax rate. In addition, for Spain we identified a bi-directional Granger causal relationship, in the long run, between the average total tax rate of economy and consumption taxes. Furthermore, Portugal appears with quite similar results with Spain regarding the consumption taxes in short and long run. In long run we identified a bi-directional relationship between the average total tax rate of the economy and consumption taxes. However as a difference to both Greece and Spain, there is no relationship between financial taxes and total tax rate in long run (as we discussed in our previous chapter Portugal appears with the weakest relationship between financial taxes and Net National Income as well).

As a generalisation, according to our findings although in all cases we found a cointegrating relationship between the variables, bi-directional relationships could appear only between consumption taxes (i.e. taxes that fall only on final consumption) and the total tax rate of the economy. In addition the direction of the relationship between the indirect financial taxes (i.e. taxes that might fall on intermediate and investment goods) and total tax rate is from the different indirect financial taxes towards the total tax rate and not vice-versa.

Moreover in this part of our thesis we applied cointegration and error-correction models to test the causal relation between the indirect taxes and expenditures in Greece, Spain and

Portugal over the period 1965-1999 (for Greece over the period 1965-1998). The empirical results obtained from the error-correction models indicate that bi-directional causality exists between indirect financial taxes and expenditures in Spain and Portugal. However, for Portugal the decisions to spend depend on tax revenues derived from taxing the final consumption as well. This implies that indirect financial taxation and expenditures decisions are jointly made by the fiscal authorities in these countries. However in Greece, causality runs from expenditures to different consumption taxes with no feedbacks, implying that the fiscal authorities determines how much to spend and then look for revenues from taxing final consumption.

On the basis of the above results we could conclude that indirect financial taxes are important for spending decisions in Spain and Portugal, while in Greece such a relationship could not be identified despite the causal relationship between these taxes and the total average tax rate of the economy.

Finally reforms in indirect tax system are unlikely to have any long run effect on the average total tax rate of the economy or on expenditures in the three countries. Although the different statistical tests provided evidence for relatively structurally stable equations explaining the different variables, reforms in consumption taxes appear to have strong short run effects on the relevant taxes. However, such changes have a very weak, if any, direct effect on total tax rate of tax system or on expenditures. Lastly from tax policy view the empirical results suggest, that a change (increase) of financial taxes can affect in long run the total tax rate in Greece and Spain where the same policy in Portugal do not have any long run effect on the total tax rate of the economy. However in Spain and Portugal the indirect financial taxes affect in long run the level of expenditures.

CHAPTER 9: ECONOMIC GROWTH AND INDIRECT TAXES (CONSUMPTION AND FINANCIAL) IN A COINTEGRATING VAR FRAMEWORK: EMPIRICAL EVIDENCE FROM GREECE, SPAIN AND PORTUGAL.

9.1 Introduction

In the previous chapter we examined the causal relationship between indirect taxes (consumption and financial taxes) and the average total tax rate of economy as well as with the expenditures in Greece, Spain and Portugal. We identified some similarities and differences in the three tax systems regarding causal relationships and long run responses of relevant variables. The next step in our analysis is to provide empirical evidence and to answer our research question as to whether there is any relationship (negative or positive) between indirect taxes (consumption and indirect financial taxes) and economic growth [*Research question* ***R6***, Table 4.1 p.100]. In this part of our thesis we investigate the causal relationship between indirect taxes (consumption and financial taxes) and growth in a model including the main components of growth, namely investment and labour force supply, over the 1965-1999 period in Greece, Spain and Portugal (for Greece for the 1965-1998 period). Our aim here is not only to assess the validity of previous conclusions, but also to examine the direction of causality between indirect taxes and growth.

As we have seen in the previous chapter about the variability of different taxes in Greece, Spain and Portugal, in the past two or more decades public finances in these countries have been characterised by a remarkable growth in tax revenues (including consumption and financial taxes). It would be interesting to see what causes what, that is, the directions of causality between indirect tax revenues and growth in the above mentioned countries. Obviously, evidence of one way of causality (positive) from indirect tax revenues to growth would imply that higher indirect taxes (consumption and financial taxes) lead to higher growth. On the other hand evidence of unidirectional causality in the opposite direction would confirm the conclusions reached by some researchers that growth affects the level of the economic performance of different taxes (see Karras, 1999). In addition evidence of bi-directional causality would imply the existence of simultaneity between indirect tax revenues and growth. This part of study covers countries with history of rapid

growth in GDP and indirect tax revenues. Given the high economic growth in the past few decades, an empirical examination covering these countries will show whether or not they have similar patterns of causality in the relationship between growth and indirect taxes. In other words, the analysis of the causality issue in the three countries provides a broader base for valid empirical inferences regarding the taxation of financial flows as well. To test the causal relationship between indirect taxes and growth, we use, as in the previous chapter, the Johansen methodology and error-corrections models. Although it is rather complicated, the appeal of this technique stems from the relevance it offers in analysing long run causal relationships in time-series data. Our aim here is first to identify permanent changes in the relevant variables explaining the different indirect taxes (through tests for stationarity of variables) and then to investigate whether the effects of these changes on the growth (level and rate) of output are permanent and in what direction.

9.2 Theoretical and empirical work on the taxation-growth relationship

There is a voluminous literature on the effects of taxes on the economy and its rate of growth. Briefly, in neo-classical economic growth models, taxation affects only the level of output but not the rate of growth, whereas endogenous growth models suggest that taxes may affect the long run rate of growth. In fact, when growth is endogenous taxation can influence the "factors" that determines the growth rate. Box 9.1 gives a summary of the theoretical work on the taxation and growth relationship.

Box 9.1: Summary of the theoretical work on the taxation-growth relationship

Endogenous growth theories provide models that can assess the effects of taxation upon economic growth. Numerous channels were identified through which taxation can affect growth. Given the various effects of taxes on savings, investment (including human capital) and labour, and the possible substitution of these factors of production, attempts to quantify the overall impact of taxes on economic growth are fraught with difficulties and may only serve to illustrate the orders of magnitude involved. In quantitative terms a wide range of theoretical predictions arise for the size of tax effect. They range from insignificant to dramatically large. The size of the growth rate effect depends just about equally on the structure of the model and on parameter values within the model. The growth-reducing effect of taxation is increased in open economy models, and reduced, and possibly even reversed, if life-cycle behaviour is considered. It is clear from the literature review that the effects of taxes on economic growth are ambiguous in some areas and unsettled and controversial in others. Nevertheless, there would appear to be several ways in which tax policy could be adopted to increase economic growth. Engen and Skinner, (1996) identified five ways that taxes may affect output growth. First, higher taxes can discourage the investment rate, or the net growth in the capital

stock, through high statutory tax rates, and low depreciation allowances. Second, taxes may attenuate labour supply growth by discouraging labour force participation or hours of work, or by distorting occupational choice or the acquisition of education skills and training. Third, tax policy has the potential to discourage productivity growth by attenuating research and development (R&D) and the development of venture capital for "high-tech" industries, activities whose spill over effects can potentially enhance the productivity of existing labour and capital. Fourth, tax policy can also influence the marginal productivity of capital by distorting the investment from heavily taxed sectors into more lightly taxed sectors with lower overall productivity. And fifth, heavy taxation on labour supply can distort the efficient use of human capital by discouraging workers from employment in sectors with high social productivity but heavy tax burden. Through all the above-mentioned mechanisms taxation can affect economic growth. Therefore, it might appear that taxes should play a central role in determining long run term growth. However, the conventional Solow, (1956) growth model implies that taxes should have no impact on long-term growth rates. In part this in the neo-classical growth models occurs by assumption, since output growth is assumed to be fixed and unaffected by tax policy. But this paradoxical result holds also because, as we mentioned above, of a distinction between changes in the level of GDP and changes in the growth rates of GDP.

The theoretical evidence has produced a wide range of estimates for the effect of taxation upon economic growth. Since the theory is so inconclusive, it becomes paramount to consider the empirical evidence. The conclusions of the empirical evidence are not quite as diverse as those of the theory. Recently a number of studies (influenced by the neo-classical growth theories) have investigated the causal relationship between economic growth and taxation. Although there are some disagreements, the picture that emerges is that the effect of taxation, if there is any at all, is relatively minor. As far as policy is concerned, the conclusion is reassuring since it removes the need to be overly concerned about growth effects when tax reforms are being planned. **The empirical evidence can be interpreted as supporting the argument that the level of taxes is not that significant, but the structure of taxation is important.**

On the other hand there are a number of studies, influenced by the endogenous growth theories, which attempted to assess the impact of taxes on per capita income and growth at the macro-level. Several of them purport to demonstrate significant negative relationship between the level of the tax/GDP ratio and the growth rate of the real GDP per capita, implying that the high tax rates reduce economic growth (e.g. OECD, 1997c). In Box 9.2 we present a summary of the empirical work on the taxation-growth relationship:

Box 9.2: Summary of the empirical work on the taxation-growth relationship

Empirical results based on statistical analysis of data from developed countries show the steady rise in taxation and the relative constancy of the mean of the growth rate (Myles, 2000). According to Myles, a very clear picture emerges from this: tax revenues as a proportion of GDP has risen significantly in all developed countries over the course of the last century, but the level of growth has remained relatively stable. This suggests the immediate conclusion that, in practice taxation does not affect the rate of growth. This review of the empirical evidence leads to the following observation: A visual inspection of tax rates and growth rates suggests that there is little relationship between the two (other regressions found a small but significant tax effect) (e.g. Engen and Skinner, 1996). In addition Plosser, (1992) finds a significant negative correlation between the level of taxes on income and profits (as a share of GDP) and growth of real capita GDP. King and Rebelo, (1990) simulate changes in the income tax by applying an endogenous growth model and find that an increase by 20 per cent reduces the rate of growth by 2 percentage points. In a Solow-type neo-classical growth model, the tax effect is much smaller and the welfare loss is equivalent to a permanent drop in real consumption by only 1.6 per cent. Agell, Englund and Sodersten, (1996) also conclude that the relationship between taxation and economic growth is not robust in OECD countries. Similarly, Easterly and Rebelo, (1993) find that the level of taxes is not significant in the endogenous theory type regressions. In their view, the reason that Plosser founds significant effects is the strong positive correlation between the level of taxes and the initial level of income; tax-to-GDP ratios are relatively low in poorer countries, which then start to catch up (the convergence effect). When the initial level of income is controlled for, Plosser's results break down. Slemrod, (1995) finds a positive, negative or no correlation between taxes and the level of per capita income depending on specification of the parameters and the countries considered. He finds a strong positive correlation between the level of general government tax revenue-to-GDP-ratio and the level of real GDP per capita in time series for United States between 1929 and 1992. In addition, he finds a positive correlation between the level of the tax revenue/GDP ratio and the level of real GDP per capita across countries in particular when developing countries (with lower GDP per capita and lower tax rates) are included in the sample. For OECD countries alone, Slemrod finds no obvious positive or negative relationship between the level of tax rates and the level of GDP per capita. Easterly and Rebelo, (1993)report that only income-tax rates have significant negative effect on per capita growth, but no other tax measures do. Their overall assessment of the results of such aggregate studies on taxation and growth is that taxes matter for growth, but that it is very difficult to measure tax distortions with such analysis. Finally, in a cross-country analysis for the 1970s Koester and Kormendi, (1989) report a significant negative effect of the marginal tax rates on the level of real GDP per capita, but not on the rate of growth when the latter is controlled for the initial level of income. They suggest that holding average rates constant, a 10-percentage point decrease in marginal tax rates would increase per capita income in an average industrial country by more than 7 per cent (and in average developing country by more than 15 per cent). Thus, a revenue-neutral tax reform, which reduces tax progressivity, would raise income and lead to an upward shift in the whole growth path. Karras, (1999) examines the effects of the tax rate on economic growth to test the theoretical predictions of the neo-classical and endogenous growth mechanisms. Using data from the 1960-1992 period for a panel of 11 OECD economies, a number of different specifications were shown to be consistent with the theoretical predictions of the neo-classical growth model and

inconsistent with those of endogenous models. Specifically, these empirical results shown that tax rates have exhibited significant persistent changes while output growth rates have not. Furthermore, a higher tax rate permanently reduces the level of output but has no permanent effects on the output growth rate. These findings according to his research suggest that the relationship between output and tax rate is best described by the neo-classical growth model (tax rates are incapable of explaining the long-run behaviour of GDP). In addition, Perotti, (2002) using a VAR model finds that in a sample of five OECD countries, the countries with the larger output elasticity of net taxes are also the countries where the impact effect of taxation on the level of output is negative. On the other hand Barro, (1990) and Bleaney, Gemmell and Kneller, (2001) predict that government expenditure and taxation will have both temporary and permanent effects on growth. Their result also suggests that non-distortionary taxation raises the growth rate while distortionary taxation reduces it. According to their research, consumption taxation can realistically be regarded as non-distortionary, rather than as merely less distortionary than income taxation.

9.3 Empirical methodology

9.3.1 Introduction to the model

In a simple accounting framework the output of an economy typically measured by GDP is determined by its economic resources, the size and the skills of its workforce and the size and the technological productivity of its capital stock. Therefore, an aggregate output equation can be expressed as follows:

$$Y=a\ *L^{b1}\ *K^{b2}\ (1),$$

where with K denotes the investment and L the effective labour force (Engen and Skinner, 1996). The growth rate of economic output on the other hand will depend on the growth rate of these resources, physical capital and human capital. If we assume that taxes enter the above growth accounting framework in the above equation in a linear fashion (taxes are supposed to exercise an "externality" effect on total output through their impact on the public sector's output) we can explore the possible primary growth effect of these taxes in the following framework:

$$Y=a\ *L^{b1}\ *K^{b2}*T_i^{b3}\ (2),$$

where with T_i we denote the different applied taxes. Most empirical studies of taxation and growth are "reduced form" estimates in that they specify a linear model of output growth rate, with tax rates (or expenditures), labour resource growth, and investment rates in the right hand side of the equation (e.g. Karras, 1999; Dalamagas, 2000). All these models are modified versions of equation (2) mainly expressed in growth rates. In our empirical analysis the following formulation of the above equation (2) will be used:

$$d\ln Y=a+b_1\, d\ln L+b_2\, d\ln K+b_3 d\ln(T_i/Y) \quad (3)^{47},$$

where, with $d\ln Y$ denotes the growth rate of real GDP, $d\ln L$ is the growth rate of labour force, $d\ln K$ is the change over time of capital stock and $d\ln (T_i/Y)$ is the growth rate of different taxes (e.g. consumption and financial taxes) as a share of GDP. The inclusion of the variable T_i/Y as an independent variable is necessary for assessing the pure impact of different taxes on growth.

9.3.2 Time series properties of variables

As we mentioned before where we briefly reviewed the theoretical and empirical results on taxation and growth, neo-classical and endogenous growth theories have substantially different implications as to how economic growth is affected by changes in certain tax variables. In particular, the neo-classical growth model predicts that such changes, while permanently changing the steady-state level of output, will alter its growth only temporarily, having no permanent effect on the economy's steady-state growth rate. On the contrary, endogenous growth models predict that such changes will permanently change the growth rate of output. Theoretically, a test of the above-mentioned theories, in the field of indirect taxation, can be constructed as follows. First, suppose permanent changes in a certain tax variable (consumption and financial taxes as a fraction of GDP) can be identified. Then the endogenous paradigm will be supported if the effects of these changes on the "growth rate of output" are found to be permanent, while the neo-classical paradigm will be supported if the effects are found to be transitory. In practice, for this approach to become empirically operational, the tax variables (consumption and financial taxes) must be non-stationary so that they will exhibit permanent changes. In addition the investigation of the effects of the same tax variables on the level of growth will provide further empirical evidence of the relationship between the particular indirect taxes and growth. Our goal in this part of our thesis is to investigate the effects of the tax-to GDP ratio, thus the share of consumption taxes to GDP and the share of financial taxes to GDP, on the level and growth of real GDP.

[47] This equation is derived from equation (2) by dividing through by Y^{b3} and taking the total differential of the corresponding log linear form of the variables.

As in our previous chapter to test for causal relationships and long-run trends between the above-mentioned variables in the econometric model, we use the Johansen methodology (Johansen 1988, 1991) in an error correction framework.

In our study we use OECD data, annual time series, taken from the OECD "Revenue statistics" edition 2000 over the period 1965-1999. As a limitation for Greece, definite data are not available for the year 1999 so the period for estimation is from 1965 to 1998. In the share of consumption taxes to GDP, as in the previous chapter, we use general consumption taxes (sales taxes and VAT) from the code 5110 in OECD classification of taxes. For the share of financial taxes to GDP we use indirect financial taxes from the code 5126 (indirect taxes on banking services, turnover taxes on insurance services, stamp duties e.t.c.). In these taxes, as we did in our previous chapter, we do not include other indirect taxes on specific services (e.g. taxes on gambling services classified under the same code in the case of Portugal or taxes on financial and capital transactions classified under the code 4400 thus as direct taxes). In addition for output and the main components of growth, namely investment and labour force, we use data on real GDP (at 1995 prices), gross fixed capital formation at 1995 prices from IMF (International Financial Statistics, 2001 edition), and on effective labour force (in thousands) from ILO (Laborsta database).

A first look at the data (see table 9.1 with summary statistics) shows that average growth per annum of real GDP has ranged from 1.6% in Greece to 2.64% for Spain and 2.15% for Portugal. In addition, the Spanish and Portuguese economies enjoyed higher growth than Greece (almost double) in per capita GDP over the 1965-1999 period. In Greece the real GDP per capita has grown around 0.97% per annum as compared to an average annual rate of 2.01% for Spain and 1.89% for Portugal. Moreover, consumption and indirect financial taxes as a fraction of GDP have increased in the three countries almost monotonically. Spain has enjoyed the highest growth rate per annum for the share of consumption taxes to-GDP (2.19%) and for the share of financial taxes-to-GDP (4.41%). On the other hand if we look at the summary statistics of the main macroeconomic determinants of the growth of output, namely investment (gross fixed capital formation) and labour supply, we realise that the three countries show very close growth rates per annum (Portugal shows slightly higher growth rates per annum for the above variables). Therefore, the above variability of the growth rate for consumption and especially of

financial taxes both across the three economies and over time should "facilitate" an empirical identification of its role for economic growth.

Table 9.1: Summary statistics for rate of growth (of real GDP, real GDP per capita, share of Consumption taxes to GDP, share of financial taxes to GDP, Investment and labour supply) over the period 1965-1999.

Variable	*real GDP*		*real GDP per capita*		*share of consumption taxes to GDP*		*share of financial taxes to GDP*		*Investment*		*Labour supply*	
Country	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. dev.	Mean	Std. Dev.
Greece	1.6	4.78	0.97	4.69	1.4	23.23	1.05	37.58	3.01	11.33	0.81	1.65
Spain	2.64	4.3	2.01	4.34	2.19	9.92	4.41	48.58	2.96	8.39	0.85	0.87
Portugal	2.15	4.7	1.89	4.83	1.44	25.73	1.56	19.58	3.82	8.68	1.12	2.58

Data source: "OECD Revenue Statistics, edition 2000".

The first step in testing for causality or for cointegration between the variables is to verify the order of integration of variables, since the causality tests are valid if the variables have the same order of integration. As in the previous chapter the Dickey-Fuller and the augmented Dickey-Fuller (ADF) tests are used to test for the presence of a unit-root in variables and thus to investigate the degree of integration of the logarithm of the level of real GDP, the log of investment (log of gross capital fixed formation) the log of labour supply and the logarithm of the share of consumption and financial taxes to GDP in Greece, Spain and Portugal. The ADF test is based in the following regression equations of the form:

$$\Delta \ln gdp_t = \gamma_0 + \theta_0 \ln gdp_{t-1} + \sum_{i=1}^{n} \lambda_i \Delta \ln gdp_{t-i} + \varepsilon_t$$

$$\Delta \ln i_t = \gamma_1 + \theta_1 \ln i_{t-1} + \sum_{\psi=1}^{\tau} \rho_\psi \Delta \ln i_{t-\psi} + \kappa_t$$

$$\Delta \ln l_t = \gamma_2 + \theta_2 \ln l_{t-1} + \sum_{\delta=1}^{k} \zeta_\delta \Delta \ln l_{t-\delta} + \upsilon_t$$

$$\Delta \ln ct/gdp_t = \gamma_3 + \theta_3 \ln ct/gdp_{t-1} + \sum_{k=1}^{p} \mu_k \Delta \ln ct/gdp_{t-k} + u_t$$

$$\Delta \ln ft/gdp_t = \gamma_4 + \theta_4 \ln ft/gdp_{t-1} + \sum_{\xi=1}^{m} \varphi_\xi \Delta \ln ft/gdp_{t-\xi} + v_t$$

In all equations the null hypothesis is that real *gdp, i, l, ct/gdp,* and *ft/gdp* (in logarithmic form) have unit roots, that is $\theta_0 = \theta_1 = \theta_2 = \theta_3 = \theta_4 = 1$. The alternative hypothesis is that the variables are integrated of order zero *I(0)*. We reject the null hypothesis if θ_0, θ_1, θ_2, θ_3 and θ_4 are significantly negative and the *t* statistics are less (or greater in absolute values) than the critical values for the given augmented Dickey-Fuller Statistic. Alternatively in the above equations a linear trend was included as well. The results reported in the following

table 9.2-9.4 for the three countries indicate that in no case can the hypothesis that the logs of series contain a unit root can be rejected.

Table 9.2: Dickey-Fuller* Unit root tests results (Greece)				
Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*gdp*	-2**	-1.66**	-5.05	-5.04
ln*i*	-0.49**	-2.54**	-7.6	-7.96
ln*l*	0.6**	-3.53**	-6.53	-6.63
ln*ct/gdp*	-1.22**	-2.06**	-5.48	-5.36
ln*ft/gdp*	-1.38**	-1.08**	-5.15	-5.19

Table 9.3: Dickey-Fuller Unit root tests results (Spain)				
Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*gdp*	-1.44**	-2.54**	-3.89	-3.6
ln*i*	-1.27**	-2.87**	-4.08	-3.99
ln*l*	-2.01**	-1.72**	-3.78	-3.39
ln*ct/gdp*	-0.41**	-1.89**	-5.26	-5.24
ln*ft/gdp*	-1.29**	-0.82**	-4.53	-4.61

Table 9.4: Dickey-Fuller Unit root tests results (Portugal)				
Variable	*level*		*First differences*	
	No trend	*linear trend*	*No trend*	*linear trend*
ln*gdp*	-0.21**	-2.05**	-5.04	-4.96
ln*i*	-0.55**	-2.1**	-4.96	-4.93
ln*l*	-0.03**	-2.74**	-5.09	-5.07
ln*ct/gdp*	-1.07**	-2.87**	-6.6	-6.65
ln*ft/gdp*	-1.15**	-0.39**	-4.94	-5.22

The ADF statistics (for *p=1 or p=2)* are in absolute value below their asymptotic value (95% critical value). Therefore it is not possible to reject the null hypothesis for a unit root for the variables in levels (log form). On the other hand for the first differences of the variables, irrespective of the order of the augmentation chosen of the ADF test the absolute values of the ADF statistics are well above the 95% critical value given for the augmented Dickey-Fuller statistic (for all models, with and without a linear trend) and hence the hypothesis that the relevant variables in first differences have a unit root is firmly rejected (stationary series). Thus the series representing the investment, labour supply, share of consumption and financial taxes-to-GDP are of the same order *I(1)* and candidates for cointegration with the variable of real gdp. In this case the first differences

* $\Delta X_t = a_0 + a_1 t + a_2 X_{t-1} + \sum_{i=1}^{n} b_i \Delta X_{t-i}$. Optimal number of lags is chosen by Akaike's Information Criterion (AIC), and Schwarz-Bayesian Criterion (SBC). The values shown in the table 9.2-9.4 denote the t-statistics of X_{t-1} (X_t=ln*gdp*$_t$, ln*l*, ln*i*, ln*ct/gdp*$_t$, and ln*ft/gdp*$_t$).

** The null hypothesis of the unit root is not rejected at 5% level of significance.

of the variables, as we mentioned in the previous chapter, may be considered to be generated, in a model with five variables, by error correction models of the form:

$$\Delta \ln X_t = \varphi_0 + \sum_{i=1}^{n} \varphi_{1i} \Delta \ln K_{t-i} + \sum_{i=1}^{\kappa} \varphi_{2i} \Delta \ln L_{t-i} + \sum_{i=1}^{p} \varphi_{3i} \Delta \ln X_{t-i} + \sum_{i=1}^{m} \varphi_{3i} \Delta \ln Y_{t-i} + \sum_{i=1}^{j} \varphi_{4i} \Delta \ln \Psi_{t-i} + \delta Z_{t-1} + u_t \quad (1).$$

where, in our case, X_t=*gdp*$_t$, K_t=*i*, L_t=*l*, Y_t= *c*$_t$/*gdp*$_t$, Ψ_t =*ft*/*gdp*$_t$ and Z_t is the error correction term. Having determined that the variables are first differenced stationary, cointegration tests, as in the previous procedures in chapter 8, of the sort suggested by Johansen, (1988, 1991) and Johansen and Juselius, (1992) were performed to examine whether the variables in question have common trends. Thus, we test for cointegration amongst the variables. To determine the order of VAR we run an unrestricted VAR model with an intercept and again the dummy for the introduction of VAT for each country as its deterministic component. **To choose the order of VAR we use the adjusted LR test, the Akaike Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC). In order to check the robustness of the results to the order of VAR we check the residuals of the unrestricted VAR model for possible serial correlation.** Finally, all the error correction models for the three countries are presented as VAR models, following the equation (1) above, with the differences of the variables in log form, and the error correction terms. These models are used to test for causal relationships between the real gdp, investment, labour supply and the share of consumption and financial taxes-to-GDP.

9.4 Empirical results from the cointegration analysis of growth and indirect taxes relationship

9.4.1 Greece

In the case of Greece, to select the order of VAR we specify a five variable unrestricted VAR model (ln*gdp*, ln*i*, ln*l*, ln*ct*/*gdp*, and ln*ft*/*gdp*) containing an intercept term and the dummy variable (*DGR*) as its deterministic component. We make an initial estimation of VAR to 4 (Table 9.5).

Table 9.5: Determining the order of VAR, Greece (1965-1998)

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model
Based on 30 observations from 1969 to 1998.Order of VAR=4
List of variables included in the unrestricted VAR:
ln*gdp* ln*i* ln*l* ln*ct*/*gdp* ln*ft*/*gdp*
List of deterministic and/or exogenous variables:
C *DGR*

Order	LL	AIC	SBC	LR test	Adjusted LR test
4	352.6074	**242.6074**	165.5416	------	------

3	300.4815	215.4815	155.9306	CHSQ(25)= 104.2519[.000]	27.8005[.317]
2	266.9565	206.9565	164.9206	CHSQ(50)= 171.3018[.000]	45.6805[.647]
1	229.9501	194.9501	**170.4291**	CHSQ(75)= 245.3148[.000]	**65.4173[.777]**
0	90.7488	80.7488	73.7428	CHSQ(100)= 523.7172[.000]	139.6579[.005]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

As the results, reported in the above table 9.5, suggest, the adjusted LR test and the Schwarz Bayesian Criterion (SBC) favour a VAR model of order 1 while the Akaike Information Criterion (AIC) of order 4. After the inspection of results for possible serial correlation, we choose a VAR of order 1. To test for cointegration we apply a cointegrating VAR (1) procedure, for the model (ln*gdp*, ln*i*, ln*l*, ln*ct/gdp*, ln*ft/gdp*), with unrestricted intercepts and trend option chosen via the Pantula principle (Harris, 1995). Based on the results displayed in Table 9.6 both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among the real *gdp*, investment (ln*i*) labour supply (ln*l*) and the share of consumption and financial taxes-to-gdp (ln*ct/gdp*, ln*ft/gdp*), (namely r=0) but do not reject the hypothesis that there is one cointegrating relation (vector) (i.e.r=1) among the variables. We accept that there is one cointegrating relation following the maximal eigenvalue and trace statistics (Table 9.6).

Table 9.6: Johansen and Juselius cointegration tests among* ln*gdp*, ln*i*, ln*l*, ln*ct/gdp*, ln*ft/gdp*, *1965-1998 (Greece).

Cointegration with unrestricted intercepts and restricted trends in the VAR
33 observations from 1966 to 1998. Order of VAR = 1.
List of variables included in the cointegrating vector:
ln*gdp* ln*i* ln*l* ln*ct/gdp* ln*ft/gdp* Trend
List of I(0) variables included in the VAR: *DGR*

Eigenvalue test (Order of VAR=1)

List of eigenvalues in descending order (order of VAR=1):
.81698 .53355 .46193 .31724 .15763 .0000

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	56.0391	37.8600	35.0400
r<= 1	r = 2	**25.1657**	**31.7900**	**29.1300**
r<= 2	r = 3	20.4521	25.4200	23.1000

Trace test(Order of VAR=1)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	119.9109	87.1700	82.8800
r<= 1	r>= 2	**63.8718**	**63.0000**	**59.1600**
r<= 2	r>= 3	38.7061	42.3400	39.3400

Model Selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	214.1488	204.1488	196.6663	201.6312
r = 1	242.1684	222.1684	**207.2033**	217.1331
r = 2	254.7512	226.7512	205.8001	219.7018
r = 3	264.9773	230.9773	205.5367	222.4173
r = 4	271.2740	233.2740	204.8403	223.7069

r = 5	274.1043	**234.1043**	204.1741	224.0337

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

The next step is to obtain the estimates of the cointegrating coefficients of the variables in the cointegrating vector. The identified long-run relationship (error correction model) is as follows:

$$Z_t = 0.72 \ln gdp - 0.03 \ln i + 0.936 \ln l + 0.64 \ln ct/gdp - 0.08 \ln ft/gdp - 0.1 * Trend$$

After normalising on the coefficient for the real *gdp*, the cointegrating vector (long run equilibrium) estimated in the Johansen procedure is (standard errors are expressed in brackets):

$$\ln gdp = \underset{}{0.04} \ln i \underset{(0.27)}{-1.29} \ln l \underset{(0.541)}{-0.88} \ln ct/gdp \underset{(0.35)}{+0.11} \ln ft/gdp \underset{(0.05)}{-0.14} * Trend \quad (0.05)$$

ECM equations for $\Delta \ln gdp$, $\Delta \ln i$, $\Delta \ln l$, $\Delta \ln ct/gdp$, $\Delta \ln ft/gdp$ variables with the error correction terms are given in the following table 9.7.

Table 9.7: Estimates of ECMs for* Δln*gdp*, Δln*i*, Δln*l*, Δln*ct/gdp and* Δln*ft/gdp*, *1965-1998 for Greece.

Variables	Δln*gdp*	Δln*i*	Δln*l*	Δln*ct/gdp*	Δln*ft/gdp*
Intercept	11.02(3.56)*	-10.03(9.89)***	4.04(1.19)*	-14.98(8.03)**	-12.66(19.65)***
Z_{t-1}	-0.09(0.03)*	0.08(0.008)***	-0.03(0.01)*	0.13(0.07)**	-0.11(0.17)***
DGR	-0.006(0.044)***	-0.09(0.12)***	-0.002(0.002)***	0.43(0.09)*	-0.02(0.24)***
DW	2.1	2.04	2.3	1.65	1.91
R^2	0.24	0.4	0.41	0.45	0.01
SER	0.04	0.11	0.01	0.09	0.23

The diagnostic test statistics suggested that in general there is a good fit in the above models. All the ECMs pass the test for first order serial correlation and functional form at 5% level of significance. Only the equations for Δln*i* and Δln*ft/gdp* fail on normality. The equation explaining the Δln*l* has been adjusted for heteroscedasticity. Cusum and cusum squared tests indicate that the above equations are structurally stable. The null hypothesis that the regression equations are correctly specified cannot be rejected at 5% significant level (similar results followed for the cases of Spain and Portugal). In the normalised cointegrating vector the coefficients on ln*i*, and ln*ft/gdp* seem to be insignificant. When we imposed additional restrictions for the exclusion of the variables (A2=0 for ln*i* and A5=0 for ln*ft/gdp)* the restrictions could not be rejected by the LR statistic at 5% significance level which is given as $\chi^2(1)=0.02$ with a P-value of 0.86, for A2=0, and $\chi^2(2)=2.78$ with a

*significant at 5% critical level, ** significant at 10% critical level, *** insignificant.

P-value of 0.24 for the joint restriction A2, A5=0. The new cointegrating vector (long-run coefficients) with these over-identifying restrictions is:

$$Z_t = \ln gdp - 0.0\ln i + 1.93\ln l + 1.46\ln ct/gdp - 0.0\ln ft/gdp - 0.22 * Trend$$

$$(1.087) \qquad (0.72) \qquad (0.1)$$

This means that the cointegrating relation has been reduced to the one expressed as:

$$\ln gdp - \ln l - \ln ct/gdp,\ DGR \sim I(0)$$

The new ECM estimates for the over-identified system are displayed in the following table 9.8:

Table 9.8: Estimates of ECMs for Δlngdp, Δlni, Δlnl, Δlnct/gdp and Δlnft/gdp, 1965-1998 for Greece.

Variables	Δln*gdp*	Δln*i*	Δln*l*	Δln*ct/gdp*	Δln*ft/gdp*
Intercept	10.45(3.34)*	-8.8(9.31)***	3.81(1.11)*	-12.88(7.62)***	-4.34(18.57)***
Z_{t-1}	-0.06(0.02)*	0.053(0.05)***	-0.02(0.006)*	0.07(0.04)***	0.02(0.11)***
DGR	-0.009(0.04)***	-0.09(0.12)***	-0.003(0.002)***	0.44(0.1)*	-0.01(0.24)***
DW	2.2	2.03	2.34	1.59	1.95
R^2	0.24	0.44	0.41	0.44	0.01
SER	0.04	0.12	0.01	0.09	0.2

Similar results follow from the diagnostic statistic tests from the new ECMs above. All the ECMs pass the tests for first order serial correlation and functional form at 5% significance level. Again the equations for Δln*i* and Δln*ft/gdp* fail on normality. The equation explaining the Δln*l* has been adjusted for heteroscedasticity. In addition the coefficients and standard errors in the over identified system are slightly different for the equation explaining the Δln*ct/gdpt* (the coefficients for the error correction term and intercept are insignificant). As we mentioned above, we use the error-correction models to test for causal relationships between the variables. As the results suggest (table 9.8) the coefficients on the error correction term are significant at 5% level of significance in the equations explaining the growth of output and the growth of labour supply. This suggests that bi-directional causality exist between the real gdp and labour supply. In addition the insignificant error correction coefficient in the equation explaining the growth of the share of consumption taxes to gdp suggests that a Granger causal relationship exist from the share of consumption taxes to gdp towards the level of the real gdp.

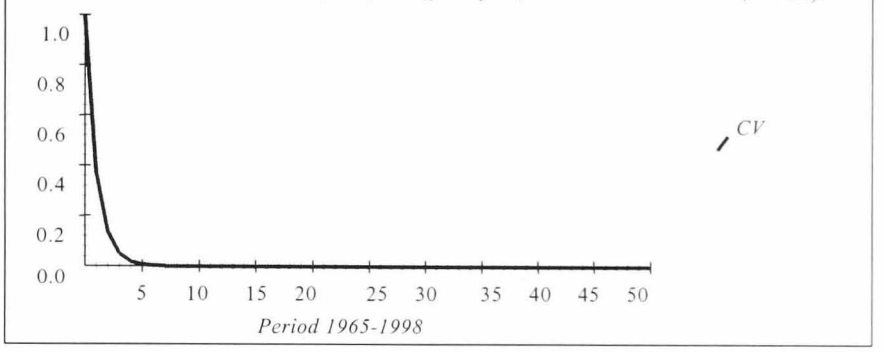
$$\ln gdp \leftrightarrow \ln l, \text{ and } \ln gdp \leftarrow \ln ct/gdp$$

Looking at the equation explaining the share of consumption taxes-to-gdp we found that the coefficient on dummy variable *DGR* is significant at 5% significance level suggesting

*significant at 5% critical level,** significant at 10% critical level, *** insignificant.

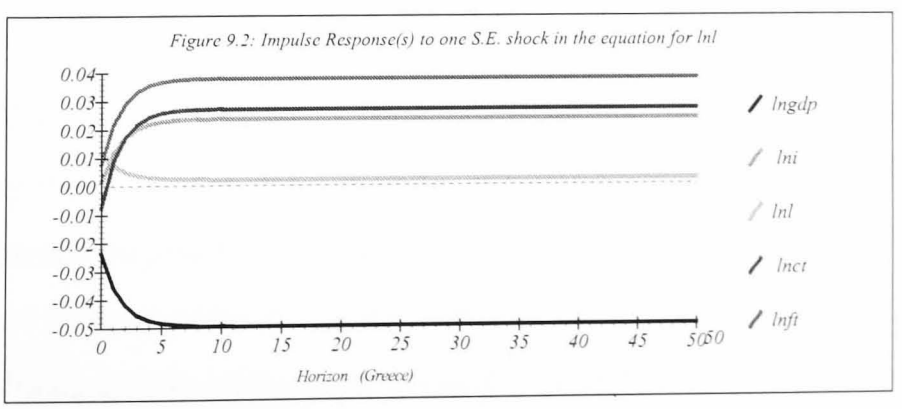
a significant impact of the introduction of VAT. On the contrary, this reform does not seem to have any impact on the growth of output, growth of investment, growth of labour supply and growth of financial taxes (insignificant coefficients). As we said above the coefficients on the error correction terms (speed of adjustment) in the individual equations for $\Delta \ln gdp$ and $\Delta \ln l$ are significant at 5% and relatively low, suggesting a moderate speed of convergence to equilibrium once the system has been shocked. The convergence back to equilibrium is complete in about five years (see also the following figure 9.1 on persistence profile of the effect of a system-wide shock to cointegrating vector[48]).

Figure 9.1: Persistence Profile of the effect of a system-wide shock to CV (Greece).



Considering the dynamic effects of a shock to the labour supply on all variables in the cointegrating VAR model we can identify an important cyclical effect (negative) on output (real gdp). The results (figure 9.2) suggest that the impact effect of a unit shock in labour supply (measured as one standard error) on consumption and financial taxes as a share to gdp is positive. The impact effect on consumption taxes is quite large and in fact larger than the effect on the labour supply itself. It appears that the negative cyclical effect on the output is caused mainly through the impact on the consumption taxes as a share to *gdp* as well.

Figure 9.2: Impulse Response(s) to one S.E. shock in the equation for lnl



[48] "Persistence profiles analysis" is applied in cointegrating systems to analyse the speed of convergence to equilibrium. When the underlying VAR model is stable the limit of the persistence profile as $N \rightarrow \infty$ tends

To summarise in the case of Greece, as the cointegrating VAR analysis suggests, we can identify that the real gdp, labour supply and the share of consumption taxes to gdp are cointegrated. In this case we are able to establish a long run relationship between the above-mentioned variables. In long run, the error correction models suggest bi-directional causation between real gdp and labour supply. The long run elasticities (derived from the long-run equilibrium) for labour supply and the share of consumption taxes to gdp (1.93% and 1.46% respectively) are quite high indicating a significant impact, from the labour supply and the share of consumption taxes to gdp towards the level of real gdp. The results indicate that an increase in consumption taxes as a share of gdp by 1% decreases the level of the real gdp by 1.46%. On the other hand in short run it appears that the negative impact on the growth of gdp is caused mainly by changes in the growth of the labour supply and their effect on the share of consumption taxes to gdp.

9.4.2 Spain

In the case of Spain, to select the order of VAR we specify, as in the case of Greece, a five variable unrestricted VAR model (ln*gdp*, ln*i*, ln*l*, ln*ct/gdp* and ln*ft/gdp*) containing an intercept term and the dummy variable (*DS*) as its deterministic component (Table 9.9).

Table 9.9: Determining the order of VAR, Spain (1965-1999)

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model
Based on 31 observations from 1969 to 1999. Order of VAR = 4
List of variables included in the unrestricted VAR:
ln*gdp* ln*i* ln*l* ln*ct/gdp* ln*ft/gdp*
List of deterministic and/or exogenous variables:
C *DS*

Order	LL	AIC	SBC	LR test	Adjusted LR test
4	409.5167	**299.5167**	**220.6475**	------	------
3	340.5045	255.5045	194.5600	CHSQ(25)= 138.0245[.000]	40.0716[.029]
2	299.4446	239.4446	196.4250	CHSQ(50)= 220.1443[.000]	63.9129[.089]
1	264.9323	229.9323	204.8376	CHSQ(75)= 289.1688[.000]	**83.9522[.224]**
0	100.7284	90.7284	83.5584	CHSQ(100)= 617.5767[.000]	179.2965[.000]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

As the results in the above table 9.9 suggest, the adjusted LR test favours a VAR of order 1 while the Schwarz Bayesian Criterion (SBC) and Akaike Information Criterion (AIC) of order four. After the inspection of results we choose an order of VAR (2) for the model (ln*gdp*, ln*i*, ln*l* ln*ct/gdp* and ln*ft/gdp*) to avoid the problem of serial correlation. To test for cointegration we apply a cointegrating VAR (2) procedure, for the model (ln*gdp*, ln*i*, ln*l*, ln*ct/gdp* and ln*ft/gdp*) with unrestricted intercepts and restricted trend chosen via the

to the spectral density function of Z_t (error correction term) at zero frequency.

Pantula principle. Based on the results displayed in Table 9.10, both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level, that there is no cointegration among the level of real gdp (ln*gdp*), investment (ln*i*), labour supply (ln*l*) and the share of consumption and financial taxes-to-gdp (ln*ct/gdp*, ln*ft/gdp*), (namely r=0) but do not reject the hypothesis that there is one cointegrating relation (vector) (i.e.r=1) among the variables. We accept that there is one cointegrating relation following the maximal eigenvalue and trace statistics.

Table 9.10: Johansen and Juselius cointegration tests among lngdp, lni, lnl, lnct/gdp ,lnft/gdp,1965-1999 (Spain)

Cointegration with unrestricted intercepts and restricted trends in the VAR
33 observations from 1967 to 1999.
List of variables included in the cointegrating vector:
ln*gdp* ln*i* ln*l* ln*ct/gdp* ln*ft/gdp*
Trend
List of I(0) variables included in the VAR: *DS*
Eigenvalue test (Order of VAR=2)
List of eigenvalues in descending order:
.91402 .51271 .36277 .24777 .069951 .0000

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	80.9693	37.8600	35.0400
r<= 1	r = 2	**23.7238**	**31.7900**	**29.1300**
r<= 2	r = 3	14.8708	25.4200	23.1000

Trace test (Order of VAR=2)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	131.3524	87.1700	82.8800
r<= 1	r>= 2	**50.3831**	**63.0000**	**59.1600**
r<= 2	r>= 3	26.6593	42.3400	39.3400

Model selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	257.5613	222.5613	196.3724	213.7495
r = 1	298.0459	253.0459	**219.3745**	241.7165
r = 2	309.9078	256.9078	217.2504	243.5643
r = 3	317.3432	258.3432	214.1962	243.4891
r = 4	322.0409	**259.0409**	211.9009	243.1798
r = 5	323.2375	258.2375	209.6010	241.8728

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

The identified long run relationship (error-correction model) is as follows:

$$Z_t = -4.77\ln gdp + 1.92\ln i - 2.67\ln l - 0.25\ln ct/gdp - 0.16\ln ft/gdp + 0.1 * Trend$$

Normalising on the coefficient of the real gdp (ln*gdp*) (A1=1) the cointegrating relation (long run equilibrium) is (standard errors are expressed in brackets):

$$\ln gdp = \underset{(0.04)}{0.4}\ln i - \underset{(0.15)}{0.55}\ln l - \underset{(0.02)}{0.05}\ln ct/gdp - \underset{(0.01)}{0.03}\ln ft/gdp + \underset{(0.001)}{0.02} * Trend$$

In the normalised cointegrating vector the coefficients of all variables are significant. Hence in the case of Spain it is not possible to estimate any over-identified system. Therefore in the case of Spain we could identify a long run relationship expressed as follows:

$$\ln gdp - \ln i - \ln l - \ln ct/gdp - \ln ft/gdp,\ DS \sim I(0)$$

ECM equations for $\Delta\ln gdp$, $\Delta\ln i$, $\Delta\ln l$, $\Delta\ln ct/gdp$, and $\Delta\ln ft/gdp$ with the lagged first differences and error correction terms are given in the following table 9.11:

Table 9.11: Estimates of ECMs for $\Delta\ln gdp$, $\Delta\ln i$, $\Delta\ln l$, $\Delta\ln ct/gdp$ and $\Delta\ln ft/gdp$,1965-1999 for Spain.

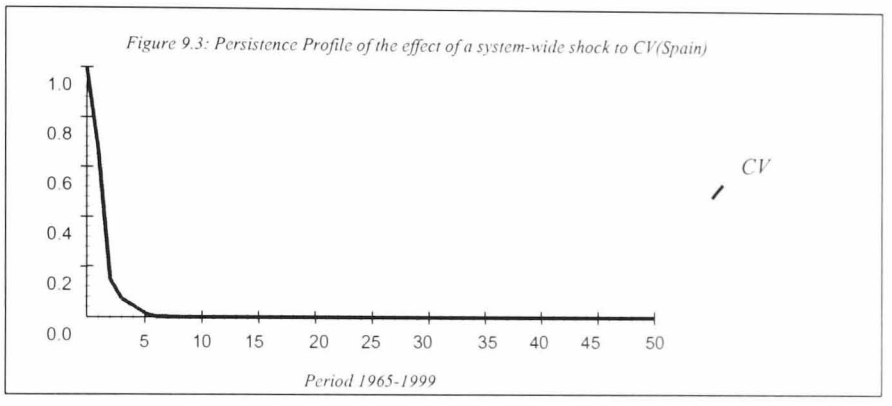
Variables	$\Delta\ln gdp$	$\Delta\ln i$	$\Delta\ln l$	$\Delta\ln ct/gdp$	$\Delta\ln ft/gdp$
Intercept	9.76(1.19)*	7.09(4.5)***	-0.52(1.01)***	6.51(5.49)***	6.11(11.73)***
$\Delta\ln gdp(-1)$	0.44(0.13)*	0.37(0.48)***	-0.11(0.1)***	0.12(0.59)***	1.47(1.27)***
$\Delta\ln i(-1)$	-0.24(0.08)*	-0.23(0.32)***	0.1(0.07)***	0.01(0.39)***	-0.89(0.83)***
$\Delta\ln l(-1)$	0.83(0.24)*	1.67(0.91)**	0.47(0.2)*	-0.006(1.11)***	0.42(2.37)***
$\Delta\ln ct/gdp(-1)$	0.007(0.03)***	0.07(0.14)***	0.05(0.03)***	-0.007(0.17)***	-0.14(0.38)***
$\Delta\ln ft/gdp(-1)$	-0.8(0.09)***	0.007(0.07)***	-0.01(0.01)***	0.05(0.09)***	0.26(0.19)***
Z_{t-1}	-0.8(0.09)*	-0.58(0.37)***	0.04(0.08)***	-0.53(0.45)***	-0.5(0.97)***
DS	0.009(0.023)***	0.04(0.08)***	0.02(0.01)***	0.22(0.1)	-0.37(0.22)***
DW	1.66	1.96	1.79	1.93	2.2
R^2	0.74	0.22	0.58	0.25	0.20
SER	0.02	0.07	0.01	0.09	0.2

The diagnostic test statistics indicate that all the above equations pass the test for first order serial correlation, functional form and heteroscedasticity at 5% significance level. The equations explaining the share of consumption and financial taxes to gdp ($\Delta\ln ct/gdp$ and $\Delta\ln ft/gdp$) fail on normality. Looking for causal relationships in the above equations we can identify a short-run effect from the growth of investment and labour force towards the growth of the real gdp (significant coefficients in the equation explaining the growth of the real gdp). In addition there is a short run effect from the growth of real gdp with one-year lag towards the growth of real gdp, and from the growth of investment with one-year lag towards the growth of investment. In long run the insignificant coefficient of the error correction term in the equations explaining the $\ln i$, $\ln l$, $\ln ct/gdp$, $\ln ft/gdp$ and the significant coefficient on error correction term in the equation explaining the growth of real gdp support the view that the direction of causality is from investment ($\ln i$), labour supply ($\ln l$), consumption and indirect financial taxes ($\ln ct/gdp$, $\ln ft/gdp$) towards the real gdp ($\ln gdp$).

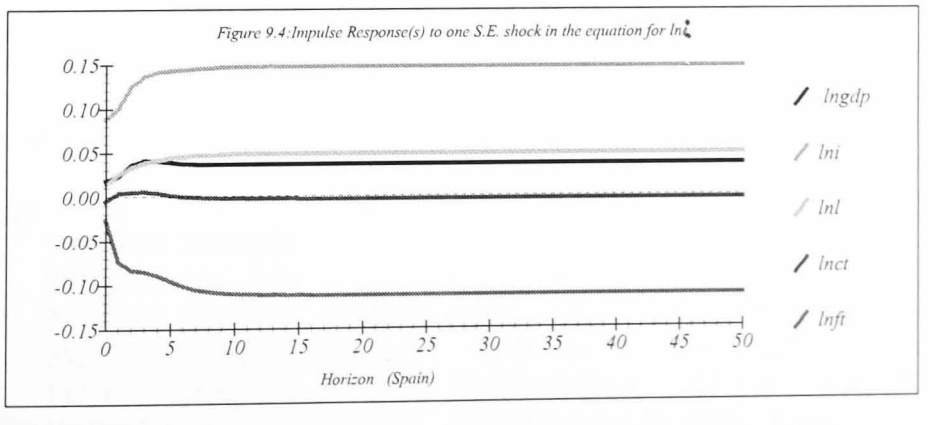
$$\ln gdp \leftarrow \ln i,\ \ln l,\ \ln ct/gdp,\ \ln ft/gdp$$

* significant at 5% critical level, **significant at 10% critical level, *** insignificant.

Again the coefficient of the dummy for VAT introduction as in the case of Greece is significant at 5% significance level in the equation explaining the growth of the share of consumption taxes to gdp. This reform appears not to have any impact on the growth of the rest of variables (insignificant coefficients). The coefficient on the error correction model in the equation explaining the growth of real gdp is rather small indicating a moderate speed of adjustment towards the equilibrium. Convergence back to equilibrium is around six years (Figure 9.3). Finally examining the above results we can not identify any causal relationship between the growth of taxes and the growth of real gdp (insignificant coefficients).



Investigating the dynamic effects of a shock to the investment on all variables in the cointegrating VAR model we can identify an important cyclical effect (positive) to the real gdp and a negative on the share of financial taxes to gdp. The results given in the following figure 9.4 suggest that the impact effect of a unit shock in investment (measured as one standard error) on the real gdp and labour force is positive while the impact effect on consumption taxes is very small and dies out very quickly.



As the results from the cointegrating VAR analysis suggest, in the case of Spain we are able to establish a long run relationship among the level of the real gdp, the level of

investment, labour supply, and the share of consumption and financial taxes to gdp. On the other hand, on the basis of the same results, we can support the hypothesis that there is a negative long run relationship between the level of the real gdp and the share of consumption and financial taxes to gdp. The long run elasticities (derived from the long run equilibrium) are -0.05% and -0.03% respectively. These results indicate that in long-run period there is a negative effect on the level of the real gdp caused by changes in consumption and financial taxes as a share to gdp thus an increase of consumption and financial taxes as a share to gdp by 1% decreases the level of the real gdp by 0.05% and 0.03% respectively. Especially, looking at the results for the financial taxes although these taxes show the highest annual growth rate among the three countries in Spain (4.41%-Table 9.1) they fail to have any positive impact on the economy's output. Finally, from the results (individual equations) we cannot identify any short run effect on the growth of real gdp caused by changes in the growth of consumption and financial taxes to gdp as a share to gdp. The results suggest that the changes in the growth of the real gdp are mainly caused by changes in its main components namely the growth of investment and labour supply.

9.4.3 Portugal

In the case of Portugal, as in the case of Greece and Spain to select the order of VAR we specify, a five variable unrestricted VAR model (ln*gdp*, ln*i*, ln*l*, ln*ct/gdp* and ln*ft/gdp)* containing an intercept term and the dummy variable (*DP*) for the introduction of VAT in Portugal as its deterministic component (Table 9.12).

Table 9.12: Determining the order of VAR, Portugal (1965-1999)

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model
Based on 31 observations from 1969 to 1999. Order of VAR = 4
List of variables included in the unrestricted VAR:
ln*gdp* ln*i* ln*l* ln*ct/gdp* ln*ft/gdp*
List of deterministic and/or exogenous variables:
C *DP*

Order	LL	AIC	SBC	LR test	Adjusted LR test
4	346.9085	**236.9085**	158.0392	------	------
3	301.1166	216.1166	155.1721	CHSQ(25)= 91.5838[.000]	26.5889[.377]
2	281.1017	221.1017	178.0820	CHSQ(50)= 131.6137[.000]	38.2104[.889]
1	262.2567	227.2567	**202.1620**	CHSQ(75)= 169.3035[.000]	**49.1526[.991]**
0	111.1529	101.1529	93.9830	CHSQ(100)= 471.5112[.000]	136.8903[.008]

AIC=Akaike Information Criterion SBC=Schwarz Bayesian Criterion

As the results, in the above table suggest, the adjusted LR test favours a VAR of order 1 while the Schwarz Bayesian Criterion (SBC) and Akaike Information Criterion (AIC) of

order four. After the inspection of results we choose an order of VAR (2) for the model (ln*gdp*, ln*i*, ln*l* ln*ct/gdp* and ln*ft/gdp*) to avoid the problem of serial correlation. To test for cointegration among the three variables we apply a cointegrating VAR (2) procedure, for the model (ln*gdp*, ln*i*, ln*l*, ln*ct/gdp* and ln*ft/gdp*) with unrestricted intercepts and restricted trend chosen via the Pantula principle. According to results displayed in Table 9.13, both the maximum and the trace eigenvalue statistics reject the null hypothesis at 5% significance level that there is no cointegration among the level of real gdp (ln*gdp*), investment (ln*i*), labour supply (ln*l*) and the share of consumption and financial taxes-to-gdp (ln*ct/gdp*, ln*ft/gdp*), (namely r=0), but do not reject the hypothesis that there is one cointegrating relation (vector) (i.e.r=1) between the variables. We accept that there is one cointegrating relation following the maximal eigenvalue and trace statistics.

Table 9.13: Johansen and Juselius cointegration tests among lngdp, lni, lnl, lnct/gdp,lnft/gdp,1965-1999 (Portugal)

Cointegration with unrestricted intercepts and restricted trends in the VAR
Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix
33 observations from 1967 to 1999. Order of VAR = 2.
List of variables included in the cointegrating vector:
ln*gdp* ln*i* ln*l* ln*ct/gdp* ln*ft/gdp*
Trend
List of I(0) variables included in the VAR: *DP*
Eigenvalue test (Order of VAR=2)
List of eigenvalues in descending order:
.96532 .60746 .51966 .20633 .11171 0.00

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r = 1	110.9285	37.8600	35.0400
r<= 1	r = 2	**29.1300**	**31.7900**	**30.8587**
r<= 2	r = 3	24.1975	25.4200	23.1000

Trace test (Order of VAR=2)

			Critical Value	
Null	Alternative	Statistic	95%	90%
r = 0	r>= 1	177.5198	87.1700	82.8800
r<= 1	r>= 2	**59.1600**	**66.5913**	**63.0000**
r<= 2	r>= 3	35.7326	42.3400	39.3400

Model selection Criteria

Rank	Maximized LL	AIC	SBC	HQC
r = 0	209.0128	174.0128	147.8240	165.2011
r = 1	264.4771	219.4771	185.8057	208.1477
r = 2	279.9065	226.9065	187.2490	213.5629
r = 3	292.0052	**233.0052**	**188.8582**	218.1511
r = 4	295.8181	232.8181	185.6781	216.9570
r = 5	297.7727	232.7727	184.1363	216.4080

AIC = Akaike Information Criterion SBC = Schwarz Bayesian Criterion
HQC = Hannan-Quinn Criterion

The identified long run relationship (error-correction model) is as follows:

$$Z_t = -0.22\ln gdp - 0.14\ln i - 1.17\ln l + 0.6\ln ct/gdp - 0.02\ln ft/gdp - 0.007 * Trend$$

Normalising on the coefficient of the real gdp (ln*gdp*) (A1=1) the cointegrating relation (long run equilibrium) is (standard errors are expressed in brackets):

$$\ln gdp = \underset{(1.66)}{-0.65}\ln i \; \underset{(9.21)}{-5.31}\ln l \; \underset{(4.1)}{+2.74}\ln ct/gdp \; \underset{(0.12)}{-0.11}\ln ft/gdp \; \underset{(0.065)}{-0.03}*Trend$$

ECM equations for $\Delta\ln gdp$, $\Delta\ln i$, $\Delta\ln l$, $\Delta\ln ct/gdp$, and $\Delta\ln ft/gdp$ with the lagged first differences and error correction terms are given in the following table 9.14:

Table 9.14: Estimates of ECMs for Δlngdp, Δlni, Δlnl, Δlnct/gdp and Δlnft/gdp, for Portugal (1965-1999).

Variables	$\Delta\ln gdp$	$\Delta\ln i$	$\Delta\ln l$	$\Delta\ln ct/gdp$	$\Delta\ln ft/gdp$
Intercept	1.16(0.41)*	0.71(0.89)***	-0.007(0.2)***	-18.11(1.03)*	-0.44(2.31)***
$\Delta\ln gdp(-1)$	-0.08(0.16)***	-0.33(0.35)***	0.18(0.25)***	-0.4(0.4)***	0.02(0.91)***
$\Delta\ln i(-1)$	0.19(0.08)*	0.58(0.17)*	-0.01(0.06)***	0.62(0.2)*	0.46(0.45)***
$\Delta\ln l(-1)$	-0.29(0.23)***	-0.37(0.51)***	-0.1(0.19)***	-1.04(0.59)**	0.47(1.32)***
$\Delta\ln ct/gdp(-1)$	-0.05(0.02)*	-0.1(0.05)**	0.005(0.01)***	-0.04(0.05)***	-0.03(0.13)***
$\Delta\ln ft/gdp(-1)$	-0.003(0.03)***	-0.11(0.07)***	0.02(0.01)***	-0.22(0.08)*	0.09(0.19)***
Z_{t-1}	-0.02(0.007)*	-0.01(0.01)***	0.001(0.003)***	0.32(0.01)*	0.007(0.04)***
DP	-0.1(0.03)	0.14(0.07)**	-0.01(0.01)***	0.24(0.08)	-0.16(0.19)***
DW	2.01	1.94	2.01	1.89	2.19
R^2	0.58	0.47	0.14	0.93	0.10
SER	0.03	0.07	0.02	0.08	0.18

The diagnostic test statistics indicate that all the above equations pass the test for first order serial correlation, functional form and heteroscedasticity at 5% significance level with exception of the equation explaining the growth of financial taxes ($\Delta\ln ft/gdp$) which fails on serial correlation at 5% level (although it passes the test at 10% level of significance). In addition the equation explaining the growth of labour force ($\Delta\ln l$) has been adjusted for heteroscedasticity. In the normalised cointegrating vector the coefficient on ln*i*, seems to be insignificant[49]. When we impose additional restriction for the exclusion of the variable ln*i* (A2=0) the restriction could not be rejected by the LR statistic at 5% significance level which is given as $\chi^2(1)=0.61$ with a P-value of 0.43. The new cointegrating vector (long run equilibrium) with this over-identifying restriction is:

$$\ln gdp = \underset{(2.56)}{-2.79}\ln l \; \underset{(0.88)}{+1.48}\ln ct/gdp \; \underset{(0.06)}{-0.09}\ln ft/gdp \; \underset{(0.02)}{-0.01}*Trend$$

* significant at 5% critical level, ** significant at 10% critical level, *** insignificant.

[49] All the joint restrictions for the exclusion of the other variables were not accepted by the LR Statistic [A1=1, A2=0, A3=0 $\chi^2(1)=5.95(0.01)$; A1=1, A2=0, A4=0 $\chi^2(1)=86.23(0.00)$; and A1=1, A2=0, A5=0 $\chi^2(1)=83.99(0.00)$].

Therefore in the case of Portugal we are able to identify a long-run relationship expressed as follows:

$$\ln gdp - \ln l - \ln ct/gdp - \ln ft/gdp,\ DP \sim I(0)$$

The new ECM estimates for the over-identified system are displayed in table 9.15:

Table 9.15: Estimates of ECMs for* Δln*gdp*, Δln*i*, Δln*l*, Δln*ct/gdp and* Δln*ft/gdp, for Portugal (1965-1999).

Variables	Δln*gdp*	Δln*i*	Δln*l*	Δln*ct/gdp*	Δln*ft/gdp*
Intercept	1.18(0.41)*	0.64(0.9)***	-0.001(0.2)***	-18.39(0.99)*	-0.24(2.34)***
Δln*gdp(-1)*	-0.08(0.16)***	-0.33(0.35)***	0.18(0.25)***	-0.38(0.38)***	0.007 (0.91)***
Δln*i(-1)*	0.18(0.08)*	0.58(0.17)*	-0.01(0.06)***	0.74(0.19)*	0.46(0.45)***
Δln*l(-1)*	-0.3(0.23)***	-0.38(0.51)***	-0.1(0.19)***	-0.94(0.56)**	0.49(1.32)***
Δln*c t/gdp(-1)*	-0.05(0.02)*	-0.1(0.05)**	0.005(0.01)***	-0.04(0.05)***	-0.03(0.13)***
Δln*ft/gdp (-1)*	-0.005(0.03)***	-0.11(0.07)***	0.02(0.01)***	-0.19(0.08)*	0.09(0.19)***
Z_{t-1}	-0.03(0.01)*	-0.01(0.02)***	0.003(0.006)***	0.59(0.03)*	0.007(0.07)***
DP	-0.1(0.03)*	0.14(0.07)**	-0.01(0.01)***	0.19(0.08)*	-0.16(0.19)***
DW	2	1.94	2.01	1.91	2.19
R^2	0.59	0.46	0.14	0.94	0.10
SER	0.03	0.07	0.02	0.07	0.18

Similar results follow from the diagnostic statistic tests from the new ECMs above. The equation explaining the Δln*l* has been adjusted for heteroscedasticity and the equation explaining the growth of financial taxes to gdp still fails on serial correlation at 5% level of significance. In addition, the coefficients and standard errors in the over identified system do not differ from the coefficient and standard errors estimated in the normalised vector. Looking for causal relationships in the above equations we can identify a short-run effect from the growth of investment (positive) and the growth of consumption taxes as a share to gdp (negative) towards the growth of the real gdp (significant coefficients in the equation explaining the growth of the real gdp). In addition there is a short run effect from the growth of the share of consumption taxes to gdp (negative) and the growth of investment with one-year lag (positive) towards the growth of investment.

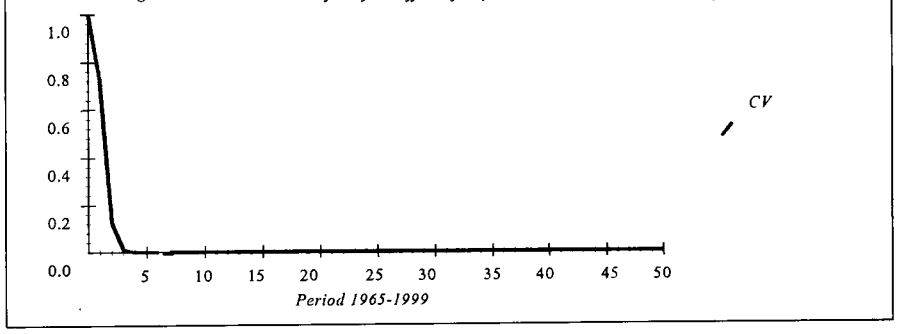
In long run, on the basis of the significance of the coefficient of the error correction term in individual equations, we can conclude that there is a bi-directional causal relationship between the real gdp (ln*gdp*) and the share of consumption taxes to gdp (ln*ct/gdp*). In addition there is a Granger causal relationship from labour supply (ln*l*) and the indirect financial taxes as a share to gdp (ln*ft/gdp)* towards the real gdp (ln*gdp*).

* significant at 5% critical level, , ** significant at 10% critical level, *** insignificant.

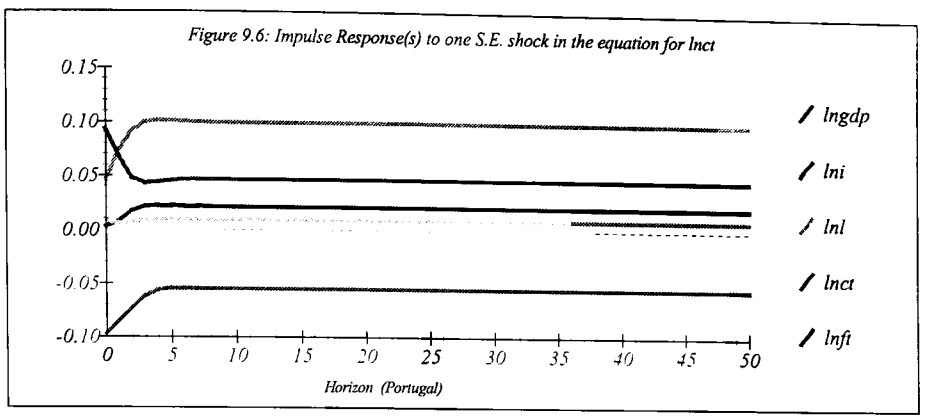
$\ln gdp \leftarrow\rightarrow \ln ct/gdp$ and $\ln gdp \leftarrow \ln l$, $\ln ft/gdp$

Again the coefficient of the dummy for the introduction of VAT is significant at 5% significance level in the equation explaining the growth of the share of consumption taxes to gdp. However, contrary to Greece and Spain, this reform appears to have an impact on the growth of the real gdp and investment as well (significant coefficients at 5% significance level for the growth of the real gdp and at 10% significance level for the growth of investment). The coefficient of the error correction term in the equation explaining the share of consumption taxes to gdp is rather high indicating a faster speed of adjustment towards the equilibrium in comparison to Greece and Spain. Indeed converge back to equilibrium is around three years (Figure 9.5). Finally examining the above results, similar to the case of Greece and Spain, we could not identify, in short run, any causal relationship between the growth of financial taxes and the growth of real gdp (insignificant coefficients).

Figure 9.5: Persistence Profile of the effect of a system-wide shock to CV (Portugal)



Considering the dynamic effects of a shock on the share of consumption taxes to gdp on all variables in the cointegrating VAR model, we can identify an important cyclical effect (positive) on output (real gdp) and investment. The results given in the following figure 9.6 suggest that the impact effect of a unit shock in the share of consumption taxes to gdp (measured as one standard error) on real gdp and investment is positive. It appears that the above mentioned positive cyclical effect on the output is caused mainly through the impact on the investment of the changes of consumption taxes as a share to *gdp*.



As the results from the cointegrating VAR analysis suggest, in the case of Portugal we are able to establish a long run relationship among the level of the real gdp, labour force supply, and the share of consumption and financial taxes to gdp. On the other hand on the basis of the same results, we can support the hypothesis, as in the case of Spain, that there is a negative long run effect of the share of indirect financial taxes as a share to gdp on the level of the real gdp. The long run elasticity (derived from the long-run equilibrium) is (-0.09) and is close to the one found for Spain (-0.03). This indicates that in long-run period there is a negative effect on the level of the real gdp caused by changes in and financial taxes as a share to gdp thus an increase of financial taxes as a share to gdp by 1% decreases the level of the real gdp by 0.09%. In addition, unlike in the case of Greece and Spain we are able to identify a positive (bi-directional) long run relationship between the share of consumption taxes to gdp and the level of gdp. The long run elasticity is positive and quite high (1.48%, derived from the long-run equilibrium), indicating that a change by 1% on consumption taxes as a share to gdp increases the real gdp by 1.48%. This result confirms the dominant position of these taxes in the Portuguese tax system and economy, especially if we take into account the high annual rate of growth for these taxes in Portugal (1.44%-Table 9.1 p.228) as well. However, in the short run the impact of consumption taxes (growth), as a share to gdp on the growth of real gdp is relatively small (0.05) and negative. In addition there is a positive short run effect from the growth of investment towards the growth of real gdp and consumption taxes as a share to gdp. Finally, unlike to the case of Greece and Spain, the dummy for the introduction of VAT is significant in the equation explaining the growth of the real gdp (at 5% level of significance) and the growth of investment (at 10% level of significance).

9. 5 Granger type causality tests for Greece, Spain and Portugal

For comparison purposes, we perform the Engle and Granger causality tests (bearing in mind the limitations regarding the identification of long-run relationships) in order to re-examine the causal relationships among the five variables in three countries by estimating an unrestricted VAR model in differences of variables with the dummy for the introduction of VAT as its deterministic variable. From the results reported in table 9.16 we can identify some differences with the results obtained in the Johansen procedure. In the case of Greece consumption taxes proved to be a non causal variable. Finally, in the case of Spain, consumption and indirect financial taxes proved to be non-causal variables.

Table 9.16: Granger type tests based on OLS equation for Greece, Spain and Portugal.

Model	(ln*gdp*, ln*i*, ln*l*, ln*ct/gdp*, ln*ft/gdp*)									
Variable	ln*gdp*		ln*i*		ln*l*		ln*ct*		ln*ft*	
	LR statistic	causal	LR stastistic	causal	LR statistic	causal	LR statistic	causal	LR statistic	causal
Greece	$\chi^2(8)$= 15.31 (0.004)	Yes	$\chi^2(8)$= 16.19 (0.003)	Yes	$\chi^2(8)$= 10.80 (0.029)	Yes	$\chi^2(8)$= 2.94 (0.568)	No	$\chi^2(8)$= 2.98 (0.56)	No
Spain	$\chi^2(8)$= 19.66 (0.012)	Yes	$\chi^2(8)$= 22.00 (0.005)	Yes	$\chi^2(8)$= 5.67 (0.68)	No	$\chi^2(8)$= 11.12 (0.194)	No	$\chi^2(8)$= 11.35 (0.183)	No
Portugal	$\chi^2(8)$= 31.63 (0.00)	Yes	$\chi^2(8)$= 30.43 (0.00)	Yes	$\chi^2(8)$= 51.24 (0.00)	Yes	$\chi^2(8)$= 24.08 (0.002)	Yes	$\chi^2(8)$= 21.58 (0.00)	Yes

9.6 Conclusions

In this chapter we investigated the effects of consumption and financial taxes (as a share-to-gdp) on economic growth, testing some theoretical predictions and assumptions derived from the neo-classical and endogenous growth mechanisms. Theoretically, a permanent increase in tax revenues (as a percentage of gdp) will permanently reduce the growth rate of real gdp, according to the endogenous growth theory, but not in the neo-classical model, where the rate of growth will be affected only temporarily, the only permanent effect being a decrease in the level of the real gdp. Using data from 1965-1999 (1965-1998 for Greece) in a cointegrating VAR framework (Johansen procedure) with five variables (the two categories of taxes, real gdp and the two main components of growth of real gdp namely investment and labour force supply) we obtained results that are closer to the theoretical prediction of the neo-classical model than endogenous growth theory for Greece and Spain. The results for Portugal were slightly contradictory (only for the consumption taxes).

In the specific case of Greece, the empirical results support the following conclusions. First, consistent with the neo-classical model, we found that consumption taxes (as a share to gdp) have a significant negative impact on the level of the real gdp (unidirectional causality with long-run elasticity 1.46%) while we were not able to identify any effect on growth of real gdp. The results suggested that effects on the growth of the real gdp were affected mainly through changes on the main components of the real gdp (e.g. through changes in labour force supply). In addition, we were not able to identify any effect on level or the growth of real gdp caused from the indirect financial taxes confirming our previous results (e.g. elasticities of these taxes on National Income, relation with total tax rate, etc.). The results contradict the findings from Barro, (1990) and Bleaney, Gemmel and Kneller, (2001) predicting that changes in consumption taxes (as a percentage to gdp) will have a positive effect, classified in their study as distortionary taxers, on the growth of real gdp. However the results are closer to the findings from Karras, (1999) and Perotti, (2002) especially on the impact of consumption taxes on growth of real gdp.

Just as for Greece, so for Spain, we identified a negative long run relationship between the consumption taxes (as a share to gdp) and the level of real gdp. However, the long run elasticity is lower than the Greek one (-0.05). In addition a negative relationship exists between indirect financial taxes (as a share to gdp) and the level of real gdp (the long-run elasticity is: -0.03). However, we were not able to identify any effect on the growth of the real gdp from consumption or the indirect financial taxes.

The results for Portugal were different from those derived for Greece and Spain- especially concerning the consumption taxes. We found positive long run relationship (bi-directional) between the consumption taxes (as a share to gdp) and the level of gdp with a relatively high long-run elasticity (1.48). In addition we were able in the case of Portugal to identify a causal relationship from the growth of consumption taxes towards the growth of real gdp as well. However, in the short run this effect is negative. The results regarding the consumption taxes are closer to the above mentioned findings by Barro, (1990) and Bleaney, Gemmel and Kneller, (2001). Moreover the empirical evidence regarding indirect financial taxes and growth does not differ from Spain and Greece. Again in the same framework we identified a negative relationship between the indirect financial taxes (as a share to gdp) and the level of real gdp (the direction of the causal relationship is from the indirect financial taxes towards the real gdp). The long run-elasticity is (-0.09).

Similarly to Greece and Spain, we were not able to identify any effect from the growth of indirect financial taxes (as a share to gdp) towards the growth of real gdp or vice-versa.

The policy implications of the results for the three countries are quite significant. In the case of Greece, the most important policy implication is that changes in the consumption taxes as a share of gdp may have permanent effects on the level of the real gdp. The direction of causality (from consumption taxes towards the real gdp) and the high negative long run elasticity support the view that the level and structure of the consumption taxes is significant in order to affect the level of the output of the economy. However, changes in indirect financial taxes do not have any effect either on the level of gdp or on the growth of the real gdp (not even temporary). Changes in consumption taxes for Spain and Portugal again alter the level of real gdp. However, while these changes for Spain, like Greece, have a negative effect on the level of gdp and no impact of growth, for Portugal they have a long run positive effect; though there are some negative temporary effects on the rate of growth of real gdp. In addition, increases in indirect financial taxes in both countries (even in Spain which is the country with a very high annual rate of growth for these taxes, 7.27%) have a negative effect on the level of the real gdp and no effect on the growth of gdp. In terms of tax policy, the findings imply that, due to the special structure of the indirect financial taxes (i.e. no right for deductions, distortions in capital formation through the taxation of intermediate and investment goods) they are very unlikely to affect growth in a positive way.

Lastly, with the exception of Portugal the empirical evidence suggests that the introduction of VAT, does not seem to have affected the indirect tax structure and its relation to the output of economy: the change resulted in the same or increased total revenues but without effect on output.

CHAPTER 10: CONCLUSIONS AND RECOMMENDATIONS

10.1 Introduction

This final chapter brings together the themes, issues, concepts, and findings of chapters 1 to 9. The findings are linked to the existing body of knowledge, which allows conclusions to be formulated on the indirect taxation of financial services as well as providing tax implications. In addition this chapter outlines the limitations of the study and suggests avenues for future research.

Briefly, this thesis discusses differences and distortions in taxing financial services by studying the relevant legislation (indirect taxes) in Greece and the other EU Member States. In addition, this thesis investigates, in a cointegrating VAR framework, the impact on total tax rate, expenditures and growth of the existing indirect financial and consumption taxes in Greece, Spain and Portugal, identifying the similarities and discussing the differences. Furthermore, in the particular case of Greece, the thesis examines the implications on the total tax revenues, in the hypothetical case of taxing financial services under the Greek VAT system using data from National Accounts. It also proposes a model for a transitional VAT treatment of financial services. Finally, the findings are compared to results (both theoretical and empirical) from the existing literature on the subject.

10.2 Main findings and conclusions

10.2.1 Differences in the VAT treatment of financial services between Greece and the EU Member States

The analysis of the legislation applied in the EU Member States to tax financial services has clearly shown that many of the obstacles and the differences depend on the differing implementation by Member States of the 6th VAT Directive. Such differences (e.g. right for deduction and option to tax) are to some extent intrinsic to the legal instrument of a "Directive" but also depend on the differences in the scope and liability of the VAT treatment of financial services.

Especially for Greece, differences can be identified in the interpretation of the rules of the 6th VAT Directive (e.g. right for deduction for financial services supplied to customers established outside the EU and no option to tax) and in the VAT treatment of some categories of financial services such as: dealing in money, credit and auxiliary services, credit card services, financial leasing, factoring, claims, insurance, fund management and professional services. At this stage the same conclusion can arise from the comparative evaluation of tax treatment of financial services among Greece, Spain and Portugal. Although a similar form of indirect tax has been applied to the main banking services in the three countries, differences related to the VAT treatment of some specific categories of financial services have been identified. We have identified eight main categories of financial services where the VAT treatment differs: credit card services, dealing in financial shares and instruments, share dividends, financial leasing, factoring, fund management, settlement of insurance claims and professional services. Finally, Greece is the only EU Member State applying turnover tax and stamp duty on insurance services while the other Member States favours an insurance premium tax.

10.2.2 Differences and potential distortions between the EU Member States

Generally, by studying the different taxes applied on financial services (both direct and indirect) we can conclude that for the EU Member States it is more common to apply direct taxes (with some elements of indirect taxes) on banking services than to apply pure indirect taxes. This is an indication of the difficulties in applying indirect taxes (including VAT) on banking services. However, all EU Member States apply pure indirect taxes as well as direct taxes on insurance services.

Regarding the VAT treatment of financial services, beyond the differences arising out of the interpretation of the main rules of the 6th VAT Directive (right for deduction, option to tax) there are differences arising from the different VAT treatment of some categories of financial services such as: dealing in foreign exchange, financial leasing, factoring, fund management and professional services. As a result of these differences, we can identify potential distortions of competition which have been categorised in three types: (a) distortions leading to competitive advantage/disadvantage among suppliers of financial services in the same Member State (b) distortions leading to competitive advantage/disadvantage among suppliers of financial services in different Member States

and (c) distortions caused by the variation in the level of "cascade effect" passed through to taxable businesses.

In addition, as far as it concerns the taxation of insurance services, although there is some consistency in the VAT treatment of such services, the study of the indirect taxation of these services (other than VAT, applied indirect taxes) shows that we are far from a common tax system on insurance services. This contradicts the core principles of the Single Market. As we already stated the latter requires tax harmonisation in the field of indirect taxation. The legislative study confirms the conclusion reached by previous studies of the indirect taxation of financial services carried out by the Commission (EC, 1996b) and OECD (OECD, 1998) that the VAT treatment of financial services is not harmonised throughout the EU. However, we extend the above results and conclusions by including in our research all categories of indirect financial taxes as well as the international financial and insurance services.

In conclusion, the legislative study enabled us to confirm that, despite the high degree of harmonisation reached by the EU Member States in the application of VAT, so far the EC has not really made progress in the field of financial services. All the above existing differences in tax treatment of both banking and insurance services can easily lead to potential distortions of competition within and across the EU Member States. Possible solutions to these problems include a "collective monitoring" of the relevant rules of the 6th VAT Directive or the introduction of a common scheme of taxing financial services under the VAT system throughout the EU. The ECJ and the VAT Committee can play a key role towards the target of harmonisation (necessary in the concept of Single Market) of the indirect financial taxes.

10.2.3 The impact on total tax revenues of taxing financial services under the VAT system in Greece

This analysis has enabled us to estimate the economic effect in the hypothetical case of taxing financial services (banking and insurance) under the VAT system in Greece. We follow the "National Accounts" approach by using aggregate data to estimate the "fiscal revenue loss" from the existing system of financial exemptions and to calculate the VAT base for the financial sector. Although this mechanism is well known in the VAT literature

we have developed some modifications with special reference to the Greek VAT system (i.e. calculation of the average weighted VAT rate).

Our results confirm previous general research results on the subject reached by Tait, (1988); Gillis, (1987); Bogetic and Hassan, (1993) where a positive impact of the abolition of VAT exemptions on VAT base and tax revenues has been pointed out. In our analysis we have obtained an estimate of 5.51% of VAT revenues over the period 1989-1998 for the fiscal revenue loss of exempting financial sectors from VAT and positive net revenue effect (68.5 billions of GDR for the year 1998). The above result is close to the one found by Wenser and Winker, (1997) using desegregated data for Germany (the fiscal revenue loss accounted for the year 1994 4% of VAT revenues).

In conclusion the results contribute to the fairly minimal extant research that there would be a positive impact of abolishing financial exemptions on the VAT base and on total tax revenues. The second conclusion reached in our analysis is that the inclusion of financial services in the VAT base gives less embedded/blocked VAT on financial institutions inputs (the inputs of financial institutions accounted approximately 0.8% of VAT revenues for Greece), confirming the results reached by Gottfried and Wiegard, (1990) for the remaining VAT on the intermediate production of the total tax-exempt sectors. Finally in this analysis it is revealed that the exempted financial sector in Greece shows very low efficiency of VAT revenue collection (approximately 29.04%) which is in accordance with the conclusions reached by Jack, (1996).

10.2.4 The profile of the indirect tax system in Greece, Spain and Portugal: The variability of VAT, consumption and indirect financial taxes over the period 1965-1998

By looking mainly at the revenue productiveness and elasticity on National Income of the different taxes we have found that the three countries apply in principle a similar consumption tax system showing at the same time a high level of spending as the National Income grows. The results suggest that VAT is an important raising instrument for Spain and Portugal. However, Greece appears to count on other indirect taxes than VAT.

In addition, an important conclusion revealed by the above analysis is the weak relation between the existing indirect financial taxes and National Income in the three countries. This finding is supported by the calculation of the average effective rate for the financial taxes in the above countries.

Finally analysing the VAT revenue performance (VAT revenues as a share to gdp) we have found that VAT exemptions (including financial exemptions) are significant for the improvement of the VAT revenue performance. This conclusion confirms, for the specific case of Greece, Spain and Portugal, the general argument expressed by Bogetic and Hassan, (1993) that VAT revenue performance depends on the VAT base and rate.

10.2.5 The impact of indirect financial taxes on the average total tax rate of the economy, expenditures and growth in Greece, Spain and Portugal

In our thesis, by applying a VAR model and using Johansen procedures we have examined the impact of the existing indirect financial and consumption taxes on the total average tax rate of the economy and expenditures in Greece (over the period 1965-1998) as well as in Spain and Portugal (over the period 1965-1999). In addition, we have been able to test the impact of tax reforms in consumption tax policy in the same model by examining the specific impact of VAT introduction on the long run relationships amongst the above stated variables.

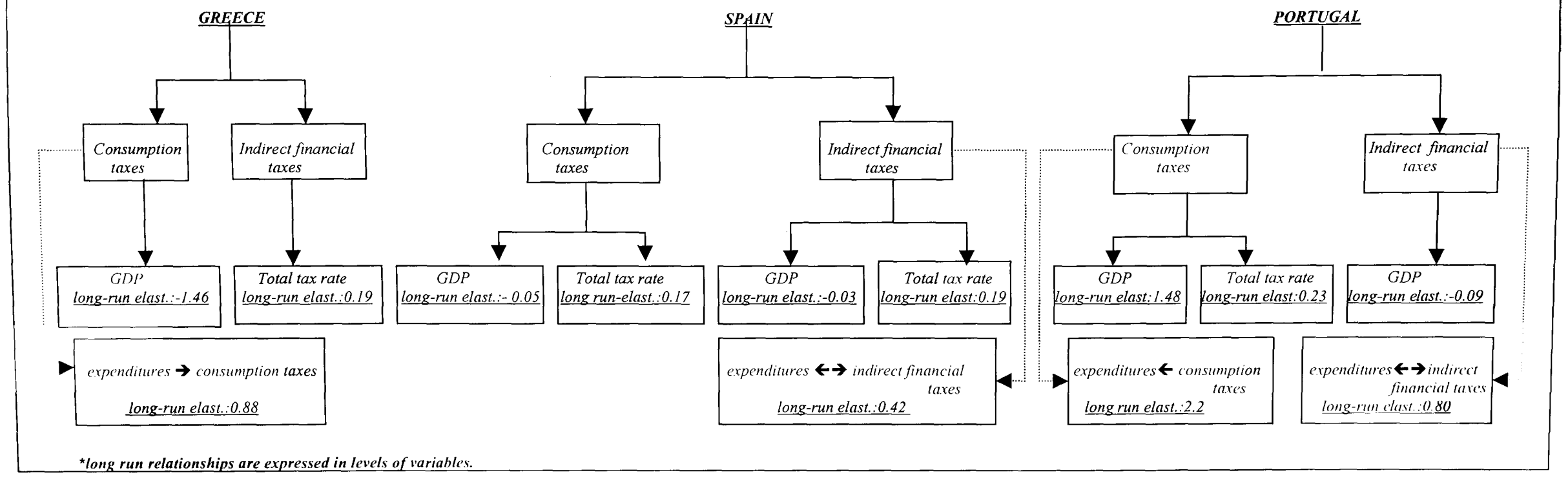
As the results revealed (Figure 10.1), there is a positive long run relationship (uni-directional causal relationship) between the existing indirect financial taxes and the total average tax rate of the economy (with long-run elasticities 0.19% for both countries) for Greece and Spain. The same positive relationship is found for consumption taxes and the total average tax rate in the case of Spain and Portugal as well (with long run elasticities 0.17% and 0.23% respectively). In addition, using the same method, we have identified a long run causal relationship from expenditures towards the consumption taxes in Greece as well as a bi-directional causal relationship between indirect financial taxes and expenditures for Spain and Portugal. Finally, for Portugal there is an additional important long run effect on expenditures from consumption taxes (with long run elasticity 2.2%). The above findings for Greece are consistent with the arguments of Andersson, (1986) that government expenditures Granger cause government taxes while the findings for Spain

and Portugal are closer to the findings of Owoye, (1995) that tax and spending decisions are jointly made by the fiscal authorities.

Furthermore, using the same techniques (i.e. applying five variable VAR model and Johansen procedures to test for cointegration between the variables in model), we have examined the impact of indirect financial and consumption taxes on economic growth (Figure 10.1). We have been able to identify a causal relationship (uni-directional) from consumption taxes towards the level of real gdp. This relationship is negative for Greece and Spain, and positive for Portugal. It is worth noting here that Portugal is the country with the higher elasticity of consumption taxes on National Income (1.36%) and quite high estimated average effective rate on consumption taxes (9.7%) as well. The results concerning the consumption taxes for Greece and Spain are closer to the findings by Karras, (1999) that taxes can affect only (negatively) the level of the output and they do not affect permanently the rate of growth while for Portugal the results are closer to the findings by Barro, (1990) and Bleaney, Gemmel and Kneller, (2001) where a positive impact from consumption taxes (classified as distortionary taxes) on the level of real gdp has been argued.

Moreover, the existing indirect financial taxes show a negative impact (uni-directional causal relationship) on the level of real output, and no short run effect on the growth of output of the economy, for Spain and Portugal (with long run elasticities -0.03 and -0.09 respectively).

Figure 10.1: Economic effects and long-run relationships* of consumption and indirect financial taxes in Greece, Spain and Portugal.



**long run relationships are expressed in levels of variables.*

After the above mentioned cointegration analysis the most important conclusion is that, although they may have a positive impact on the total average tax rate of the economy, the existing indirect financial taxes (i.e. taxes that might fall on intermediate and investment goods) can only affect the level of the real output negatively. In addition, consumption taxes, including VAT (i.e. taxes that fall only on final consumption) can affect permanently the level of the real output, through their impact on the main determinants of growth, namely labour force supply and/or investment. This effect can be either negative or positive depending on the whole tax structure. Countries with a dominant position of consumption taxes with high elasticity of consumption taxes on National income as well as high average effective rates on consumption are more likely to appear with positive impact on the level of the real output (e.g. the case of Portugal).

Moreover indirect financial taxes are important for spending decisions for Spain and Portugal, where a clear long run relationship has been identified. For Greece on the other hand the decision to spend Granger causes consumption taxes. However consumption taxes are important for spending decisions for Portugal.

The last important conclusion is that reforms in indirect tax system (e.g. VAT) are unlikely to have any direct long run effect on the total average tax rate, expenditures or growth. Rather, these reforms will have short run effects on the revenues accruing to the tax administration from the relevant taxes (e.g. consumption taxes).

10.3 Implications of the study

The study detailed in chapters 1-9 leads to both fiscal (tax) and economic implications.

10.3.1 Tax implications

The conclusions drawn from the legislative study (see also section 10.2.2) show that there are many differences and little harmonisation in indirect taxation (including VAT) of financial services in the EU Member States. These can lead to potential distortions of competition within and across EU Member States, thus contradicting the core principle of the "Internal Market", namely the harmonisation of indirect taxes across the EU Member States and hindering the efforts of the European Commission for a Single Market on financial services.

Especially article 93 of the consolidated version of the treaty of the European Union (EU, 1997) states that: *"The Council shall, acting unanimously,...adopt provisions for the harmonisation of legislation concerning turnover taxes, excise duties and other form of indirect taxation to the extent that such harmonisation is necessary to ensure the establishment and the functioning of the Internal Market..."*. Consequently, the main implication of the lack of harmonisation in the indirect taxation of financial services is the need for organised efforts in order to eliminate differences and to apply harmonised rules in EU Member States[50]. This demands work in two directions. Should the EU Member States prefer the existing system of financial exemptions then the efforts would concentrate on option 1 (Table 10.1) (i.e. improvement of the current system of financial exemptions and harmonisation of indirect taxation of insurance services). In case a tax reform is preferred, option 2 can be developed instead (i.e. application of VAT on financial services).

Table 10.1: Different options for harmonisation of indirect taxation of financial services in EU.

Option 1	*Option 2*
Harmonised financial exemptions in VAT system: Narrow interpretation of article 13a, 13b(d) 1-6 of the 6th VAT Directive. Legislative modifications to article13a, 13b(d) 1-6, 13c of the 6th VAT Directive. Introduction of common rules for calculation of deductions: uniform application of article 17(3) c, 18 and 19(2) of the 6th VAT Directive. Detailed definition of financial services. Production of blueprints: Providing list of financial services and their VAT status. **Harmonised indirect taxes on insurance services:** Approximation of rates and exemptions.	**Taxation of financial services under the VAT system:** Normal scheme: Identification of feasible method. Special scheme: Development of rules.

10.3.2 Economic implications

The most important economic implication drawn from the empirical study (see also section 10.3.5) regarding the existing indirect financial taxes in Greece, Spain and Portugal is that, although they can affect positively the total tax rate of the economy, any increase of these taxes can only decrease the real level of the output of the economy through changes in the main determinants of growth, namely investment and labour supply.

[50]The need for harmonised rules on indirect taxation of financial services is clearly supported by the findings of a recent study on behalf of the European Commission (London Economics, 2002). The findings reveal that trading costs could fall sharply as a result of full European financial market integration. A Single Market on financial services would increase the EU growth in long run by at least 1.1%, or 130 billion euro in 2002 prices, and the total employment by 0.5%.

This negative impact of the applied indirect financial taxes on the real output of the economy must lead the relevant tax administrations to question and reconsider the role and existence of these taxes in the whole tax system. However, these taxes seem to be more important for the spending decisions of the fiscal authorities.

Moreover, changes in consumption taxes are likely to affect the level of the real output of the economy positively or negatively depending on the whole tax structure. Subsequently, changes in VAT (e.g. application of VAT on financial services) can alter the revenues accruing to the government as well as the real output of the economy. The net effect depends on the whole tax structure (relation between direct/indirect taxes, the structure of the abolished indirect taxes etc.). In the case of Greece the above implication is more relevant taking into account that although consumption taxes show a dominant position in the whole tax structure [high elasticity on Net National Income (1.36%) and high average effective tax rate on consumption (11.45%)], they may affect negatively the real output of the economy. This implication obviously requires a comprehensive reform of tax system in order to benefit of changes in indirect taxation of financial services. The application of VAT on financial services may have a positive impact on VAT base, VAT revenues efficiency and total tax revenues as well as to result in less embedded/blocked VAT on financial institutions inputs (see section 10.2.3). However, in order for this positive impact to affect the real output of the economy the tax administration must accompany this change with a comprehensive tax reform.

10.4 Recommendations

There are some recommendations derived from the findings and conclusions of this study. The main categories of recommendations are derived mainly from the study of legislation, taking into account the economic implications discussed above. In addition there are some recommendations for the specific case of Greece.

Differences in indirect tax rules and practices between the EU Member States result in distortions of competition, in compliance cost and double or avoidance of taxation, even where there are EU measures already in place which are designed to avoid these problems. In addition the creation of EMU and the adoption of euro in 1999 has successfully remove the distortions related to exchange risks within the Euroland and simultaneously has shed more light on the remaining tax distortions (i.e. distortions arising of different VAT

treatment of financial services across EU Member States). Moreover, financial institutions need to be able to comply with their obligations in a way, which does not involve disproportionate time and resources. As a first step towards harmonising and streamlining the indirect taxation of financial institutions within the "Single Market", we have identified a number of key changes that would substantially ease the impact of indirect taxation on a cross-border economic financial activities in EU and enable financial institutions to operate on a genuinely European basis. These general changes are as follows:

- The scope of the 6th VAT Directive regarding financial services needs to be reviewed. The Directive needs to be implemented and interpreted consistently across the EU and both Member States and the European Commission must act in accordance with their commitment to the Single Market.
- A Single Market needs a consistent approach to the VAT treatment of financial services.
- Proposed methods and practices must recognise the increasing move away from nationally organised efforts and the impact of new technology on financial transaction processes.

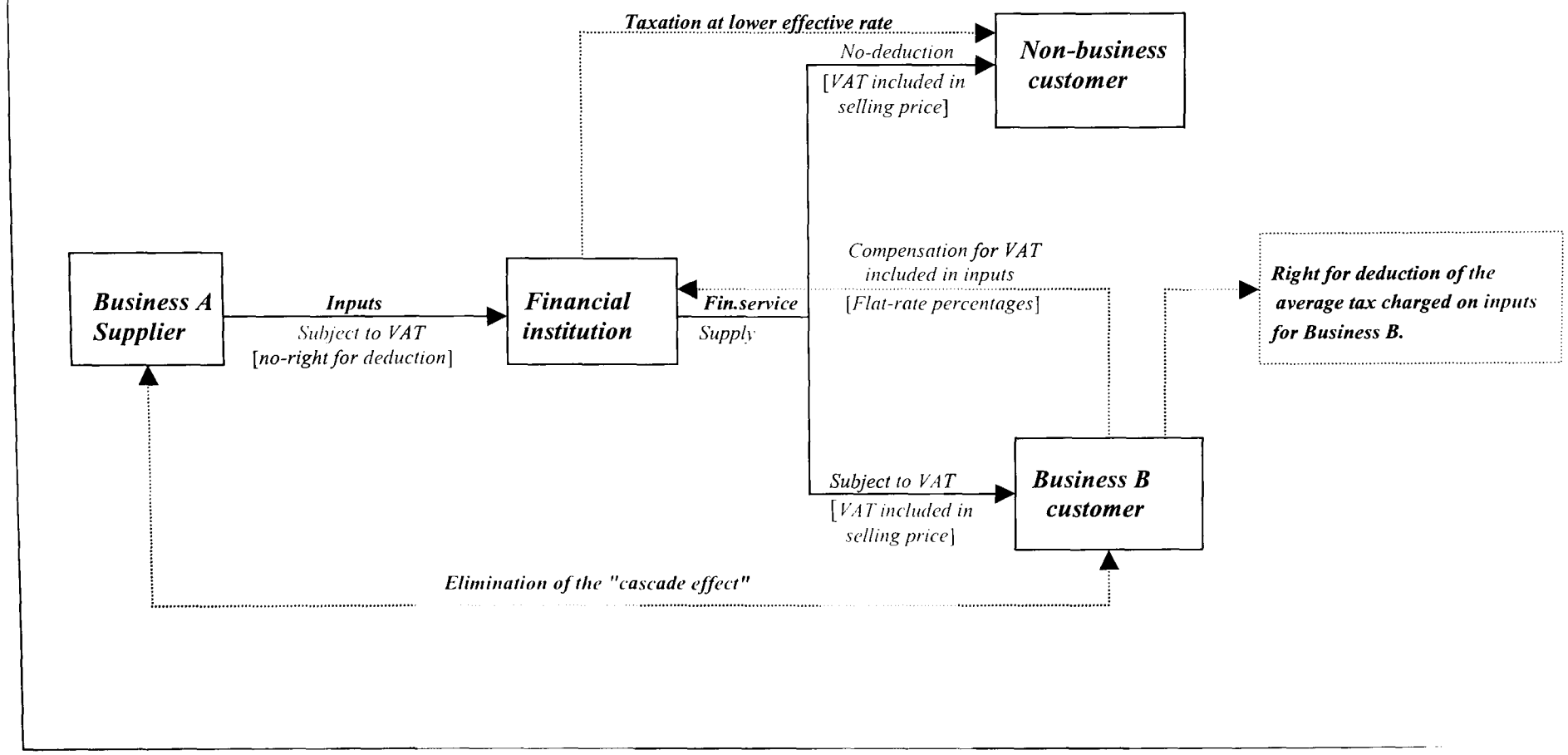
For the specific case of Greece considering the economic implications as well (see section 10.2.3-5) the main recommendations are as follows:

- Greece needs to support any future change in EU legislation towards harmonisation of the VAT treatment of financial services.
- In order to benefit from a future change in the VAT treatment of financial services Greece has to consider a comprehensive tax reform.
- In the case of application of VAT on financial services in EU (i.e. the second option detailed above in table 10.1) a special VAT scheme, similar to the one applied the agricultural sector (article 25 of the 6th VAT Directive), seems to hold considerable promise for Greece as a transitional alternative to the present exemptions for financial services given that this system can easily be adopted and be operational in accordance with the existing invoice credit VAT system.

Finally, this study resulted in the development of the rules of a flat-rate scheme for taxing financial services under the VAT system. The proposed rules are developed and presented in detail in Appendix 3. Lastly a brief review of the above system's basic principles and functions[51] are presented in the following Figure 10.2.

[51] This method satisfies the basic goal of an invoice credit system, by taxing only the final consumption. Briefly under this scheme financial institutions will not have the right to deduct the VAT charged on their inputs. However, their customers will indirectly compensate the financial institutions for VAT charged on their inputs since it will be part of their sales price. In order to avoid the problem of the "cascade effect" in production chain, the taxable entities participating in financial transaction will have the right to deduct the average tax charged on the inputs of the particular financial institution which supplies the financial service, fixed at a percentage of the sales price. For non-business customers' financial services will be taxed, though at lower effective rate, due to lack of the right of deduction of tax.

*Figure 10.2: **Operational model for a flat-rate scheme of taxing financial services under the VAT system.***



10.5 Limitations of the study

Two categories of research limitations are discussed below. These are: general limitations and limitations in methodological approach and design.

10.5.1 General limitations

Firstly, a review of the research on indirect taxation of financial services of the last decade reveals relatively little attention to the study of the economic effects of these taxes in a particular EU context. In addition, regarding the issue of the feasibility of applying VAT on financial services, it is the American researchers (i.e. Canada) who have dominated the field. Given the relative paucity of research into the issue of the indirect taxation of financial services, this study is just a start towards a new approach in an EU context.

Moreover, the findings and conclusions of this study are limited by the "Public finance" focus of the research. The focus of the study is the indirect taxation of financial services resulting in findings and conclusions which mainly apply to goverments/tax administrations policies on the subject. Indeed the purpose of the study is to investigate the above issues by adopting a "Public finance" perspective and not to attempt at this stage to assess the pure implications (i.e. administrative and compliance implications) for the financial sector. Whilst the aim of the study may have been accomplished, the limitations of a non-generalisable theory, including the financial sectors' implications and views, limit the findings and the conclusions presented earlier.

10.5.2 Limitations of methodological approach

There are some limitations in the methodological approach used in this study. Firstly, a more comprehensive and deep fieldwork by adopting "financial institutions" perspective, was beyond the mandate and time limit of this research. The inclusion of the above approach would require longer time and a different mandate from the Greek Ministry of Finance.

Secondly, the difficulty to access detailed information/data necessary to estimate the fiscal revenue loss of the applied exemptions in Spain and Portugal (i.e. data on the average weighted VAT rate, on financial sectors intermediate consumption, dispersions of rates for intermediate consumption, output etc.) prevented us, at this stage, from conducting similar analysis to the one conducted for Greece.

Finally, our estimation of the fiscal revenue loss of the applied financial exemptions in VAT system in Greece does not capture general equilibrium effects. This is beyond of the scope of this thesis. Lastly, the method used ("National accounts approach") can only be used for forecasting as long as there in no change in tax rates on services (financial services) affected since it is based on the calculation of the average weighted VAT rate.

10.6 Contribution to knowledge

Nevertheless, this thesis is valuable because it clearly reached its aims, answered the research questions, and made important contributions and practical policy implications. These included:

- A comparative evaluation of VAT and the indirect tax treatment of financial services in Greece and the other EU Member States and the identification of potential distortions of competition.
- The estimation of the fiscal revenue loss caused by financial exemptions in the VAT system in Greece, as well as the identification of financial institutions' inputs (i.e. the "cascade effect" arising from taxing intermediate consumption).
- The identification of similarities and differences of tax system in Greece, Spain and Portugal. Investigation and findings on the impact of indirect financial taxes on the total average tax rate of the economy, expenditures and growth in Greece, Spain and Portugal as well as the identification of causal relationships.
- The development of rules needed for the application of a flat-rate scheme for taxing financial services under the VAT system.

Generally, we contributed to the limited and incomplete theoretical and empirical research that exists in this area (the empirical research has so far concentrated on direct taxation than on indirect taxation). This thesis is therefore a first step towards a better understanding of the indirect taxation of financial services. Indeed, as we discussed in our literature review, the research on VAT treatment of financial services in EU has neglected the issues of international financial services as well as the analysis of practices used to tax insurance services. In addition, we contributed to the existing empirical findings on the economic effects of financial exemptions (i.e. effects of cascade tax on intermediate goods) in VAT system, as well as the effects of existing indirect financial taxes on the total average tax rate, expenditures and growth.

10.7 Suggested avenues for future research.

It can be argued that the research on indirect taxation of financial services is frequently characterised by the efforts to develop a feasible method in order to tax financial services under the VAT system abolishing the existing exemptions. This study provides a starting point for helping tax administrations and EU institutions to reach a definitive policy in indirect taxation of financial services that will satisfy the goal of "Single Market". Hence, this section suggests potential avenues for future research.

Firstly, the findings enable general inferences to be drawn about the economic effects of indirect financial and consumption taxes (i.e. effects on total average tax rate, expenditures and growth). In addition this study used the "National accounts" approach to examine the economic effects (i.e. the fiscal revenue loss) of the applied financial exemptions in VAT system in Greece. Further research could use the same or a different method to extend the findings to other EU countries. Additional comparative research is also necessary to determine findings on fiscal revenue loss and "cascade effect" (embedded VAT) in other EU countries, preferably in Spain and Portugal in order to verify the general validity of the conclusions reached by this study.

Secondly, in our study we investigated the impact of consumption and indirect taxes on growth by using a relatively simple model. Lack of data before 1965 led us to apply a small model that omits variables that could also explain the growth of real output such as exports, productivity growth e.t.c. This was done to avoid problems of an econometric nature. Depending on data availability (e.g. by using quarterly data), future research could extend the above model by including more variables.

Thirdly, more comprehensive fieldwork is necessary in order to study the implications on financial sector in the benchmark case of taxing financial services under the VAT system in Greece. This can be done by looking at the subject from the financial institutions' perspective as well, investigating the impact of such a measure on financial institutions administrative obligations, compliance cost, perception of taxation, etc.

Finally, further comparative research will be necessary in order to determine the appropriateness of each method proposed (cash-flow method, TCA method, special VAT regime etc.) to tax financial services under the VAT system in the EU context. For

example the application of the special regime proposed by this study or of the TCA method (Tax Calculate Account) could be examined in the case of Greece, through a pilot study in collaboration with the Hellenic Banks Association[52].

[52] The Hellenic Banks Association and the Greek Ministry of Finance are, in principle, agreeable to such a pilot study in the future (Hellenic Banks Association and Greek Ministry of Finance, Working document No 999, 21/08/1998).

Appendices and Bibliography

Appendix 1: Calculation of VAT base of financial institutions (Input-Output tables)

Table a_1: Input-output table-Calculation of VAT base of Financial Institutions, Year 1989 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	391.234	55.873	447.107	12.24%
Intermediate Consumption	60.659	35.913	96.572	
Gross Value-added	330.575	19.96	350.535	
Consumption of Fixed Capital	10.006	1.563	11.569	
Net Value-added/VAT base	320.569	18.397	338.966	
Yield from taxation	338.966*12.236%=41.47 billion of Drachmas.			

Table a_2: Input-output table-Calculation of VAT base of Financial Institutions, Year 1990 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	522.718	73.912	596.63	13.41%
Intermediate Consumption	75.624	49.72	125.334	
Gross Value-added	447.094	24.192	471.286	
Consumption of Fixed Capital	13.445	2.049	15.494	
Net Value-added/VAT base	433.649	22.143	455.792	
Yield from taxation	455.792*13.4057%=61.10 billion of Drachmas.			

Table a_3: Input-output table-Calculation of VAT base of Financial Institutions, Year 1991 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	668.723	92.828	761.551	14.05%
Intermediate Consumption	87.442	67.891	155.333	
Gross Value-added	581.281	24.937	606.218	
Consumption of Fixed Capital	18.445	2.516	20.961	
Net Value-added/VAT base	562.836	22.421	585.257	
Yield from taxation	585.257*14.054%=82.25 billion of Drachmas.			

Table a_4: Input-output table-Calculation of VAT base of Financial Institutions, Year 1992 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	839.986	122.693	962.679	13.91%
Intermediate Consumption	111.988	77.825	189.813	
Gross Value-added	727.998	44.868	772.866	
Consumption of Fixed Capital	24.229	3.401	27.63	
Net Value-added/VAT base	703.769	41.467	745.236	
Yield from taxation	745.236*13.913%=103.68 billion of Drachmas.			

Table a_5: Input-output table - Calculation of VAT base of Financial Institutions, Year 1993 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	724.043	142.86	866.903	13.48%
Intermediate Consumption	135.293	91.956	227.249	
Gross Value-added	588.75	50.904	639.654	
Consumption of Fixed Capital	20.852	3.95	24.802	
Net Value-added/VAT base	567.898	46.954	614.852	
Yield from taxation	614.852*13.482%=82.89 billion of Drachmas.			

Table a_6: Input-output table-Calculation of VAT base of Financial Institutions, Year 1994 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	917.205	164.668	1081.873	13.52%
Intermediate Consumption	152.165	106.919	259.084	
Gross Value-added	765.04	57.749	822.789	
Consumption of Fixed Capital	26.416	7.627	34.043	
Net Value-added/VAT base	738.624	50.122	788.746	
Yield from taxation	788.746*13.526%=106.68 billion of Drachmas.			

Table a_7: Input-output table-Calculation of VAT base of Financial Institutions, Year 1995 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	1105.668	189.440	1295.108	14.50%
Intermediate Consumption	198.539	120.499	319.038	
Gross Value-added	907.129	68.941	976.070	
Consumption of Fixed Capital	31.843	5.186	37.029	
Net Value-added/VAT base	875.286	63.755	939.041	
Yield from taxation	939.041*14.50%=136.16 billion of Drachmas.			

Table a_8: Input-output table-Calculation of VAT base of Financial Institutions, Year 1996 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	1233.851	196.775	1430.626	13.29%
Intermediate Consumption	223.368	125.940	349.308	
Gross Value-added	1010.483	70.835	1081.318	
Consumption of Fixed Capital	37.475	6.547	44.022	
Net Value-added/VAT base	973.008	64.288	1037.296	
Yield from taxation	1037.296*13.298%=137.939 billion of Drachmas.			

Table a_9: Input-output table-Calculation of VAT base of Financial Institutions, Year 1997 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	1347.858	219.477	1567.335	13.32%
Intermediate Consumption	259.710	137.854	397.564	
Gross Value-added	1088.148	81.623	1169.771	
Consumption of Fixed Capital	41.330	7.221	48.551	
Net Value-added/VAT base	1046.818	74.402	1121.22	
Yield from taxation	1121.22*13.3252%=149.404 billion of Drachmas.			

Table a_{10}: Input-output table - Calculation of VAT base of Financial Institutions, Year 1998 (At current Prices-In billion of Drachmas).				
	Credit Institutions	Insurance	Total	AWVR
Output	1499.497	240.700	1740.197	13.51%
Intermediate Consumption	306.023	149.234	455.257	
Gross Value-added	1193.474	91.466	1284.94	
Consumption of Fixed Capital	45.358	7.919	53.277	
Net Value-added/VAT base	1148.116	83.547	1231.663	
Yield from taxation	1231.663*13.5182%=166.498 billion of Drachmas.			

Appendix 1: Calculation of the Average weighted statutory VAT rates (1989-1998)

Table b_1: Calculation of the AWVR-Year 1989.

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	3.32%	3%	6%	16%	36%	Total
Self-supplies and direct sales of farmers	73550					73550
Private consumption		48928	2082912	1015897	364024	3511761
Government consumption		972	123684	185491	7008	317155
Intermediate consumption of exempt sectors		2039	50774	59692	1972	114477
Public fixed capital investment			887	169981		170868
Fixed capital investment of exempt sectors			1350	258903		260253
Fuels and lubricants (intermediate consumption)			134	36	173	343
Purchases of private cars for professional use (intermediate consumption)			103			103
Transactions in gold for non industrial use						
Construction of Buildings and land for industrial use						
Total	73550	51939	2259844	1690000	373177	4448510

AWVR=(73550*3.3186%+51939*3%+2259844*6%+1690000*16%+373177*36%)/4448510=12.2363%

Table b_2: Calculation of the AWVR-Year 1990.

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	3.24%	3%	4%	6%	8%	16%	18%	36%	Total
Self-supplies and direct sales of farmers	80248								80248
Private consumption		24798	34717	1010626	1414873	513261	718582	434260	4151117
Government consumption		698	977	62659	88631	94474	133500	7672	388611
Intermediate consumption of exempt sectors		3198	4478	26342	36704	53897	75455	3946	204020
Public fixed capital investment				380	531	86996	121795		209702
Fixed capital investment of exempt sectors				550	767	125785	176103		303205
Fuels and lubricants (intermediate consumption)				73	102	20	27	224	446
Purchases of private cars for professional use (intermediate consumption)				62	86				148
Transactions in gold for non-industrial use									
Construction of buildings and land for industrial use									
Total	80248	28694	40172	1100692	1541634	874433	1225462	446102	5337497

AWVR=(80248*3.2365%+28694*3%+40172*4%+1100692*6%+1541634*8%+874433*16%+1225462*18%+446102*36%)/5337497=13.4057%

Table b_3: Calculation of the AWVR-Year 1991

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	4.37%	4%	8%	18%	36%	Total
Self-supplies and direct sales of farmers	159459					159459
Private consumption		80874	2820061	1416793	503962	4821690
Government consumption		2194	162810	245858	7876	418738
Intermediate consumption of exempt sectors		9550	78443	160943	4910	253846
Public fixed capital investment			1009	254297		255306
Fixed capital investment of exempt sectors			1486	374461		375947
Fuels and lubricants (intermediate consumption)			457	122	588	1167
Purchases of private cars for professional use (intermediate consumption)			249			249
Transactions in gold for non-industrial use						
Construction of buildings and land for industrial use						
Total	159459	92618	3064515	2452474	517336	6286402

AWVR=(159459*4.3665%+92618*4%+3064515*8%+2452474*18%+517336*36%)/6286402=14.0544%

Table b_4: Calculation of the AWVR-Year 1992

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	3.77%	4%	8%	18%	36%	Total
Self-supplies and direct sales of farmers	197011					197011
Private consumption		93788	3212127	2119171	431225	5856311
Government consumption		2443	164167	258709	7736	433055
Intermediate consumption of exempt sectors		11772	87075	208209	4057	311113
Public fixed capital investment			477	278154		278631
Fixed capital investment of exempt sectors			861	502640		503501
Fuels and lubricants (intermediate consumption)			649	1045	840	2534
Purchases of private cars for professional use (intermediate consumption)			334	152		486
Transactions in gold for non-industrial use						
Construction of buildings and land for industrial use						
Total	197011	108003	3465690	3368080	443858	7582642

AWVR=(197011*3.7693%+108003*4%+3465690*8%+3368080*18%+443858*36%)/7582642=13.9139%

Table b_5: Calculation of the AWVR-Year 1993

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	4.66%	4%	8%	18%	Total
Self-supplies and direct sales of farmers	304017				304017
Private consumption		102256	3285795	3497636	6885687
Government consumption		2496	131463	349990	483949
Intermediate consumption of exempt sectors		14740	75840	296585	387165
Public fixed capital investment				411491	411491
Fixed capital investment of exempt sectors				524763	524763
Fuels and lubricants (intermediate consumption)				2927	2927
Purchases of private cars for professional use (intermediate consumption)				637	637
Transactions in gold for non-industrial use					
Construction of buildings and land for industrial use					
Total	304017	119492	3493098	5084029	9000636

AWVR=(304017*4.6610%+119492*4%+3493096*8%+5084029*18%)/9000636=13.4826%

Table b_6: Calculation of the AWVR-Year 1994

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	4.79%	4%	8%	18%	Total
Self-supplies and direct sales of farmers	320252				320252
Private consumption		112405	3853281	4172514	8138200
Government consumption		4435	151905	403458	559798
Intermediate consumption of exempt sectors		17263	88822	347353	453438
Public fixed capital investment				509272	509272
Fixed capital investment of exempt sectors				528538	528538
Fuels and lubricants (intermediate consumption)				5205	5205
Purchases of private cars for professional use (intermediate consumption)				765	765
Transactions in gold for non-industrial use					
Construction of buildings and land for industrial use					
Total	320252	134103	4094008	5967105	10515468

AWVR=(320252*4.7948%+134103*4%+4094008*8%+5967105*18%)/10515468=13.5260%

Table b_7: Calculation of the AWVR-Year 1995

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	5.37%	4%	8%	18%	Total
Self-supplies and direct sales of farmers	368876				368876
Private consumption		244724.04	6559847.6	6809798.75	13614370.46
Government consumption		5460.58	173725.72	6078899.45	6258085.75
Intermediate consumption of exempt sectors		44717.59	896008.99	931238.98	1871965.56
Public fixed capital investment				717791	717791
Fixed capital investment of exempt sectors				1474808	1474808
Fuels and lubricants (intermediate consumption)				2947.16	2947.16
Purchases of private cars for professional use (intermediate consumption)				3146.34	3146.34
Transactions in gold for non-industrial use					
Construction of buildings and land for industrial use					
Total	368876	294902.21	7629582.38	16018629.68	24311990.27

AWVR=(368876*5.37%+294902.21*4%+7629582.38*8%+16018629.68*18%)/24311990.27=14.50%

Table b_8: Calculation of the AWVR-Year 1996

Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).

Categories/Rates	4.64%	4%	8%	18%	Total
Self-supplies and direct sales of farmers	395898				395898
Private consumption		150117	5137996	5090554	10378667
Government consumption		4941	213715	491003	709659
Intermediate consumption of exempt sectors		24915	93306	477146	595367
Public fixed capital investment				561811	561811
Fixed capital investment of exempt sectors				591200	591200
Fuels and lubricants (intermediate consumption)				7714	7714
Purchases of private cars for professional use (intermediate consumption)				722	722
Transactions in gold for non-industrial use					
Construction of buildings and land for industrial use					
Total	395898	179974	5445017	7220148	13241038

AWVR=(395898*4.6410%+179974*4%+5445017*8%+7220148*18%) 13241038=13.298%

Table b_9: Calculation of the AWVR-Year 1997					
Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).					
Categories/Rates	5.37%	4%	8%	18%	Total
Self-supplies and direct sales of farmers	368876				368876
Private consumption		244724.04	6559847.67	6809798.75	13614370.46
Government consumption		5460.58	173725.72	607899.45	787085.75
Intermediate consumption of exempt sectors		44717.59	896008.99	931238.98	1871965.56
Public fixed capital investment				717791	717791
Fixed capital investment of exempt sectors				591200	591200
Fuels and lubricants (intermediate consumption)				95644.07	95644.07
Purchases of private cars for professional use (intermediate consumption)				153036.38	153036.38
Transactions in gold for non-industrial use					
Construction of buildings and land for industrial use					
Total	368876	294902.21	7629582.38	9906608.63	18199969.22
AWVR=(368876*5.3798%+294902.21*4%+7629582.38*8%+9906608.63*18%)/18199969.22=13.3252%					

Table b_{10}: Calculation of the AWVR-Year 1998					
Breakdown of the VAT base in VAT rates (Amounts in million of Drachmas).					
Categories/Rates	5.32%	4%	8%	18%	Total
Self-supplies and direct sales of farmers	386120				386120
Private consumption		362014.42	7159087.99	7834736.44	15355838.85
Government consumption		6022.12	178539.41	611124.93	795686.46
Intermediate consumption of exempt sectors		55166.20	1028393.65	1045342.37	2128902.22
Public fixed capital investment				839814	839814
Fixed capital investment of exempt sectors				1568080.50	1568080.50
Fuels and lubricants (intermediate consumption)				3217.40	3217.40
Purchases of private cars for professional use (intermediate consumption)				2837.51	2837.51
Transactions in gold for non-industrial use					
Construction of buildings and land for industrial use					
Total	386120	423202.74	8366021.05	11905153.15	21080496.94
AWVR=(386120*5.3296%+423202.74*4%+8366021.05*8%+11905153.15*18%)/21080496.94=13.5182%					

Appendix 2a: The functional form of taxation in Spain and Portugal.

- *The functional form of taxation in Spain*

In general the Spanish tax mix has a different balance compared with other EU Member States, with a relatively strong reliance on labour taxes, largely to finance social security expenditures, and a relatively low share of consumption taxes. Recent reforms have improved incentives to work and removed barriers to the internationalisation of the Spanish firms, and have helped to make the tax system simpler and more neutral, especially as regards company taxation. However, the structure of tax wedges, combined with significant labour market rigidities continues to inhibit job creation, and especially job creation for the unskilled. Until the mid -1970s government spending in Spain was fairly low by international comparisons, keeping the tax pressure considerable below the OECD average. However, after 1975 and up until the late 1990s, taxation rose sharply to finance escalating government expenditures. Recent changes in tax system have achieved progress in streaming taxation, reducing compliance cost and redressing previous distortions resulting from tax progressivity and lack of neutrality. Despite improvements, the tax system contains imbalances, reflected in relative strong pressure on labour income, lack of neutrality in the taxation of savings, preferential corporate tax regimes and weaknesses in tax decentralisation (Joumard and Varoudakis, 2000).

In 1996 the level of aggregate taxation in Spain was almost seven percentage points below the EU average and the third lowest in the EU. Social security contributions are the most important category of revenues (36.4%) of total taxation. Spain on the other hand has the lowest indirect tax/GDP ratio (10,8%) of the EU Member States and a lower than average direct/GDP ratio (11.8%). VAT accounts for 52.7% and excise duties for 26.8% of indirect taxation. The most important direct taxes are taxes on personal income (71% of total direct taxes). Taxes on consumption in % of GDP increased significantly during the first half of 1980s from 5.3% of GDP in 1980 to 9.8% in 1986. After 1986 the level remained relatively stable around 9.7% of GDP. The reason for this can be found in Spain's accession to the EU, which led to VAT replacing a multiphase tax based on the final price in each production level. However, the level of taxes on consumption as a % of GDP or total taxation is the lowest among the EU Member States (OECD, 2000). Finally, Spain applies indirect cascade taxes on financial services as well. These are mainly a turnover tax on banking services, a tax on economic activities (stock market transactions) as well as a premium tax on insurance contracts.

- *The functional form of taxation in Portugal*

The Portuguese tax system has developed positively in the past decade. Following the 1989 tax reform, tax bases have been broadened and statutory tax rates are lowered. The overall tax burden is not high by the international comparison and the tax mix relies more on the neutral consumption taxes. However, further reform should be envisaged to make the system more neutral efficient and equitable (Bronchi and Gomes-Santos, 2001). The system has mainly criticised for a number of features, which continue to add to the complexity of the system and make tax administration difficult, creating loopholes, which hamper efficiency and equity.

In 1996 the level of aggregate taxation in Portugal was 37.1% of GDP more than five percentage points lower than the EU average (42.3%) and among the lowest in EU (only Greece, Spain, Ireland and UK had lower levels). Indirect taxes were the most important category of revenues (41% of total taxation); direct taxes accounted for only 27.4 of total taxation. Social security contributions made up 31.6% of total taxation. Revenues from VAT reached 53.3% of total indirect taxation while excise duties brought in 27% of GDP to 8.1% to GDP. The Portuguese direct tax/GDP ratio (10.2% in 1996) was one of the lowest in EU. The most important direct tax is personal income tax. In addition over the period 1980-1983 the overall level of taxation as % of GDP increased by more than 9 percentage points from 25.5% to 34.7% (OECD, 2000). The strongest increase can be observed in the early 1980s and in the early 1990s. Finally Portugal, as Greece and Spain, applies indirect cascade taxes on financial services. These are mainly a stamp duty on banking operations, a tax on credit and capital transactions as well as a premium tax on insurance contracts.

Appendix 2b: Equations of computation of elasticities (Consumption, total and indirect financial taxes) for Greece, Spain and Portugal . Estimation Period 1965-1998.

Greece

- ***Consumption taxes***

$\Delta ct=7.6+0.07\Delta NI$
(15.2) (0.01)
$R^2=0.64$, $SER=64.71$, $DW=2.1$

$\Delta lnct=0.21+1.19\Delta lnNI$
(0.05) (0.16)
$R^2=0.57$, $SER=0.15$, $DW=1.8$

- ***Total Tax Revenues***

$\Delta Tr=39.45+0.69\Delta NI$
(121.5) (0.16)
$R^2=0.39$, $SER=500.8$, $DW=1.5$

$\Delta lnTr=0.93+0.46\Delta lnNI$
(0.03) (0.2)
$R^2=0.14$, $SER=0.08$, $DW=1.3$

- ***Total consumption*** *(adjusted for heteroscedasticity)*

$\Delta c=30.56+0.91\Delta NI$
(15.78) (0.03))
$R^2=0.90$, $SER=175.85$, $DW=2.1$

$\Delta lnc=0.062+0.65\Delta lnNI$
(0.02) (0.13)
$R^2=0.69$, $SER=0.03$, $DW=1.47$

- ***Financial taxes***

$\Delta ft=1.5+0.01\Delta NI$
(1.69) (0.003)
$R^2=0.64$, $SER=6.88$, $DW=1.74$

$\Delta lnft=0.05+0.96\Delta lnNI$
(0.09) (0.23)
$R^2=0.32$, $SER=0.23$, $DW=1.8$

Spain

- ***Consumption taxes***

$\Delta ct=-49.06+0.91\Delta NI$
(40.11) (0.01)
$R^2=0.53$, $SER=130.65$, $DW=2.1$

$\Delta lnct=0.27+0.90\Delta lnNI$
(0.04) (0.32)
$R^2=0.20$, $SER=0.09$, $DW=1.95$

- ***Total Tax Revenues***

$\Delta Tr=-292.31+0.55\Delta NI$
(250.7) (0.09)
$R^2=0.51$, $SER=816.6$, $DW=2.1$

$\Delta lnTr=0.06+1.12\Delta lnNI$
(0.07) (0.19)
$R^2=0.47$ $SER=0.15$, $DW=2.2$

- ***Total consumption*** *(adjusted for heteroscedasticity)*

$\Delta c=103.7+0.84\Delta NI$
(82.34) (0.05)
$R^2=0.9$, $SER=336.69$, $DW=1.4$

$\Delta lnc=0.01+0.85\Delta lnNI$
(0.01) (0.13)
$R^2=0.76$, $SER=0.02$, $DW=1.5$

- ***Financial taxes***

$\Delta ft=-2.7+0.007\Delta NI$
(9.1) (0.003)
$R^2=0.13$, $SER=29.6$, $DW=1.53$

$\Delta lnft=-0.95+2.23\Delta lnNI$
(0.08) (0.64)
$R^2=0.27$, $SER=0.18$, $DW=2$

Portugal

- ***Consumption taxes***

$\Delta ct=-8.1+0.1\Delta NI$
(4.58) (0.01) (adjusted for heteroscedasticity)
$R^2=0.62$, SER=42.34, DW=2.4

$\Delta lnct=0.14+1.36\Delta lnNI$
(0.11) (0.3)
$R^2=0.37$, SER=0.2, DW=1.4

- ***Total Tax Revenues***

$\Delta Tr=-15.92+0.42\Delta NI$
(11.63) (0.03) (adjusted for heteroscedasticity)
$R^2=0.86$, SER=202, DW=2.4

$\Delta lnTr=0.05+0.77\Delta lnNI$
(0.02) (0.12)
$R^2=0.53$ SER=0.05, DW=1.8

- ***Total consumption***

$\Delta c=6.01+0.94\Delta NI$
(22.4) (0.03)
$R^2=0.84$, SER=89.05, DW=1.9

$\Delta lnc=0.03+0.81\Delta lnNI$
(0.01) (0.09)
$R^2=0.71$, SER=0.03, DW=1.8

- ***Financial taxes***

$\Delta ft=0.77+0.004\Delta NI$
(2.69) (0.002)
$R^2=0.30$, SER=10.71, DW=1.3

$\Delta lnft=-0.04+1.34\Delta lnNI$
(0.068) (0.41)
$R^2=0.25$, SER=0.17, DW=1.66

Appendix 2c: VAT rates applied in Greece, Spain and Portugal

- *List and evolution of VAT rates applied in Greece, Spain and Portugal*

Member States and Dates	Reduced rate	Standard rate	Increased rate
Greece			
1/01/1987	3/6	18	36
1/01/1988	3/6	16	36
28/04/1990	4/8	18	36
8/08/1992	4/8	18	-
Spain			
1/01/1986	6	12	33
1/01/1992	6	13	28
1/08/1992	6	15	28
1/01/1993	3/6	15	-
1/01/1995	4/7	16	-
Portugal			
1/01/1986	8	16	30
1/02/1988	8	17	30
24/03/1992	5	16	30
1/01/1995	5	17	-
1/07/1996	5/12	17	-

Data source: European Commission (DOC/2206/2000-EN)

- *Geographical features of the application of VAT in Greece, Spain and Portugal*

Greece

For the departments of Lesbos, Chios, Samos, the Dodecanese and the Cyclades, and on the Aegean islands of Thasssos, the Northern Sporades, Samothrace and Skiros, the rates of 4%,8% and 18% have been reduced by 30% to 3%, 6% and 13% respectively. These rates apply to imports, intra-Community acquisitions, and supplies of goods and services effected on these islands and supplies of goods from other areas of Greece to persons established on these islands. The preferential system does not, however, apply to tabacco products and means of transport. Mount Athos is excluded from the scope of VAT.

Spain

For VAT purposes, the country does not include the Canary islands, Ceuta and Melilla.

Portugal

A special reduced rate of 4% is applied in the Azores and Madeira.

Appendix 3: Design of a flat rate scheme of taxing financial services.

1. Introduction

All the alternative methods of taxing financial services are developed from a purely economic concept of what constitutes value added in financial services. It is worth noting here that as we have discussed in the chapter 2 on the structure of VAT (i.e. the methods developed for the VAT calculation), the aim of VAT from a purely economic concept is not to tax value added but to tax the final consumption (which is the goal of the applied credit-invoice method in VAT system). The different methods proposed for taxing financial services under the European VAT system could more or less satisfy this goal. No matter how valuable and enlightening the adopted method from the economic perspective, a special regime of taxation of financial services will take place within an already difficult and as we have seen not fully harmonised existing legal context. In this appendix we develop a special operation regime for taxing financial services-a common flat-rate scheme- and describe as a feasible solution, bearing in mind the empirical results emerged in our thesis, for the Greek and EU VAT system.

2. Application of the proposed methods to tax financial services.

Before starting the discussion of the design features of the proposed flat rate system it is necessary to provide here an overview of the application of the proposed methods (already mentioned in the literature review) of taxing financial services in order to explain the problems in adopting them in the Greek and EU VAT system. As we have seen in the literature review there are mainly two applicable methods of taxing financial services, namely the cash flow and the subtraction method. We would like to recall very briefly, that under the cash-flow method all cash inflows from financial transactions (whether income or capital) received by a financial institution would be treated as taxable supplies on which VAT must be remitted to tax administration by the financial institution. All cash outflows (whether income or capital) paid by a financial institution would be treated as taxed purchases in respect of which the financial institution would be entitled to a refund of VAT from tax administration. The net cash inflows or outflows with respect to a particular financial transaction represent the value-added in the transaction, which should

be subject to VAT. Therefore, the basic cash-flow method may be applied to each transaction, allowing transactions with non-residents to be zero-rated and allowing registered customers to claim refunds of paid thereon. Where the customer is registered, all cash inflows received by the customer would be treated as taxable sales on which VAT must be remitted to the tax administration by the customer. All cash outflows paid by the customer would be treated as taxed purchases in respect of which the customer would be entitled to a refund of VAT from the tax administration.

While the basic cash-flow method would result in VAT being applied to financial services in a manner that is consistent with the normal invoice-credit VAT system and would correctly allocate the VAT base between depositors and borrowers, several problems have been identified with respect to the application of the basic cash flow method to financial services (EC, 1996b). The most significant problems that would arise under the basic cash flow method are as follows:

- Changes in tax rates can create problems in the implementation of the method (change of the basic rules and the structure of the method). There are also many problems in implementing the method in a multi-rate VAT system in Greece (in Greece additional reduced VAT rates are applied in many remote islands and areas, which requires different structure of the method)
- Additional borrowing requirements and present cash-flow problems
- Due to the volume of cash inflows and outflows between financial institutions and their customers, applying VAT to all capital and income cash flows would be burdensome to both the financial institution and their customers.
- Administrative problems in calculating the VAT.

The above-mentioned problems have been addressed in a modified cash flow system the so-called TCA (Tax Calculation Account) system (EC, 1999a). This system provides a means of measuring the value of the margin services on a customer-by-customer/transaction-by-transaction basis. This system would be "truncated" in that only financial institutions would be required to compute the tax on financial services. Thus all tax computations would be based entirely on the computations performed by financial institutions which would have the necessary information. All financial services provided by financial institutions would be taxable under the TCA system. Financial institutions

would, therefore, be allowed to claim full refund of VAT paid on all taxable purchases. Financial services for which explicit fees or commissions are charged would be taxed in the same manner as non-financial supplies under the normal VAT system. No special rules would be required to extend the VAT to such services. Although this method address some of the problems mentioned above there is still place for improvement in the adjustment required of the system when the tax rates change or when the method has to be applied to tax insurance services (its operational merits is still under consideration by the Commission) (EC, 1999b).

Under the approach of the subtraction method, the tax base would be determined by subtracting from the total financial revenues, the total financial expenses incurred by financial institution. Financial revenues would include interest receipts dividends on securities, gains from security transactions, while financial expenses would include interest payments and losses from securities. The total VAT base under the subtraction method would equal the VAT base determined under the basic cash-flow system. However, unlike the basic cash-flow method, the VAT base cannot be calculated on a transaction-by-transaction basis under the subtraction method. As a result refunds of input VAT which registered business customers may claim, can only be determined on a formula basis. The main attraction of the subtraction method over the basic cash-flow method is that no adjustment is required on implementation of the system or when the tax rates change. In addition the operationalisation of this method is straightforward and does not require any additional administrative tool for implementation in each Member State. The main problem with the subtraction method is that there is no precise way of identifying the value of services for export (exported financial services are not zero-rated), nor is there a precise way of allocating the financial margin to transactions with registered business customers to allow for claiming of refunds of input VAT. The approximations involved in determining these values would create inequities in tax system.

All the above methods seem to be in accordance with the general rules and goals set by the invoice credit VAT system. However, from an operational point of view further comparative research will be required in order to determine the appropriateness of each method in taxing financial services in the EU context (see also Van Brederode, 1995; EC, 1999a). Finally, another preliminary question needing further research is the impact of

taxing financial services, using the above mentioned methods, on Member States revenues.

3. Common flat rate scheme for financial institutions

Another method to tax financial services in the credit-invoice VAT system, which to our knowledge has neither been seriously discussed nor has been proposed as a method for taxation in academic literature (see Van Brederode, 1995) is the application of a special flat-rate scheme similar to the one applied to tax the agricultural sector (article 25 of the Sixth VAT Directive). From a principle of the goals that have been set and identified above (ability to be applied in an already existing VAT regime) this method is relatively simple from an operational point of view and already applied in taxing supplies of agricultural goods and services in EU Member States. In addition to study the economic effects of this method in taxing financial services on tax revenues the "National Accounts approach", already used in our thesis to study the impact on tax revenues in the case of Greece, can be easily applied in each Member State. **As known, a similar method is already applied in Member States for the calculation of the value added in agricultural sector for EU budget purposes (Sixth VAT Directive: Annex C, "Common methods of calculation").**

To begin with the general principles of the flat rate scheme for financial services, we have to note that financial institutions subject to this special regime will not have the right to deduct the VAT charged on their inputs. However, their customers will indirectly compensate the financial institutions for the VAT charged on their inputs since it will be part of their sales price. In order to avoid the problem of the cascading of the tax in the production chain, the taxable entities participating in the financial transaction will have the right to deduct the average tax charged on the inputs of the particular financial institution which supplied the specific financial service, fixed at a percentage of the sales price. For non-business customers, financial services will be taxed due to lack of the right of deduction of tax. However, the taxation in this case is effected on a lower effective tax rate. From economic point of view the deduction of an average percentage of input tax by the business customers is quite problematic taking into account the principle of economic neutrality, which characterises the invoice-credit method. The flat-rate percentages may vary among the different sub-divisions of financial institutions, sectors etc. (i.e. banking and insurance) in order to take into account the different input (including gross fixed-asset

formation); output ratios among these different financial institutions, so that the calculation of the input tax attributable to the financial institutions sales and supplies (i.e. flat rate compensation) will be more accurate. This problem as Van Brederode, (1995) argues can easily be solved if the compensation percentage will be determined by using input data for a fixed period (three or five years) for each financial institution individually, giving an accurate estimate of the relative percentage. The common flat-rate scheme will apply only on financial institutions, which carries out financial services clearly defined by the special scheme rules. In the case of mixed transactions carried out by the same institutions the common pro-rata regulations may be applied. In addition where the financial institution will carry out a non-financial transaction subject to VAT, the normal VAT regime can be applied. The financial institution in this case can be entitled to a full deduction for the input tax charged on inputs. Other issues can be solved, as we will see in the following analysis, within the existing rules of the Sixth VAT Directive. These rules shall be mentioned where necessary in the following construction of the new scheme.

Analytically the Member States may apply the following common flat rate scheme adopting the proposed design features:

- Due to difficulties in taxing the value added in financial transactions the Member States may apply to financial institutions a flat-rate scheme tending to offset the value added tax charged on purchases of financial services provided by the financial institutions pursuant to this scheme
- For the purposes of this scheme the following definitions shall apply:

➢ "financial institution": a taxable entity which carries out its activity on financial services defined below. Since only financial institutions would be taxed under this flat rate scheme, the definition of financial institution is very important for the application of this scheme. Financial institutions could be defined to include:

- banks, credit unions, and trust, loan and acceptance companies,
- credit card companies,
- investment dealers, life insurers, property and casualty insurers, and
- any other person whose principal business is the business of lending money, accepting deposits, or purchasing or selling securities

➢ "flat-rate financial institution": a financial institution subject to the flat-rate scheme provided for below,

- "financial service": any service as listed below supplied by a financial institution by means of the equipment normally available on financial institutions main premises or at any place related to financial institution (branches, ATMs etc.) in order to carry out its activity,
- "value added tax charged on inputs": the amount of the total value added tax attaching to the goods and services purchased by all financial institutions of each Member State subject to the flat-rate scheme where such tax would be deductible under article 17 of the Sixth VAT Directive by a taxable entity subject to the normal value added tax scheme,
- "flat-rate compensation percentages": the percentages fixed by Member States and applied by them in the cases specified below to enable flat-rate financial institutions to offset at a fixed rate the value added tax charged on inputs,
- "flat-rate compensation": the amount calculated by applying the flat-rate compensation percentage provided in this scheme to the annual turnover (exclusive VAT) of the flat-rate financial institutions.

- The Member States shall allow the financial institutions to fix the flat-rate compensation percentages, where necessary. The financial institutions shall notify the tax administration before applying them. These percentages shall be based on macro-economic statistics for flat-rate financial institutions alone for the preceding three years. The necessary data will be based on the input VAT incurred by the specific financial institution (these amounts have been already calculated for Greece by using aggregate data for financial sector over the period 1995-1998 in chapter 6). The compensation percentages may not be used to obtain for flat rates financial institutions refunds greater than the value-added tax charged on inputs. The percentage may be rounded up or down to the nearest half point.
- Member States, for simplification reasons, may release financial institutions from obligations imposed upon taxable persons by the article 22 of the Sixth VAT Directive,
- The flat-rate percentages provided above shall be applied to financial services' value (exclusive VAT) supplied by flat-rate financial institutions to taxable entities other than those eligible within the territory of the country for this flat-rate scheme.
- This compensation shall exclude any other form of deduction

- Member States may provide for the flat-rate compensation to be paid by the taxable entity to which the financial services are supplied. In this case the taxable entity shall be authorised, following the procedure laid down by the Member States, to deduct from the value added tax for which it is liable, the amount of the flat-rate compensation it has paid to the flat-rate financial institutions.
- Member States shall refund to the purchaser or customer the amount of the flat rate compensation he has paid to the flat rate financial institutions in respect of the following transactions:

➢ Supplies of financial services to taxable customers established within the European Union but in other Member States or to taxable customers established outside the European Union provided that the services are used by those customers for the purposes of the transactions[53] referred to in article 17 (3) (a) and (b) of the Sixth VAT Directive or that these services are deemed to be supplied within the territory of the country and on which tax is payable solely by the customers under the article 21 (1) (b) of the same Directive. Member States shall determine the method by which the refunds are to be made. In particular, they may apply: a) the detailed rules laid down in Directive 79/1072/EEC, for refunds made to taxable entities (or persons) which are not established within the territory of the country but they are established in another Member State and b) the detailed rules laid down by the Directive 86/560/EEC, for refunds made to taxable entities (or persons) which are not established within the territory of the EU.

- Member States shall make all the necessary provisions to check properly the payment of the flat rate compensation to the flat rate financial institutions
- Member States shall not provide for the years of the application of the flat rate scheme the financial institutions with the right to opt to the normal VAT regime to ensure the same method of taxation of financial services throughout the European Union,
- The Commission shall, before the end of the fifth year following the entry into force of this flat rate scheme, present to the Council final proposal concerning the application of the normal VAT scheme to transactions in respect of financial services carried out by financial institutions.

[53] These are transactions, which would be deductible if they had been performed within the territory of the country.

- Member States shall take all the necessary measures to ensure the uniform basis of assessment of the VAT in this flat rate scheme in order to apply the scheme of the own resources[54] using the common method of calculation. For the purposes of calculating the value added in the own resources scheme shall be taken into account, exclusive the VAT, the following:

- The value added of the total final output of financial institutions including financial institutions' own consumption of financial services
- the value of total inputs required to achieve the production of the supplied financial services
- the value of the gross-fixed capital formation in connection with financial transactions listed below
- the value added for flat rate financial institutions which, will be included in the calculations for the Member State's own resources statement, is equal to the difference between the value of total final output of financial institutions, exclusive of value added tax, and the total value of inputs together with gross fixed capital formation.

4. Definition and list of financial services

For the application of this flat rate scheme the definition of a financial service is very important. The absence so far of any proper definition of what constitutes a financial service in tax literature could be solved by following in general, the principles and classification provided in the GATS Annex on financial services: "Definition of financial services". Therefore, for the application of this scheme, a financial service may be considered to be any service of financial nature offered by a financial institution of a Member State. Financial services include all insurance and insurance related services, and all banking and other financial services (excluding insurance). Financial services, for the application of this flat rate scheme, may include the following activities:

- Banking and other financial services (excluding insurance)

- Acceptance of deposits and other repayable funds from a taxable or non-taxable person (account operations and counter operations, including ATMs)

[54] Following the rules of this scheme the Member States assess the amounts payable to EU for budget purposes.

- Lending of all types, including consumer credit, factoring and financing of financial transaction
- Mortgages
- Money transfer
- Securities
- Travel and overseas services including foreign exchange
- All payment and money transmission services, including credit, documentary credit charge and debit cards, and banker drafts
- Financial leasing (equipment and contract hire)
- Financial guarantees
- Trading for own account or for account of customers, whether on an exchange, in an over-the-counter market or otherwise, the following:
  - Financial instruments (including cheques, bills, certificates of deposits)
  - Derivative products including, but not limited to, futures, options, and exchange rate and interest rate instruments such as caps, swaps, forward rate agreements, sale and repurchase agreements, back to back/washable loans/parallel loans, deep discount and deep gain securities, zero-coupon bonds etc.
  - Other negotiable instruments and financial assets, excluding bullion
- Participation in issues of all kinds of securities, including underwriting and placement as agent (whether publicly or privately) and provision of services related to such issues
- Money broking
- Asset management, such as cash portfolio management, pension fund management, custodial, depository and trust services
- Settlement and clearing services for financial assets, including securities, derivative products, and other negotiable instruments
- Advisory, intermediation and other auxiliary financial services close linked to all the activities listed above.
- Electronic banking services
- Insurance and insurance related services
- Life and non-life insurance
- Reinsurance and retrocession
- Insurance intermediation, such as brokerage and agency

- Services auxiliary (close linked) to insurance such as actuarial. consultancy, risk assessment and claim settlement services.

5. The operationalisation of the flat-rate scheme

As it appears from the following table 1a, as a method for taxing financial services the flat rate scheme can easily be adopted and to be operational in accordance with the basic principles of the existing invoice credit VAT system. The method satisfies the basic goal of an invoice credit system. It taxes only the final consumption through the deduction of the flat rate compensation by businesses (the taxable recipient of financial services). In this way the problem of the "cascade tax" in transaction chain due to the current applied VAT exemptions will be reduced. In addition, with this method, exported financial services are still exempted (zero-rated). Thus the method does not create any competitive disadvantage for the European financial institutions concerning supplies of international financial services. Of course, to ensure that the European financial institutions can operate on foreign markets on the same level as domestic competitors, it is not only necessary to untax their financial services supplied to business customers established outside the EU, but to provide to all foreign customers the right to refund of VAT whether their country of domicile grants a refund of VAT, especially when mixed services are supplied to them (e.g. financial advisory services). This implies amendment of the 86/560/EEC Directive so that the refund of VAT paid by business customers established outside the EU will be compulsory for all Member States in the above circumstances. In addition, the above designed flat rate scheme seems to hold considerable promise for Greece as a transitional alternative to the present exemption for financial services given that there is no need of additional variation of the scheme to be developed to deal with the taxation of insurance services.

Moreover the above developed tax scheme provides two alternative methods for payment of the flat-rate compensation. One version of these methods would be for the taxable customer of the flat-rate financial institution's output to calculate the flat-rate compensation, on the invoice/receipt, attributable to the price/value[55] and paid to the financial institution together with the price. One copy of this document should be returned

[55] Depending on the nature of financial service and on the existence of an explicit charge on invoice, for the good or service.

to the financial institution, and the other should be retained by the taxable customer in order to support the claim for the flat-rate compensation deduction from the output liability of the relevant tax period. Another method would be for the tax authorities to pay the financial institution the flat-rate compensation calculated either by them or by the financial institution on the basis of their sales or supplies of services, at the end of the relevant tax period. The first method is more open to abuse than the second one, since it would be in the interest of either the financial institution or the taxable customer (or both), for the latter to inflate the flat-rate compensation in collusion with the financial institution, while the second method relieves the taxable customer from having to finance the flat-rate compensation. With either method, the flat-rate financial institutions must be brought within tax administration control in order to enable the tax administration to cross-check samples of flat-rate compensation receipts or documents with those of taxable customers, and thus discourage abuse. However, as flat-rate scheme financial institutions will be within the tax administration's control system without contributing to the revenues, with the second method, this will inevitably raise the compliance cost. On the other hand, the flat-rate percentages cannot be correct for all financial institutions and at best may succeed in only rough approximation. More important, this method does not remove the disincentive to the financial institution to invest (e.g. on machinery). These purchases are taxed, and the amount of flat-rate compensation given does not vary with the individual financial institution's decision for the investment. Conclusively for Greece the first method seems more appropriate given the high amounts of inputs of financial institutions as we show in the chapter where we examined the impact of taxing financial services in Greece under the VAT system.

Typically, under the flat-rate scheme, it is implied that the financial institution does not pass on the VAT paid on its purchases to the taxable customer (in the form of hidden tax- "cascade effect"). This may be true where the flat-rate compensation is, to a certain extent, satisfactory in paying back to financial institution the input tax, or competitive conditions do not give to financial institution such an opportunity; otherwise the financial institution will have an incentive to pass some of financial institution's input tax to the taxable customers, which will lead the financial institution to inflate the flat-rate compensation as well. In this context, it should be noted that the flat-rate scheme encourages efficiency, in the sense that the less inputs a financial institution uses for a certain amount of output, the

more likely it is for the flat-rate compensation to offset or even exceed the input tax incurred.

We would like to clarify here that the flat-rate scheme of taxing financial institutions does not provide the financial institutions with the right to opt for the normal VAT scheme or exemptions under any voluntary registration provision. This option would not be justifiable. The reason is that this would create discrimination, as some of these financial institutions might supply some of their financial services and instruments to the non-taxable customers, or exempt businesses; being outside the flat-rate or normal VAT rate scheme, they will charge services increased by irrecoverable input tax, whereas similar financial services supplied by other financial institutions under the normal VAT scheme would be subject to the normal VAT rate on the full value or selling price.

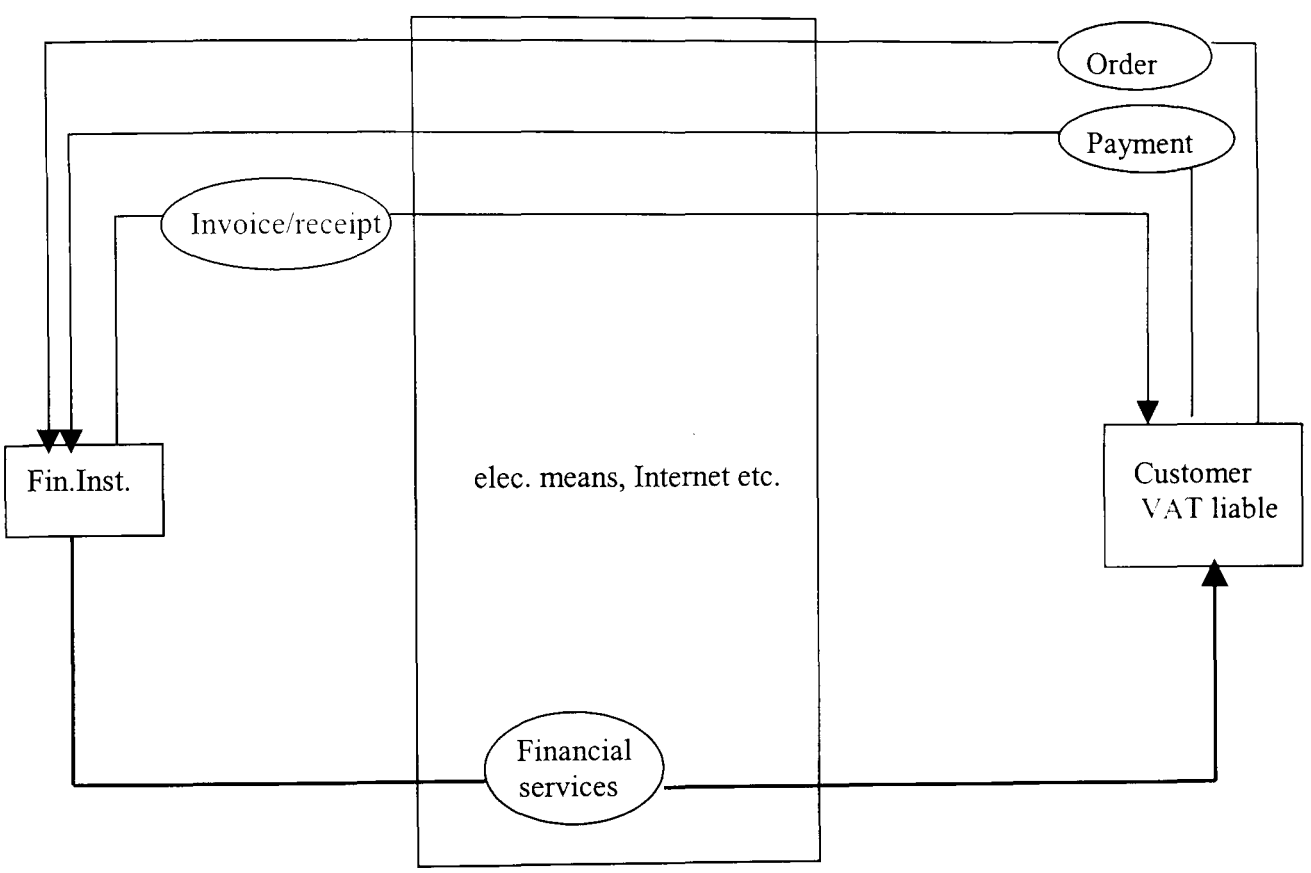
Table 1a: Comparison of flat rate system to invoice credit system.		
	Normal VAT system	***Flat rate Scheme***
Taxable person	Any supplier of taxable goods and services must collect and remit the tax.	Only financial institutions would calculate and remit tax.
Tax base	Explicit price charged for goods and services.	Financial service's value (excluding VAT) including flat-rate compensation, and financial institutions' own consumption of financial services.
Scope of tax	Transactions with non-residents are zero-rated. Transactions between domestic financial institutions are taxable unless specifically exempted. Transactions with shareholders, owners and affiliated persons are taxable unless VAT grouping allowed, and customer is a member of VAT group. Tax on supplies made to non-registered persons resident in EU remitted to Member State in which business establishment of financial institution making supply is located. No tax collected by supplier of goods and services to registered customer resident in another Member State. Where registered customer is not eligible for full refund of input tax, tax on imported supplies remitted by customer to Member State in which customer is resident through reverse charge. Transactions with other domestic registered customers are taxable and customer is entitled to refund of tax paid.	Transactions with non-residents are zero-rated. Transactions with other domestic financial institutions are taxable. Transactions with taxable customers are taxable and customer is entitled to refund of tax paid (flat-rate compensation). Where customer is not entitled to full refund of input VAT, the customer for simplification reasons, could be required to remit tax through reverse charge mechanism (based on calculation of the compensation percentages provided by financial institution).
Collection of tax	Tax remitted to government equals tax due from customer.	Financial institution applies the compensation percentages to financial service's value (exclusive VAT).
Refund of input VAT	Customer entitled to full refund of input taxes on supplies consumed in course of making taxable supplies.	Financial institutions can offset at a fixed rate (flat-rate compensation) the VAT charged on inputs.

Furthermore, in the case where some categories of financial services could be performed on-line by electronic means, the method can use the so-called reverse charge mechanism[56].

[56] This mechanism provided for in article 9(2)(e) of the Sixth VAT Directive, stipulates that financial services are taxed in the Member State where the customer has established his business to which the services are supplied. The mechanism does not apply when the financial supplier and the customer are established in the same Member State.

This means that these services should be allocated to the country (Member State) of the recipient, where VAT is due and deductible through the same rules mentioned above in the design and application of the flat rate scheme (see also figure 1a-1b).

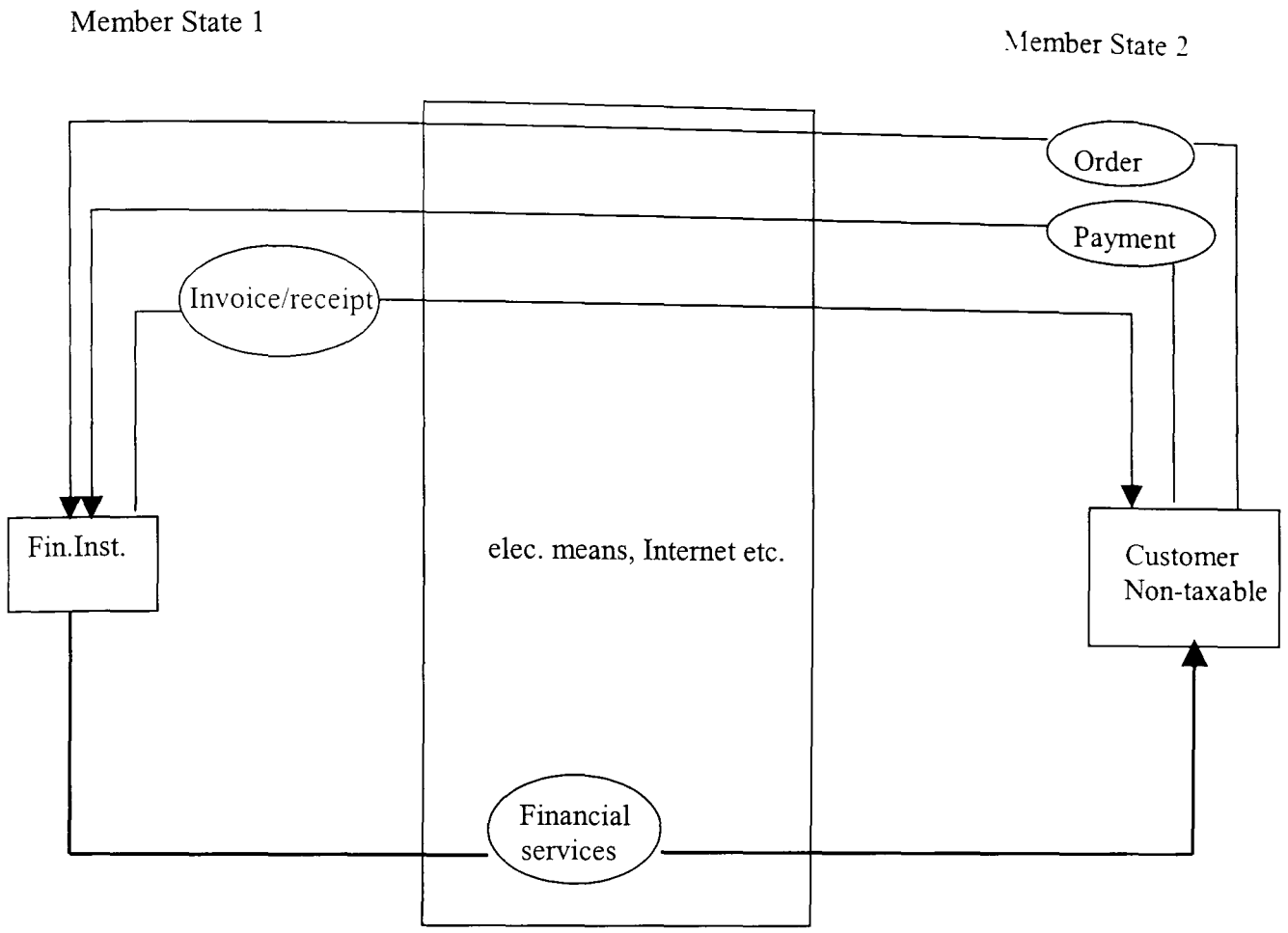
Figure 1a: On-line supplies of financial services by a flat rate scheme financial institution to a VAT liable customer (taxable entity).



*In most cases VAT is paid and is deductible in Member State 2, through the reverse charge mechanism [article 9(2)(e) of the Sixth VAT Directive].

As we can see from the above figure in the case where financial services are performed on-line through electronic means, these services should be allocated to the country of the customer where VAT is due and deductible through the reverse charge mechanism. However, the VAT treatment should not be depending on whether the order has been made through Internet, by phone or by writing. Therefore, although in the case of off-line services the main rule is that VAT is due in the country where the supplier of services is resident or has his permanent establishment, in the case of financial services VAT shall be due in the country where the customer is established through the above mentioned reverse charge mechanism.

Figure 1b: On-line supplies of financial services by a flat rate scheme financial institution to a non-taxable person.



*No VAT charged. Application of the compensation percentages in the Member State 1. No deduction of VAT in Member State 2.

When the customer is a non-taxable person (figure 1b) the general principle that VAT should be levied in the country of destination (i.e. the Member State where final consumption takes place) cannot be applied in the flat-rate scheme. This would require having the financial institution registered in VAT system in the second Member State as well. Because of that, the basic rules of the flat-rate scheme shall be applied. No VAT will be charged to non-taxable persons and the deduction of the input tax of financial institution will occur through the compensation percentages in Member State 1.

Finally if financial institutions would become subject to VAT under this flat rate scheme it appears that the changes in revenues can easily be calculated through a common method in EU Member States following the "National Accounts approach". This method has already been used in the case of the special scheme applied to tax the agricultural sector in EU Member States.

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