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QUALITY OF TAXATION AND THE CRISIS: TAX SHIFTS FROM A GROWTH PERSPECTIVE

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Abstract: One aim of consolidation after the crisis on the taxation side is to curb growth as little as possible. Economic literature suggests that some tax systems are more conducive to growth, in particular those relying on consumption, environmental and property taxation. This paper reflects on behavioural responses of economic agents to taxation and reviews the literature on the impact of tax structures on growth. Furthermore, it analyses the tax structure in the EU-27 Member States and assess if the crises has triggered a move towards tax systems more conducive to growth.

Keywords: financial crisis, tax efficiency, optimal taxation, tax structure, tax shift

JEL classifications: H11, H21, H26, E62

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1. INTRODUCTION

The massive and unprecedented fiscal interventions and fiscal stimulus packages to fight the economic and financial crisis have left large strains on the public finances of the EU Member States. In 2009, EU wide deficit peaked at 6.8% of GDP (up from 0.8% of GDP before the crisis), staying at a similar level in 2010 (6.4% of GDP) before slightly declining. Public debt is projected to increase continuously from 59 % of GDP in 2007 to 83.3% in 2012. This surge in government deficits and debts calls on governments to devise credible fiscal exit strategies. Although there is evidence that consolidation effects on the spending side are more effective than those on the revenue side, the magnitude at stake suggests that a contribution of taxation may be inevitable.

Europe's aim is to prosper as a greener, knowledge-based economy, growing fast and sustainably, creating high levels of employment, and to shape tax systems as to achieve these goals in line with the EU 2020 strategy. In the framework of the European Semester the important role of taxation for consolidation and sustainable growth was laid down in the Annual Growth Survey in January 2011 and confirmed in the Euro Plus Pact in March 2011.² Hence, the current economic, budgetary and political situation both offers an opportunity and stresses the need for rethinking the 'quality of tax systems'.

Undoubtedly, tax policies pursue many policy objectives, which create trade-offs. Taxation serves to raise the necessary funds for public expenditure, to redistribute income (progressive income taxation), to stabilise the economy, to address externalities (environmental taxes, taxes on alcohol and tobacco), and to influence the allocation of resources. At the same time, taxes should not be distortive for economic growth. Given these various dimensions of taxation, it is evident that 'quality of taxation' is a multi-faceted concept.

The concept of 'quality of taxation' deals with the design of tax policy and tax systems to achieve desired policy objectives (redistribution, allocation, stabilisation, etc.) in the most efficient way - that is by minimising undesired distortions, promoting growth, and minimising the cost of tax collection. As economic growth is usually considered as a precondition for the general improvement of living conditions, the focus of the discussion on the quality of taxation in this paper is on the effects on GDP and on long-term and sustainable growth. For any given level of taxation various economic outcomes can be obtained depending on the way a tax system is designed in terms of tax structure, the individual tax design and the interaction between the different tax instruments.

² European Commission (2011a) and Heads of state of the Euro area (2011)

The remainder of the paper is organised as follows. Chapter 2 gives a short theoretical overview of how taxation can affect the level of GDP and GDP growth. It examines how the structure of taxation by main types of taxes can be made more growth-friendly. Chapter 3 then sets the theoretical arguments into perspective by reviewing recent empirical findings of simulation and estimation techniques. As the reviewed literature stresses the importance of the structure of taxation for growth, chapter 4 analyses the tax structure in EU Member States and the observed shifts in the tax structure in the recent past. It extends earlier work on tax shifts by the OECD in three ways: The focus on the EU allows interesting insights into EU similarities/differences, and convergences or divergences. The focus on tax categories according to economic function allows for an analysis of the tax burden on consumption, labour and capital in a comparable framework, irrespective of their purely statistical classification.³ Furthermore, as environmental issues are high on both the EU and OECD agenda and environmental taxes are considered to remedy market failure, a special focus is put on environmental tax shifts. Chapter 5 assesses whether increasingly shifts towards growth-friendly systems have been observed since the beginning of the crisis. Section 6 concludes. It should be noted that this paper refrains from the assessment of the impact of tax systems on redistribution or poverty. While important issues, they go beyond the scope of this paper.

2. TAXATION AND GROWTH: OVERVIEW OF THE MAIN THEORETICAL ARGUMENTS

Economic theory links taxation to growth through its influence on the decisions of economic agents. Stiglitz (1999) distinguishes non-distortionary taxation, where individuals cannot alter their tax liabilities, from distortionary taxation, where individuals take action in order to reduce tax liabilities. Hence, taxation – at least theoretically - changes economic decisions and can thereby affect economic growth. Considering a simple production function (equation 1) it is obvious that taxation can affect GDP and economic growth through its impact on i) physical capital ii) human capital and iii) through its effect on the total factor productivity (TFP).

Equation 1: $Y = F(K, L, A)$

where K denotes physical capital, L denotes labour and A represents the state of technology, i.e. the total factor productivity. As explained in more detail further on, a tax on labour might impact on labour market and educational decisions (L) as it makes work less profitable. Taxation of capital reduces incentives to save and invest, i.e. the accumulation of physical capital (K), and taxation of research and development might curb technological developments, by making these activities less profitable (A). While in

³ European Commission (2011b) provides taxation on economic function according to a common methodology for the tax categories consumption, labour and capital

exogenous growth models taxation can affect the steady state level of income per capita and its short-term growth rate on the transitional path, in endogenous growth models taxation can actually alter the long-run growth rate.⁴

The following paragraphs try to give some indications on how taxation might influence growth relevant decisions. The focus of the analysis is on tax categories namely on the categories labour, capital, consumption, property and environment. The overall impact on employment, GDP and growth is, however, also crucially determined by the composition and the quality of public expenditure, the exact design of individual taxes, and the interaction of taxation across jurisdiction borders which will be touched upon in sections 2.6 and 2.7.

2.1. Taxes on labour

Taxes on labour (i.e. personal income taxes, payroll taxes and social security contributions) can affect decisions in three major ways by altering: i) the allocation of time between labour and leisure ii) human capital accumulation iii) occupational and entrepreneurial behaviour and choices.⁵ In particular, labour taxes can affect labour supply decisions, both concerning the decision to participate in the labour market (extensive margin) and the amount of hours worked (intensive margin). However, the exact effect of taxation on labour supply can theoretically not be determined as the substitution effect and the income effect work in opposite directions. While the substitution effect would make people work less, "substituting work for leisure", the income effect leads individuals to work more in order to maintain the same income.⁶ Economic theory also indicates that the exact impact of labour taxes on the labour market depends on the labour demand elasticity, the degree of centralisation of the wage bargaining and the distribution of incomes among different income levels.⁷

Additionally, labour taxes, in particular progressive taxes, may affect the decision to undergo additional education and training (human capital formation), because they change future returns to education and training. As discussed in Woehlbier (2002), progressive taxation reduces the return to human capital formation - which takes the form

⁴ Myles (2009a) reviews different production functions – which are also referred to as growth accounting models - and effects of taxation on GDP and economic growth.

⁵ This classification is suggested based on Meghir and Phillips (2010), Myles (2009c) and Bocconi University (2011).

⁶ Empirics has shown that men's labour supply decision is quite inelastic to tax changes, while women and low income earners are more responsive (see Bocconi University (2011) for a review of empirical literature).

⁷ For details on these aspects see Meghir and Phillips (2010) or Bocconi University (2011)

of higher future income - by a larger amount than it reduces the costs. These costs consist to a large extent of foregone earnings but also of other, partly not tax deductible expenses for education and training. Hence, the net present value of the investment in education and training is reduced.

Johansson et al (2008) point out that, to the extent that labour taxes affect the relative price of capital and labour, this could lead to a reallocation of inputs, possibly lowering the efficiency in the use of production inputs.⁸ This implies that the exact incentive/disincentive effects of labour taxation depend also on the tax treatment of alternative investment forms.

As reviewed in Myles (2009c) income taxes (both corporate income taxes and personal income tax) can influence the choice to engage in entrepreneurial activity, due to changes in the risk-return profile related to it. On one hand, taxes reduce the income of successful entrepreneurs, which might deter risk-averse individuals from entrepreneurial activity. On the other hand, if losses are deductible on other income, the risk of entrepreneurship is shared with the state. However, if the income tax system is progressive, or if there are limits to loss offset, losses can only be offset at lower rates than profits are taxed. As such non-linearities lower the expected after-tax return from taking risk, they might discourage entrepreneurship.⁹ As the risk-return profile is changed by income taxation – even more in the case of progressive taxation – this affects the choice between employment and entrepreneurial activity and the risk taken in entrepreneurial activity. As the return on (risky) innovation is changed, this might reduce the investment in R&D as well as human capital formation, impacting on long-term growth.

Moreover, varying scope for tax evasion/avoidance across occupations might alter occupational choices. Bocconi University (2011) stresses that high marginal income taxes can not only bias the compensation packages towards less taxed items but may also distort occupational choices towards those, where tax avoidance is easier. Hence, taxes on labour not only affect short-term decision making, but also life-cycle decisions.

2.2. Taxes on capital

Taxes on capital - such as business profits, capital gains, dividends and interests - can influence the rate of capital accumulation. By changing the return on capital, they might discourage saving and investment by economic agents (firms or individuals); hence

⁸ According to the production efficiency theorem by Diamond and Mirrlees "Whatever the government could do with a distortionary tax on producers, it could do better with a direct tax on consumers that maintained the economy on the production possibilities schedule." cited after Stiglitz (1999, p. 569)

⁹ De Mooij and Nicodème (2007)

capital taxes alter the intertemporal allocation of resources. Lower levels of investment eventually lower the capital stock which in turn impacts on growth. Thus, due to the intertemporal structure capital taxation accumulates the distortions over time.

In the light of these distortions¹⁰ several authors (e.g. Judd (1985), Chamely (1986) and Jones et al (1997)) state that the capital income taxes should be zero in the long run for an exogenous level of public expenditure – also in a closed economy. Considering a small open economy and assuming perfect capital mobility the finding that the optimal tax rate on capital is zero even dates back to the 1950s (Samuelson (1954) and Tiebout (1956)). This finding was reinforced by Gordon (1986) and Razin and Sadka (1991), specifying that "*in the absence of location-specific rents a small open economy should not levy any source-based taxes on capital.*"¹¹ They argue that due to the outflow of capital and hence the lower capital intensity of production, productivity in the less mobile factors will also fall. This drop in productivity could be avoided by taxing immobile factors directly instead of taxing capital, which then affects the other input factors.

As outlined by Sørensen (2007) later models, introducing uncertainty in labour markets, or models allowing for complementarities between leisure and future consumption indicate, however, that a positive capital income tax would be optimal.

The fact that despite growing capital mobility capital income taxes, and in particular source-based capital income taxes, still exist in the real world has given rise to further explanations¹² for the existence of source-based capital income taxes:

i) *The existence of location-specific rents:* While capital taxes on normal returns introduce distortions, capital taxes on rents will not induce capital flight, as long as these location-specific rents from e.g. agglomeration are not wiped out.

ii) *Imperfect capital mobility:* Capital is less mobile than suggested by the literature due to the cost associated with adjusting the capital and a certain home-bias in investor's portfolios.

iii) *Reducing distortions of personal income taxes:* The existence of personal income taxes might induce a bias towards investment in financial capital by discouraging human capital investment. In addition they might induce entrepreneurs to shift labour income to

¹⁰ The distortions become infinitely large in the underlying standard Ramsey infinite horizon model.

¹¹ Cited after Sørensen (2007) p.177

¹² See e.g. De Mooij and Ederveen (2005), Nicodème (2008) and Sørensen (2007) for more details on the main justifications.

capital income to avoid taxes. Thus capital taxes work as a backstop to personal income taxes and alleviate distortions on human capital formation.

iv) *The benefit principle*: The benefit principle argues that to the extent that companies consume public goods, they should pay for it. As there is no direct link between these services and the corporate taxation, other forms of payment might however better correspond to the benefit principle.

In a world of increased international capital mobility, and in particular in an integrated market such as the European Union, source-based corporate income taxes may impact on growth on different levels. Leaving aside other factors, such as country's regulatory framework with respect to the tax base or administration, the corporate tax system can affect (i) where firms choose to locate their investment, (ii) how much they invest, and (iii) where they choose to locate their profits. Research predicts that the average effective tax rate in different countries might influence the first decision, the marginal effective tax rate the second, and the statutory tax rate the third.¹³

The tax treatment of capital gains as well as other returns to capital such as interests and dividends can distort companies' financing decisions. Most of the EU corporate tax systems are characterised by the deductibility of interest payments, while dividend payments do not reduce the tax base. Due to this tax discrimination companies might favour debt financing over equity financing for their investments (De Mooij and Ederveen (2005)). This not only favours companies with access to debt financing – usually older and less innovative firms –, but also leads to high leverage ratios. High leverage ratios make companies more vulnerable to financial market fluctuations, which together with reduced innovation activities might ultimately impact on growth.

Moreover, capital gains taxes which are levied upon realization can also hinder efficient reallocation of capital. Economic agents might be locked-in in existing corporations with possibly inefficient investments trying to avoid capital gains taxes levied on realisation. Thus, by limiting the access to finance, the entrance of new, potentially more productive firms is curbed.

2.3. Consumption Taxes

Consumption taxes – mainly value added tax (VAT) and excise duties - are often regarded as less distortionary than income taxes, as they do not distort intertemporal decisions the way income taxes do. Consumption taxes fall partly on accumulated assets,

¹³ See Nicodeme (2008) for further details.

which are an inelastic tax base. Moreover, consumption taxes do not impact on the returns to saving and, usually, do not have a progressive tax structure¹⁴.

As stated by Atkinson and Stiglitz (1980)¹⁵ and recently stressed by Crawford et al (2009), in terms of their impact on individuals' budget constraints and hence on their behaviour there should be no difference between a uniform tax on consumption and a uniform tax on wage, and (cash-flow) profit income. Hence, a wage (plus inheritance) tax and a consumption (plus bequest) tax are equivalent. Therefore, Crawford et al (2009) conclude that a shift from wage to consumption taxation has no impact on labour supply. Any positive employment and growth effects rather stem from the alleviation of distortions inherent in the labour market, or the effect on the real value of other sources and uses of funds¹⁶. Moreover, different compliance cost and administrative cost issues between labour and consumption taxes might also contribute to efficiency gains when shifting from labour to consumption taxation.

Taxes on goods and services allow for taxing different components of consumption at different rates. In a seminal 1927 contribution, Ramsey suggested a system of differentiated commodity taxation to distort consumers' behaviour as little as possible. His 'inverse elasticity rule' depends on the price elasticity of goods and services and suggests high taxes on commodities with low price elasticities. When the price elasticity is low, even large price hikes would not reduce demand significantly, i.e. goods are consumed irrespective of the price. Hence, levying a consumption tax on these goods would not alter consumers' behaviour significantly. In contrast, the consumption tax on very price elastic goods should be rather low in an efficient tax system, as they might distort behaviour.

Later research – still based on tax differentiation – favours taxing complements to leisure highest to make them unattractive as compared to work (Corlett-Hague, 1953). More recently, Kleven et al (2000), and Kleven (2004) specify that there might be a case for taxing consumption that uses little household time – or even saves time – less heavily than other leisure commodities. High taxation makes it expensive to buy these services on the market and renders it more attractive to 'do-it-yourself'. The incentive to spend time on DIY activities is highest for individuals facing high marginal tax rates, i.e. highly skilled high income individuals. Lower taxation of these substitutes for self supply, such

¹⁴ As explained by Stiglitz (1999), a more progressive tax results in a greater deadweight loss, and is hence less efficient than a proportional tax. Here, efficiency is defined with respect to revenue, as for any given effect on utility, the progressive tax yields lower revenue than a proportional tax.

¹⁵ As in Stiglitz (1999)

¹⁶ According to Crawford et al (2009) an increase in commodity taxation would decrease the real value of social benefits, and hence possibly increase labour supply.

as child care, or restaurant services, might encourage people to spend (more productive) time in the labour market instead of producing these services themselves.

Kleven (2004) also claims that, goods which are conducive to health should be taxed at lower rates. These healthy goods might save time by preventing people from falling ill, thereby reducing time off work or even lengthening their working lives, thus positively impacting on growth

While Crawford et al. (2009) confirm the theoretical point for an optimally differentiated rate structure, they question its practicability and the overall social gains that could be achieved. What usually remains from the idea of taxing different commodities differently in practice is some non-optimal form of VAT differentiation and excise taxes which are levied on specific products.

As explained above, Kleven (2004) provides a case for higher taxation of i.a. health damaging goods, which may come in the form of excise duties.¹⁷ Excise taxes are a way to correct for externalities (costs imposed on others) and even costs imposed to oneself in the case of alcohol and tobacco, which arise during production or final consumption of these products.¹⁸ Hence, in the case of excise taxes the distortionary – i.e. the corrective – effect of taxes is welcome, mostly in the area of alcoholic drinks, tobacco products as well as on environmentally harmful behaviour and products. Moreover, as explained above higher taxation of health damaging goods – which might come in the form excise taxes – might increase working time.

2.4. Environmental taxes

As mentioned above, environmental taxes (i.e. generally excise duties levied on environmentally harmful tax bases such as energy, transport and pollution/resource) aim at influencing consumers and producers via price incentives towards the desired – i.e. less environmentally harmful – behaviour. An ideal Pigouvian tax – a tax that is intended to correct the market outcome – should raise the private marginal costs at the level where it equals the social marginal cost. It takes the cost pollution imposes on others into account and thus internalises externalities. Hence, in a first best setting, a Pigouvian environmental tax would correct market distortions improving the efficiency of resource allocation.¹⁹ The revenue raised could then be used to decrease distortive taxation on e.g.

¹⁷ The way Kleuven (2004) argues provides reasoning for the existence of excise duties based on optimal tax theory – efficiency – arguments.

¹⁸ A higher VAT rate on these products would not affect producers using these goods.

¹⁹ See Kosonen and Nicodeme (2009) for a short discussion of the optimal Pigouvian tax rate in second-best settings.

labour. In the short-term, a 'double dividend' could materialise when environmental taxes are recycled to cut labour taxes, as they reduce environmentally harmful behaviour and help to decrease distortions on the labour market.

However, more recent literature²⁰ points out that, given pre-existing distortions in the tax system, an environmental tax creates distortions itself. As the tax increases the costs of production, firms' investment and production decisions might change, thereby impacting on labour demand. If the cost increase is passed on to consumer prices, the real net wage of households is lowered, which might affect labour supply. Hence, the existence of a 'double dividend' is controversial in the literature.²¹ Moreover, in the long-term, an environmental tax should erode its tax base, resulting in lower revenues and a reduced double dividend.

In contrast to regulatory instruments, environmental taxes set a price at each unit of pollution. They thus provide an ongoing incentive to reduce pollution at each unit and encourage the lowest cost abatement across polluters, as they leave the choice of abatement technology to the polluters. Thereby, environmental taxes might encourage innovation and R&D activities to develop new, less polluting technologies. This results in a more equal mix between a cleaner production process and end-of-pipe abatement measures than in the case of regulatory interventions.²² Usually, a wide tax base (in a geographical sense) induces more innovation activity as the opportunities to benefit from the innovation, for example by selling it to others, are greater.

2.5. Property Taxes

The OECD classification of property taxes comprises in this tax category recurrent taxes on immovable property (paid by both households and businesses), taxes on net wealth (paid by both households and businesses), taxes on gifts and inheritance and taxes on financial and capital transactions. As these taxes are obviously very heterogeneous in their nature, their effects on growth-relevant decision are diverse.

Depending on the bequest motive inheritance and gift taxes are found to have different impacts on economic efficiency.²³ Taxation on planned bequests introduces distortions by discouraging capital accumulation and providing disincentives and disadvantages to enterprises in case of heritage. However, if inheritances are the unplanned result of a

²⁰ As reviewed by Parry and Oates (1998)

²¹ For a summary of relevant literature see Kosonen and Nicodeme (2009).

²² Compare OECD (2010)

²³ For a review see Cremer and Pestieau (2003)

precautionary, consumption smoothing saving motive, then inheritance taxes should not change economic behaviour.

Periodic taxes on wealth are considered as '*roughly analogous to a tax on capital income on that wealth*' by Boadway et al (2009, p.776)). Accordingly, their effects on economic activity could also be considered as similar. Hence, as explained above these taxes might distort decisions to build up capital, i.e. to save and invest, which in turn impacts on long-term productivity.

Taxation of immovable property is usually considered as least distortionary, because these taxes do not affect the decisions of economic agents to supply labour and to invest in human and physical capital as directly as other taxes do.²⁴ Moreover, the immobility of the tax base is another appealing property. However, even though property might be immovable in the medium-term, property taxes might influence the initial location decision of businesses and property prices as future taxes might be priced in. Moreover, they are subject to introducing behavioural changes, when they fall on business property, affecting investment decisions and competitiveness with foreign producers. Hence, literature²⁵ suggests to use land values (value of property minus value of building) as tax base instead of property values, to avoid a disincentive – even for individuals – to add to the value of their properties.

Taxation on financial and capital transactions is reviewed in Boadway et al (2009) as discouraging asset transactions and therefore hindering the efficiency of asset markets.²⁶ Thus these taxes might distort investment decision by increasing firm's cost of capital or by discouraging share owners from share-value increasing investments.

2.6. Further Issues

The above paragraphs give an overview on how taxation might influence growth via changing agents' behaviour. These reflections, and the taxes' possible distortions, are based on tax categories, i.e. they do not take into account any – sometimes quite sizeable – distortions that result from the exact design of individual taxes. Their details should be assessed separately as to study their impact on economic behaviour and how to correct these individual distortions.²⁷

²⁴ Compare Johansson et al. (2008) or Boadway et al (2009).

²⁵ See e.g. Boadway et al (2009)

²⁶ For a theoretical and empirical analysis see also Bond et al (2004).

²⁷ A detailed analysis of this aspect – while likely having non-negligible effects – is outside the scope of the current paper.

2.6.1. Design of individual taxes

The above mentioned example of deductibility of interest payments under corporate income tax systems in many EU causes distortions due to the exact design of the corporate tax system. Furthermore, while there might be a limited and contingent argument for VAT reduced and differentiated rates in theory and practice, they are also prone to tax fraud by "unproductive" relabeling activities.²⁸ Thus they might turn out costly not only in terms of lost revenues, but also with respect to growth considerations. Hence, in general, the literature²⁹ seems to support broad tax bases and low tax rates in order to reduce deadweight and welfare losses. A cut in inefficient reductions, exceptions or exemptions – the so-called tax expenditures – which might either not be economically justified any more or display incentives not in line with their original aims could increase efficiency of many tax systems.

2.6.2. Interactions with public expenditure and within the tax system

Two other factors were not taken into account when assessing the distortions of taxation and possible effects on growth, namely the interaction with public expenditure, and the interaction between taxes. Barro (1990) shows that the provision of a public input even when financed by distortive taxation can have a beneficial effect on growth in a non-monotonic way. In his model, only above a certain threshold the distortions imposed by the tax outweigh the benefit of the public good and hence curb growth. While taxes are necessary to finance growth-enhancing public expenditure, there might be a way to finance in the least distortionary manner.

Usually, tax reforms do not only consist of changing a single tax rate, but include a combination of base and rate changes – in many cases of various taxes. Hence, the interaction between individual taxes should also be taken into account, when assessing growth impacts.

2.6.3. Tax administration and tax compliance

Besides economic criteria, quality of taxation also needs to take into account compliance and administrative costs. According to Shaw et al. (2009) modern 'optimal tax theory' has for the most part ignored any other costs than those created by distorting people's behaviour. However, one of the core problems of taxation is the information asymmetry between the tax administration and the taxpayer about his true ability to pay and the income gained. Calculating tax liabilities and ensuring that they are paid is a costly

²⁸ For a further analysis see Copenhagen Economics (2007) and Crawford et al (2009)

²⁹ Compare OECD (2010b)

activity for both taxpayers and administrations. The associated compliance costs – for taxpayers – and administrative costs – for tax administrations – arise as soon as taxes are levied. While even in a world with honest taxpayers 'natural' administrative costs will arise, these cost increase considerably when taxpayers try to reduce their tax liabilities by engaging in tax planning (tax avoidance or tax evasion).³⁰ These activities also increase any 'natural' compliance costs that exist as taxpayers have to find their way through tax laws. Tax avoidance often goes hand in hand with the complexity of tax systems. The more complex a system and the harder the tax base is to determine, the more scope there is usually for tax avoidance.³¹ Non-compliance is likely to increase tax distortions, as statutory tax rates and legal bases might have to be increased for the whole society as a result.

2.6.4. *Political economy aspects*

The arguments presented in this chapter have important implications for policy decisions. Given the above observations on the degree of distortions introduced by taxes, it seems that some taxes – at least according to theory – should be preferred to others. It seems that environmental taxes, property taxes on immovable property and consumption taxes introduce fewer distortions than income taxation.

In policy terms, hence a shift in the tax structure to a less distortive system might be supportive to growth. However, enacting tax shifts might be difficult from a political point of view. Literature³² has indeed identified a status quo bias, which basically states that voters oppose change. Given this preference, the rationale for a reform has to be communicated efficiently and be understood by the electorates as necessary or welfare-improving and fair, to improve its likelihood of success

The timing of a tax reform has to be chosen properly not only with respect to the initial public finance conditions but also with respect to the time-span (or speed) of its implementation. An abrupt tax reform may limit the room for negotiations and hinder economic agents' reactions in the short-term such as e.g. preventing the bringing forward of consumption in case of a VAT increase. A gradual reform allows splitting the reform in different chunks, such that only one group at a time is affected, which could lead to the acceptance of the reform of the majority.³³ Moreover, a long-term perspective with early announcements of tax reforms offers a stable and predictable economic environment,

³⁰ Compare Stiglitz (1999) or Slemrod and Yitzhaki (2002)

³¹ Shaw et al (2009)

³² For a survey see Castanheira et al (2011).

³³ Compare Castanheira et al (2011)

which allows households and businesses to take optimal long-term decisions such as investment in human and physical capital.

2.7. EU dimension

2.7.1. Tax competition

The effects taxes might have on growth do not stop at national boundaries. Given the high integration of the EU single market, and the high mobility of certain factors, tax competition and tax evasion considerations might influence policy makers' decisions.

Assuming benevolent governments, tax competition literature³⁴ predicts that, without coordination, governments apply tax rates on mobile factors that are inefficiently low. Governments mutually undercut each others' tax rates on mobile tax bases in order to avoid an outflow of taxable income or attract mobile bases. Due to low tax revenues, governments cannot provide the socially optimal level of public goods, or they tax immobile factors such as labour at rates above socially optimum levels to sustain overall tax revenues and the provision of public goods.³⁵

Riedl and Rocha-Akis (2009) investigate the reaction of the domestic tax base to changes in the (domestic and foreign) tax rate. They show that in the long run a 1% reduction in the effective average domestic CIT rate leads to a less-than-proportional increase in the level of domestically reported corporate taxable profits, resulting in actually less tax revenues. Hence, to keep up revenues, countries might see themselves forced to increase taxes on less mobile factors to inefficiently high levels to keep the same level of public service provision. Huizinga et al (2008) state that tax bases are affected by tax rates (the weighted average of national tax rates and differences between national and foreign tax rates) via debt-shifting. They find that international debt shifting serves to lower average levels of corporate income taxation in high-tax countries, which might introduce some dead-weight loss.

Given their results, Huizinga et al (2008) and Riedl and Rocha-Akis (2009) both conclude that their results point towards possible gains from international tax cooperation/coordination. According to Riedl and Rocha-Akis a simultaneous rise in CIT rates across countries would result, on average, in a less-than-proportional decrease in the CIT base and, therefore, higher CIT revenue.

³⁴ This strand of the literature is based on the seminal models by Zodrow and Mieszkowski (1986) and Wilson (1986). Tax competition literature assuming Leviathan governments concludes that tax competition improves welfare by limiting the size of an otherwise excessive state (see Edwards and Keen (1996); also for a synthesis of these two views)

³⁵ Bucovetsky and Wilson (1991)

In the field of energy taxation, coordination might not only avoid tax competition, but allow for greater social returns. As mentioned above, environmental taxation might encourage innovation; the greater the opportunity to benefit from this innovation, the greater the level of innovation. The possibility to profit from this tax induced innovation can be increased by widening the tax base, which could be done by reaching over country barriers.

Environmental taxation imposed on companies might however also induce pollution intensive companies to (re)locate to countries with the lowest environmental taxation. This as well as the government's attempt to maintain the company's competitiveness with respect to foreign (less taxed) competitors might result in environmental taxation below the social optimum. EU wide and international coordination hence could help to build similar environmental standards across countries.

On consumption taxation, in particular on VAT, Crawford et al (2009) see welfare gains in tax/administrative coordination. The current EU-VAT system, which is characterised by the zero rating of exports and the system of 'deferred payment' for VAT on imports from other EU Member States, opens the room for tax fraud by so called carousel trading. Improved administrative cooperation could serve as a (non-structural) remedy to these shortcomings in the EU VAT system.

2.7.2. *Tax exporting*

While the above mentioned cases represent different forms of harmful tax competition, another aspect that deserves attention in an EU dimension is the possibility of tax exporting. Tax exporting refers to the shifting of tax burdens from domestic residents to non-residents of the taxing jurisdiction. Tax exporting is more significant the larger the share of non-resident producers/consumers is relative to the market size. The standard example given by Oates (1972), are taxes on restaurants and hotels in tourist areas, which are mostly paid by non-residents. Huizinga and Nielsen (1997) show that policymakers also have an incentive to increase capital taxes (such as corporate income taxation) if part of the tax incidence is on foreigners. This might lower tax rates imposed on residents in other areas since public services are partly financed by non-residents or alternatively an increased provision of public goods. Tax exporting indicates that as governments do not take into account the overall social costs (imposed on residents and non-residents), but only those on residents, the tax rate might be set above the social optimum. However, the overall welfare effects of tax exportation are hard to determine, as they might counteract welfare decreasing tax competition or tax evasion.³⁶

³⁶See Huizinga and Nicodeme (2006) for an empirical evaluation.

Given the high interdependence of Member States' tax systems in the EU single market, cooperation at EU level could prove beneficial. As indicated above cross-border spill-over effects induced by tax competition or tax exporting may constrain the taxing capacity of an individual Member State and introduce additional distortions. Moreover, tax cooperation can also benefit the implementation of national tax policy strategies, for instance when it leads to the exchange of best practices or the elimination of mismatches between national systems.

3. TAXATION AND GROWTH: OVERVIEW OF EMPIRICAL FINDINGS

While presenting theoretical behavioural effects of taxes, the analysis in chapter 2 did not give any quantification of the effect of changes in the tax system on GDP and GDP growth. Hence, this chapter provides a summary of the evaluation of changes in the tax system based on simulations as well as on econometric estimations.

As demonstrated above, according to economic theory, taxation – only with the exception of lump sum taxes – creates distortions and in turn may impact negatively on economic growth. Hence, looking for an optimal tax system or assessing the quality of a tax system, two basic questions arise. The first is on the optimal level of tax revenues, while the second question is how a given level of tax revenues can be raised optimally. At the current juncture of additional consolidation needs, these considerations could translate into the question on how to increase a tax system's capacities to raise revenues, promote growth and employment, while sustaining redistributive and allocative functions.

Particularly the first question has been the focus of a large number of studies.³⁷ The results of these studies, however, are rather inconclusive with respect to providing evidence that a high total level of taxation impacts negatively on economic growth. Given that the level of taxation also presents political choices for private or public provision of public services, this paper will not go in detail on levels of taxation. Rather, it deals with the issue of how a tax system can be designed to be supportive to growth and employment given a certain level of tax revenues. As economic growth is usually considered as a precondition for the general improvement of living conditions, the focus of the discussion is on the effects of changes in the tax structure on GDP and long-term growth.

³⁷ See for a review, European Commission (2008) and Myles (2009a).

3.1. Simulations

The simulation models surveyed in Myles (2009a) display different results of tax reforms on growth. While some do not find any significant effects from changes in the tax structure others refer to the existence of non-negligible effects on GDP and GDP growth. The effects depend on the way the government sector is modelled (including productive or just wasteful government spending), the degree of detail represented in modelling growth channels, in particular with respect to human capital accumulation and labour market reactions to tax cuts, and the calibrated parameters. Despite these widely varying outcomes for tax-reform simulations, Myles (2009a, p.44) concludes that "*almost all the results support the claim that a move from income taxation to consumption taxation will raise the rate of growth even though the predicted effect may vary.*"

These effects of taxes on GDP are confirmed by simulations using the European Commission's Quest III model³⁸. This New-Keynesian DSGE model³⁹ distinguishes labour taxes, consumption taxes (VAT and others) and corporate profit taxes; its parameters are estimated on euro area and US data. The estimation results reported in European Commission (2008) indicate that in the standard model⁴⁰ a budgetary neutral tax shift in the order of 1% of GDP from labour taxes to consumption taxes has indeed a positive effect on employment and GDP. The long-run effects are larger when a coordinated euro-area wide tax shift is considered, than in case of a unilateral tax shift, no matter if a small or large country performs this shift. However, in the short-run the gains might be larger in the case of unilateral individual country shifts due to competitiveness effects. The quantitative results of a coordinated shift indicate an increase in employment and real GDP by about 0.25% in the euro area in the long run.⁴¹

A similar simulation exercise with the Quest III model also including property taxes (taxes on housing) is reported in European Commission (2010a) and Roeger and in't Veld

³⁸ European Commission (2008)

³⁹ The key features of the model are 1) a fraction of households are liquidity constrained 2) prices and wages adjust with lags 3) monetary policy is described by a Taylor rule and 4) debt is stabilized by means of a gradual adjustment in labour taxes.

⁴⁰ Benefits and transfers are indexed to consumer prices in the standard model. The GDP effects are higher if no indexation is assumed.

⁴¹ The Quest III simulations refer to the GDP level, not to changes in long-term growth rates, which have not been investigated.

(2010). Here, the effects of a permanent reduction of the government deficit by 1% of GDP through different tax increases are simulated.⁴²

A consolidation through an increase in consumption taxes is found to be the most favourable of all tax-based consolidations as regards long run GDP – while in the short run all tax consolidations result in GDP losses (see graph 1 below). A 1% of GDP consolidation achieved by raising consumption taxes would lead to an initial decline in GDP of 0.1-0.2 percent; in the long run GDP would be higher by 0.4-0.5 percent compared to the baseline scenario of no consolidation. A consolidation through increasing labour or property taxes would lead to stronger initial GDP losses and lower long-run gains. Contrastingly, an increase in corporate income taxes would lead to relatively small short-run losses in GDP. However, these losses build up over time as investment is depressed and the capital stock declines, leading to the highest GDP losses in the long-run. These developments are displayed in graph (1), which shows the short term effects of tax consolidations on GDP as lines and the long term effects on GDP for 10, 20 and 30 years as bars.

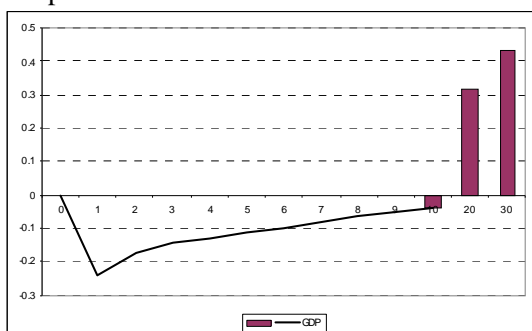
The larger simulated GDP effects in the more recent study are mostly the result of the combined consolidation with tax shifts. While the first simulation reports the effects of a budgetary neutral tax shift, the second simulation assumes a permanent deficit reduction of 1% of GDP compared to a baseline scenario. It is assumed in the model that the stock of outstanding debt gradually declines and that interest rates fall (risk premium) over time. This increased room for fiscal manoeuvre – relative to a baseline scenario – can in turn be used to cut tax rates; all model simulations assume a reduction in labour taxation. Thus, strong tax increases are only limited to the first years of the consolidation, while in the medium and long run labour taxation falls, impacting positively on employment and GDP.

Summing up, while the effects of a pure tax shift towards less distortionary taxation seems to be limited, the proper design of a consolidation seems to have more sizeable effects on GDP in the long-run.

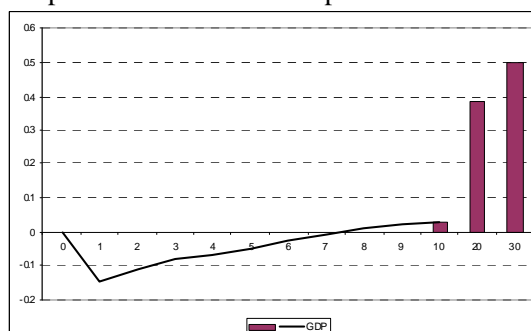
Graph 1:

⁴² The scenarios referred to assume an indexation of benefits to net after tax wages. Roeger and in't Veld (2010, p.24) report that alternative assumptions would increase distortions and lead to larger negative output effects of debt. .

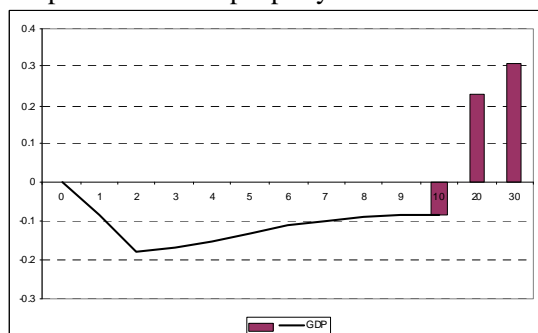
Graph I.1 Increase labour taxes:



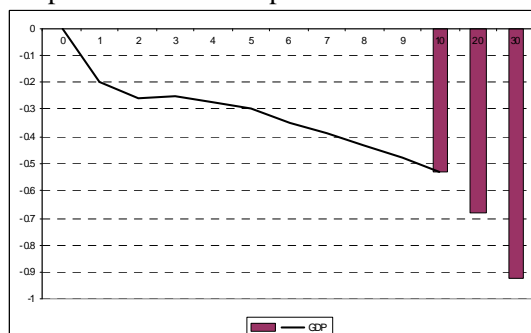
Graph I.2 Increase consumption taxes:



Graph I.3 Increase property taxes:



Graph I.4 Increase corporate income taxes:



Source: European Commission (2010d), Quest III model

Recently, the European Commission (2011)⁴³ reported on the effects of an energy tax reform on employment and growth. The simulations – performed by Cambridge Econometrics with the E3ME model⁴⁴ – assume that the additional revenues from increased energy taxation are recycled to reduce the employers' social security contributions. The impact of shifts from social security contributions to different forms of energy taxation on employment and GDP are reported small but positive. The impact gets stronger, the higher the additional energy tax revenues are assumed. This positive impact on GDP and employment is driven by the modelling assumption that additional revenue from energy taxation would be used to reduce the employers' social security contributions. Lower labour costs boost employment and decrease domestic price levels increasing private consumption. This positive impact on employment and GDP is confirmed by the European Commission's Quest III model, which was used to assess the impact of an energy tax reform taking into account the crisis.⁴⁵

⁴³ European Commission (2011c): SEC(2011) 409

⁴⁴ The E3ME model of Cambridge Econometrics is a dynamic macro-econometric model designed to deal with E3 interactions (economy-energy-environment). It is a European model treating each Member State separately and keeping the rest of the world exogenous.

⁴⁵ These results are also reported in European Commission (2011c): SEC(2011) 409.

Overall, the simulations reviewed generally find some positive effects of shifts from labour towards property, consumption and environmental taxation. The driving force in the simulations is usually the assumed positive impact of the tax cut on labour taxation on the labour market.

3.2. Estimations

Empirical research is largely driven by the theoretical underpinnings that some taxes are more detrimental to growth than others. In his survey of empirical literature Myles (2009b) finds some evidence that consumption taxes are less damaging for growth than income taxes. However, he considers the lack of structural modelling of the estimated equations as a severe limitation to the interpretation of the results, and highlights that causality issues could not be resolved by the estimations.

Recently, Arnold (2008), Johansson et al (2008) and Arnold et al (2011) have investigated the effect of the tax structure on long-run GDP, using a panel error correction model for 21 OECD countries over the years 1971-2004. Based on the results of these estimations the authors suggest a growth- friendliness ranking for tax instruments, which is lead by property taxes, in particular by recurrent taxes on immovable property, followed by consumption taxes (and other property taxes). The authors classify personal income taxes as inferior to these two tax instruments, and corporate income taxes as having the most negative effects on GDP per capita.

Xing (2010) challenges these results. The author argues that the used Pooled Mean Group (PMG) estimator's assumptions might not be valid for the investigated dataset. The PMG estimation method assumes that the long-run relationships between variables are homogenous across countries and only allows for heterogeneous short-run dynamics. Challenging the validity of the homogeneity assumption, Xing (2010) first replicates the estimations by Johansson et al (2008) using slightly different specifications and performing robustness tests. Based on a differently specified PMG estimates, the author concludes that income taxes and consumption taxes are worse than property taxes. However, Xing (2010) does not find strong evidence for any further ranking between consumption taxes, personal and corporate income taxes. Relaxing the homogeneity assumption and using pooled OLS and the two-way Fixed Effects estimations the author can only confirm the results from the PMG estimations for certain groups of countries.

Analysing the impact of labour tax reducing reforms, Bocconi University (2011) only finds very weak evidence for any effects on the labour market. However, focusing on reforms targeted to woman and those where social partners were involved show the expected positive impact on the labour market.

The estimation results surveyed above might indicate that the OECD is consisting of too heterogeneous countries to perform this analysis. Hence, the remainder of the paper will focus on tax structures and changes in the EU. Based on the observations of Arnold (2008), Johansson et al (2008), and Arnold et al (2011) for OECD countries the following chapter analyses tax structures and tax shifts in the EU-27 until 2008. Furthermore, chapter 5 assesses if fiscal policy since the beginning of the crisis has been characterised by shifts from income to consumption taxation or 'green' taxation – as suggested by the literature reviewed above.

4. DEVELOPMENT IN EU MEMBER STATES⁴⁶

4.1. Status quo of tax burden and tax share in the EU-27

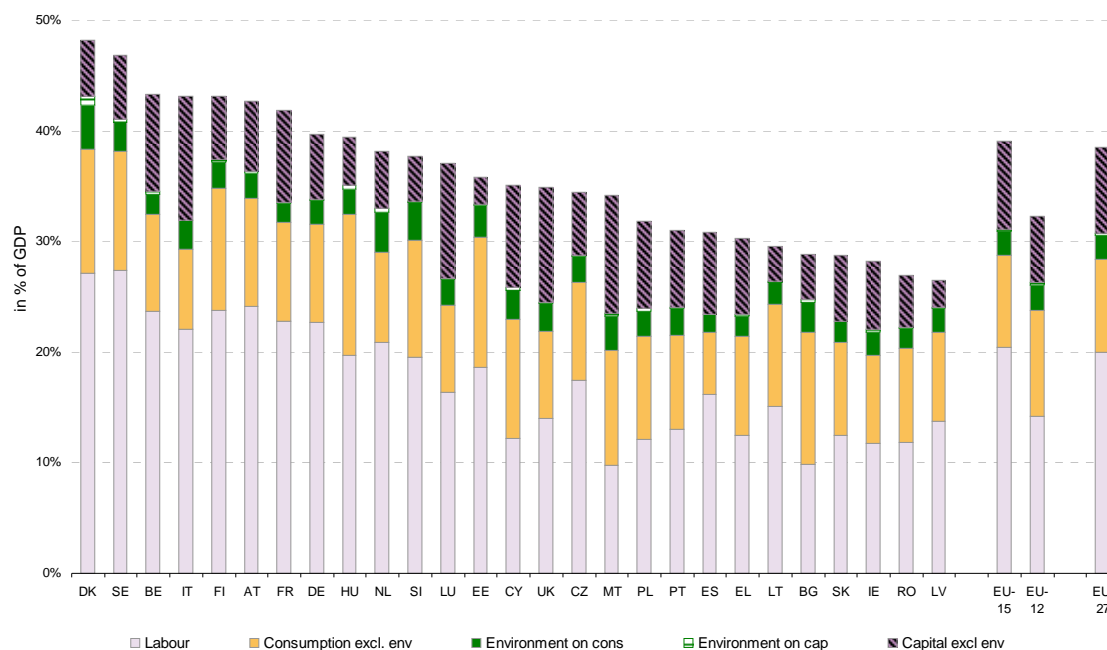
A snapshot of the tax mix in the EU Member States is given in graph 2. It shows the distribution of the total tax burden according to economic function for 2009 – the latest year for which detailed data are available. This graph groups taxes together according to the function they are levied on displaying the following groups: taxes on labour (including social security contributions), capital (taxes on stocks of capital/wealth and taxes on capital and business income) and consumption (VAT and excise duties).⁴⁷ Furthermore, as environmental issues are high on the EU agenda and environmental taxes are considered to remedy market failure, environmental taxes are displayed in graph 2.

While the EU-27 is a high tax area on average with an average tax-to-GDP ratio of 38.4% in 2009, there are considerable differences between old Member States (denoted EU-15) and new Member States (denoted EU-12). The EU-15 average tax burden reaches almost 39% of GDP, while the EU-12 Member States display a considerably lower average tax burden of 32% of GDP. As displayed in graph 2, most of the EU-15 countries (except for Ireland, Greece, Spain, Portugal and the United Kingdom) are ranked above the EU-27 median, i.e. to the left side of the graph, while only three new Member States, namely Hungary, Estonia and Slovenia display an above median tax burden. The highest overall tax burden in 2009 was recorded in Denmark, amounting to above 48% of GDP whereas Latvia's tax ratio amounted to a mere 26.6% of GDP.

⁴⁶ Data in this chapter are based on European Commission (2011b).

⁴⁷ For further information on the derivation of the taxes according to economic function see European Commission (2011b). The available data categorisation deviates from the categorisation used in chapter 2 as it subsumes corporate income taxation and property taxation under capital taxation.

Graph 2: Level of taxation and tax mix in 2009 (in % of GDP)



Note: Averages represent GDP weighted averages

Source: European Commission (2011b), own calculations

As can be derived from graph 2 EU Member States also differ with respect to their tax mixes. The importance of labour taxes is highlighted by the fact that half of the Member States derive more than half of total tax revenues from taxing labour, among which ten old Member States. This translates into share of labour taxes in total taxation of 53% in EU-15 compared to 44% in the EU-12. The high share of consumption taxes in the EU-12 of 37% of total taxation is mostly the mirror image of low labour taxation. Cyprus, Latvia, Lithuania, Malta, Hungary and Rumania levy about 40% of taxes on consumption, with Bulgaria even raising 50% of total taxes on consumption. In contrast, consumption taxes reach a modest 27% of total taxation in the EU-15, with, Belgium, Spain and Italy levying less than one quarter on consumption taxes. For Italy and Spain the low revenues are partly due to VAT exemptions and reduced rates applied to a large base, as well as the low standard rate in Spain. Taxes on capital are the least important source of revenues for both, EU-15 at 21% and EU-12 at 19% of total taxation. The dispersion within the two groups are quite the same ranging from 30% in the UK to 13% in Sweden for the old Member States and 32% in Malta to 9% in Latvia.

Graph 2 also gives information on environmental taxes which in principle can be levied on all three tax bases consumption, labour and capital. In practice, however, environmental taxes fall mostly on consumption, usually in the form of excise duties. Denmark is the only country which levies in addition a significant part of environmental taxes on capital, by taxes such as the 'tax on hydrocarbon' and the 'corporation tax on hydrocarbon manufacturing'. Both EU-15 and EU-12 Member States levy about 2.4 % of

GDP on environmental taxes. Given the lower overall tax burden in the EU-12 this translates into a share of environmental taxation of more than 7.5% of total taxation in EU-12 Member States but only 6% of total taxation in EU-15 Member States. Hence, the tax systems of the EU-12 rely to a larger extent on environmental taxation.

4.2. Special focus: Environmental taxes

As the crisis has evoked renewed policy interest in the subject of 'green tax shift', the paper offers some further analysis on environmental taxation.⁴⁸ The interest of policy makers on environmental taxes usually stems from the potential double dividend of environmental taxation, which has been reviewed in section 2.4.

The European Commission, the OECD and the International Energy Agency (IEA) have agreed on a common statistical framework on environmental taxes. They define environmental related taxes as "*any compulsory, unrequited payment to general government levied whose tax base is a physical unit (or proxy of it) of something that has a proven specific, negative impact on the environment*".⁴⁹ However, charges and fees on environmentally harmful tax bases are not comprised by this definition, as they present requited payments – i.e. there is a link between the service and the payment. Statistically, environmental taxes are divided into four broad categories, namely energy, transport, pollution and resource taxes. Value added type taxes are not included, as these taxes are levied on all products.

4.2.1. Energy taxes⁵⁰

Energy taxes are taxes on energy products such as mineral oils, gas and electricity as well as CO₂ taxes. They are mostly levied as excise duties per unit of physical consumption and usually fixed in nominal terms, implying that their real value decrease with inflation. As graph 3 shows, they are by far the most significant environmental tax, representing around three quarters of environmental tax receipts. This is mostly due to the existence of EU legislation⁵¹ which provides a common framework for taxing energy products and electricity in the EU and sets minimum tax rates.

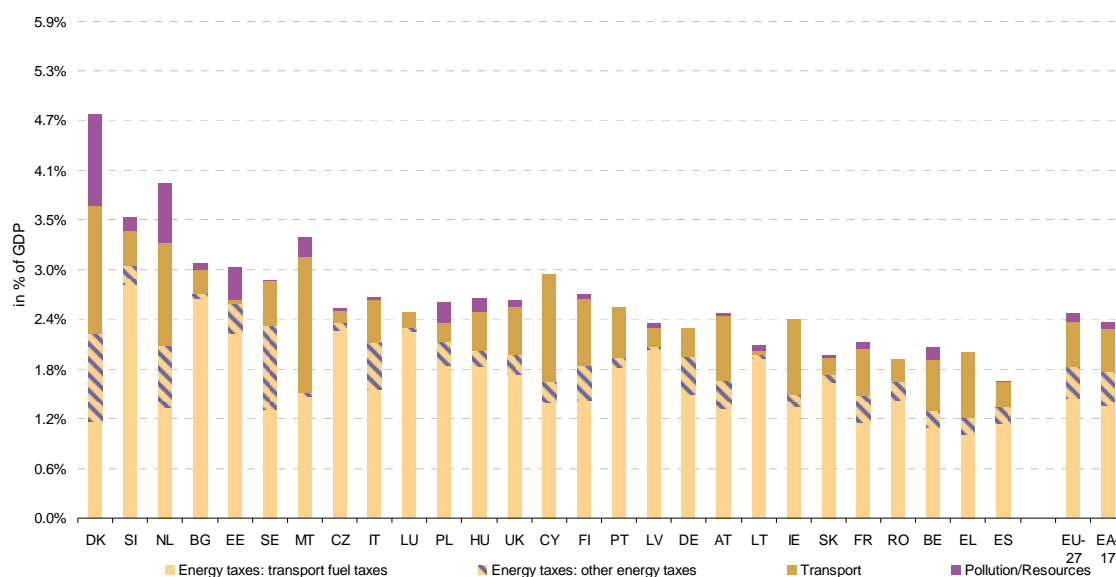
⁴⁸ The EU's 2020 strategy defines the challenges that Europe is facing for the next decade, in economic, environmental and social areas and sets relevant priorities in terms of sustainable growth, more resource efficient, greener and more competitive economy. (European Commission COM (2010))

⁴⁹ Definition as in European Commission (2001) p. 9 and p.15.

⁵⁰ This part draws partly on the sub-section on 'Transport fuel taxes' in Part II.5 of the publication 'Taxation Trends in the European Union' European Commission (2009) and (2010b), which was originally drafted by the author and adjusted for 2009 data, based on a methodology to disentangle fuel tax revenues developed by the author

⁵¹ Council Directive 2003/96/EC of 27 October 2003

Graph 3: Energy tax revenues (in % of GDP)



Note: Averages represent GDP weighted averages
 Source: European Commission (2011b), own calculations

What becomes also evident from graph 3 is that most energy taxes are levied on transport fuel. The high share of taxes derived from the transport use of fuels reflects the details of the minimum excise tax rates set up in the Energy Tax Directive⁵². Minimum tax rates for petrol, which is almost exclusively used for transport purposes, are the highest among all products covered by this Directive. On the other hand, minimum rates for heavy fuel oil, primarily used for heating purposes, are very low. Tax rates for product categories, which are used for both transport and stationary purposes, are heavily differentiated. This differentiation of minimum tax rates between motor fuels and fuels used for heating/business use reflects that the choice of the minimum excise duty rates was not only influenced by environmental and efficiency considerations. From an environmental and efficiency viewpoint taxing equally polluting substances in an equal way is preferable, as it also reduces administrative cost and non-compliance activities. However, the current choice of minimum tax rates allows Member States to take social (fairness) and equity considerations into account when setting tax rates, when e.g. allowing for lower tax rates for heating fuels.

The predominance of transport fuel taxes is particularly striking for the new Member States; most of which levy around 90 % of their energy taxes on transport fuels. The high transport fuel shares in energy taxation in the new Member States is explained by the fact that they enjoy tax exemptions or at least considerably reduced rates from the minimum excise duty for the taxation of other products in the category energy taxes such as

electricity and natural gas.⁵³ As electricity and natural gas are hardly taxed their energy tax revenue from any other source but mineral oil taxes is very low.

In contrast to the new Member States, the relative importance of fuel taxes varies considerably across the old Member States. The band spreads from a fuel tax revenue share in energy taxes of above 90 % for Ireland, Luxembourg, and Portugal to only about 50 % for Denmark and Sweden. The difference in the shares is due to the tax revenues on natural gas and electricity. While the latter two countries receive significant revenues from taxes on electricity and natural gas (more than 25 % of energy taxes), Ireland, Luxembourg and Portugal only collect negligible revenues on these items (less than 1 % of energy taxes). Hence, differences in the taxation of natural gas and electricity persist, despite the attempt to reduce differences in the level of taxation in Member States by the introduction of minimum tax rates on energy products and electricity in the Energy Tax Directive (2003/96/EC). The difference results from the choices made by the individual Member States. While Denmark exceeds the minimum excise duty on electricity by more than 180 times (Sweden still about 60 times)⁵⁴, other countries enjoy derogations for compliance with the minimum excise duty, reflected in zero tax rates.

4.2.2. *Other environmental taxes*

Transport taxes mainly include taxes linked to the ownership and use of motor vehicles (including aeroplanes) and the services provided herewith. Hence also e.g. road taxes – as long as they are defined as taxes – fall under this category. They correspond on average, slightly less than one quarter of total environmental tax revenues and 1.4 % of total taxes and social contributions (in the EU-27 weighted average). The remaining two categories, pollution taxes and resource taxes, are usually analysed together, as their revenues are almost negligible. Pollution taxes comprise taxes on emissions to air, water, management of solid waste and noise, except for CO₂ taxes. Resource taxes include any taxes on the extraction or use of natural resources. In contrast to energy taxes, old Member States levy significantly more other environmentally related taxes than new Member States, measured as % of total taxation. This is partly due to the lack of EU-wide harmonisation and the tax preferences of the Member States.

⁵³ Council Directive 2004/74/EC

⁵⁴ In the Netherlands the tax rate on electricity exceeds the minimum excise duty by more than 200 times. However, due to data limitations the revenue share of taxes on electricity in energy taxes could not be calculate exactly; it should be around the same magnitude as for Denmark and Sweden.

4.2.3. Revenue raising potential of environmental taxes

The fact that energy products – and in particular transport fuels – are already quite heavily taxed compared to other environmental tax categories leads some authors (Fullerton et al. (2009) p. 425) to state that *'It is not obvious that environmental taxes have significant revenue-raising potential. Existing large-scale taxes such as excises on motor fuel are already near the upper limit of what can be justified by the environmental costs involved. Taxes on waste management represent an interesting case for reform but are unlikely to raise much additional revenue.'*

However, even environmental tax increases in seemingly undertaxed groups such as transport or pollution/resource taxes might not be possible in the short to medium term. Indeed, the environmentally related tax bases pollution and transport deserve particular attention due to numerous fees levied on these bases. These fees are often the result of the replacement of taxes by fees over the last decades due to privatisation activities in the Member States. Taxes on transport are in many Member States complemented by fees falling on the same tax base such as road charges or highway tolls. However as these tolls are linked to some kind of service, i.e. the use of highways, they are not unrequited payments and hence not taxes by definition. The same argument holds for environmental charges levied on pollution. Usually payments for waste and sewage disposal are linked to a service and hence recorded as a fee – therefore they are not reflected in the data analysed above. Hence just looking at the tax data might underrepresent the actual overall burden (taxes and fees) on these bases. Given that the service – waste management or road use – for which usually a fee instead of (or in addition to) a tax is levied also contains an environmental component, much higher taxes might neither be socially optimal nor justified by the environmental cost involved.

Moreover, the difference between fees and taxes might often be a statistical artefact, differing from country to country. Hence, the amount of taxes and fees together levied on a tax base might be the relevant variable to use if the economic intention is to assess the internalisation of externalities and to assess additional revenue raising capacities.

In Austria, for example, taxes on transport and pollution amount to 0.8% of GDP and 0.03% of GDP respectively. However, when charges and fees levied on these databases are included, the overall burden on transport increases to 1.3% of GDP and on pollution to 0.7% of GDP.⁵⁵ For transport taxes the increase is due to road tolls (Vignette) and the increase in the overall burden on pollution is the result of various charges on water (use of water, wastewater) and waste. This shows that while transport and pollution might

⁵⁵ Data on environmental fees and charges is derived from the OECD/EEA environmental database (OECD (2011)).

seem undertaxed an in-depth analysis taking into account fees might draw a different picture.

Thus, to judge if further burdening of these basis is economically justified by environmental costs involved, an assessment of the overall charges is necessary. As this analysis might point to limited revenue raising capacities of environmental taxes in the short run, the OECD (2010) considers auctioned permission permits and carbon taxes to offer additional revenue raising potential.

4.3. Development of the tax mix before the crisis

As stressed in the previous chapters, some literature – and more and more general wisdom – suggests shifts from taxes on labour and capital to consumption, environmental and property taxes in order to promote growth and employment. We are therefore interested whether these shifts could be observed in the EU until the beginning of the crisis. A look at the recent past in the EU-27 Member States suggests that shifts towards taxes considered less distortive have been relatively limited so far.

Graph 4 below displays the change of the revenue share in total taxation by economic function between the years 2001-2008. By its nature, this graph does not contain any information on the development on the overall tax to GDP ratio; this information is, however, displayed in graph 5. Thus, while graph 4 contains information on shifts within the tax system and hence displays the change in importance of the tax categories, graph 5 shows the change in tax-to-GDP ratios for the tax categories and overall tax revenues.⁵⁶

The years for analysing the tax shift were chosen in order to reduce possibly different influences from the economic cycle which could drive changes in the tax mix via the automatic stabilisers. Some tax bases are more prone to cyclical swings than others. In a favourable economic climate usually (company) profits and the wage sum increase faster than private consumption. Together with the progressivity of most income tax systems this results in a faster increase of income taxes than consumption taxes and hence a shift of their respective shares. The reverse applies in economic downturns. While consumption tax revenues remain relatively stable, income tax revenues are usually affected more heavily. Hence, the observed change in their respective shares in total taxation might just be due to cyclical developments, rather than tax policy.

One way to reduce these influences it to compare years where similar economic situations were prevailing.⁵⁷ Both, 2001 and 2008, are the first years after the business

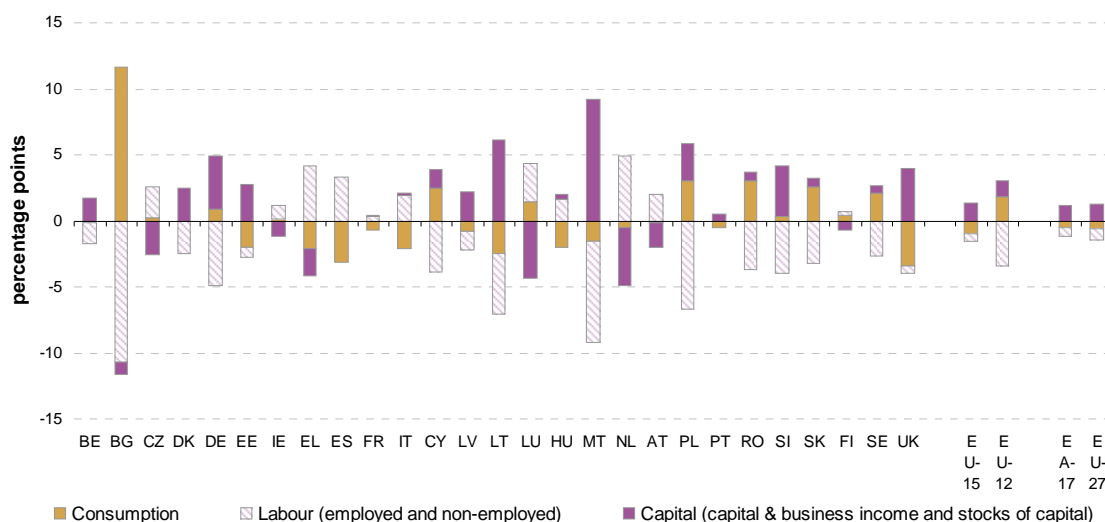
⁵⁶ Graph 5 is used to support the analysis performed on the basis of graph 4.

⁵⁷ Another possibility would be to use cyclically adjusted data. Cyclically adjusted data on the functional level is however not available.

cycle peak was reached, introducing a period of lower growth. Sensitivity tests were performed using the years 2000-2007, which were both denoting the peak of the business cycle, and 2000-2008, where the output gaps were of similar magnitude. While not exactly identical, similar trends could be observed (see the Annex for the graphs).⁵⁸

Moreover, it is important to recall that any change observed in the tax mix might also be due to the fact that the share of the tax base in GDP has changed (composition effects). The tax base for capital taxation, proxied by the operating surplus, increased by around 1.5% of GDP between 2001 and 2008. The tax bases for labour and consumption taxes, namely compensation of employees and private consumption, remained rather stable in % of GDP. To get an unbiased picture, the changes in the tax mix analysed in the following sub-sections will be put into perspective referring to policy measures.

Graph 4: Tax Shift between 2001 and 2008, on the basis of total taxation



Note: Averages represent GDP weighted averages
 Source: European Commission (2011b), own calculations

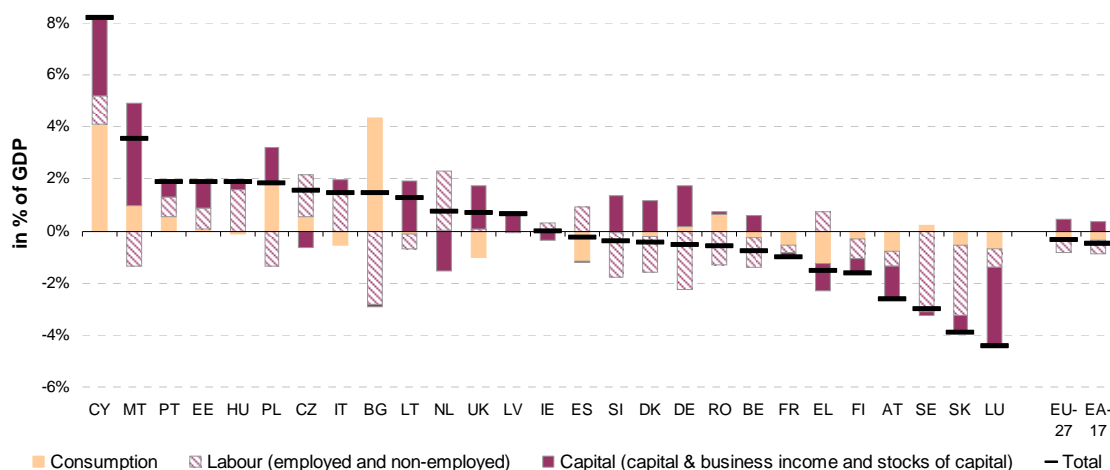
Strikingly, on an overall EU-27 basis (GDP weighted averages), tax mixes have basically remained unchanged. While the share of labour and consumption in total taxation decreased by 0.6 and 0.8 percentage points respectively, the capital share increased by roughly 1.3 percentage points.⁵⁹ Comparing developments in old and new Member States displays large variations. In the EU-12 the labour tax share decreased by 3.4 percentage points, whereas the consumption tax share increased by 1.8 percentage points,

⁵⁸ Given that 2009 was characterised by a slump in GDP, not experienced in the recent past, it was not used as a reference year.

⁵⁹ Due to statistical shortcomings, the overall sum of the tax shifts does not always sum up to zero.

basically in line with suggestions in the literature. Contrastingly, with an increasing capital share and a decreasing consumption share, the EU-15 Member States have experienced changes opposite to recommendations in the literature.

Graph 5: Contribution of tax categories to the change in the total tax-to-GDP ratio, in % of GDP



Note: Averages represent GDP weighted averages

Source: European Commission (2011b), own calculations

4.3.1. Taxation on labour

In line with the proposals for growth enhancing tax systems, 15 Member States' tax systems experienced a decrease in the share of labour taxation in the 2001-2008 period. However, a significant decrease (more than one standard deviation) could only be observed in three Member States with above EU average labour tax shares (50.8%) in 2001, namely in Germany (from 60.6% to 55.7%), Lithuania (from 53.9% to 49.3%), and Slovenia (from 55.8% to 51.9%). On the contrary, a couple of new Member States with already relatively low labour tax shares in 2001 experienced the most significant decrease in labour taxes. Bulgaria's labour tax share decreased by more than 10 percentage points to 30.7% – the third lowest in the EU-27 –, and Malta's 7.7% drop in the labour tax share now results in the lowest share in the EU-27 at 27.7%.

The reasons for the reduced dependency on labour taxation in all of the above mentioned countries but Malta are several cuts in tax rates and social security contributions. Bulgaria and Slovenia experienced a particularly strong decrease in social security contributions and payroll taxes respectively, together with considerable tax rate cuts. Germany saw a decrease in its tax base (proxied by compensation of employees) and cut PIT rates over the entire income range and Lithuania reduced its flat income tax rate. In Malta, the lower share can not directly be traced to significant changes in

tax/contribution rates or tax exemptions, but rather reflects the decline in the tax base and the increase in capital tax revenues.

4.3.2. *Taxation on capital*

Over the period under investigation 17 Member States faced an increase in their capital tax shares. Starting from an above average share in 2001 Malta displays the largest increase in the capital tax share (+9.2 pp). In 2008 it had the second highest capital tax share, just after the UK, which also increased the capital tax share over the period under investigation (+3.6 pp). The other countries experiencing a significant increase in capital tax shares, namely Lithuania (+6.1 pp), Germany (+4.0 pp) and Slovenia (+3.8pp), started from well below average capital shares. The countries displaying a sizable reduction in the capital tax share, namely the Netherlands (-4.4pp), Luxembourg (-4.3 pp) and the Check Republic (-2.6 pp), started form at or above average capital tax shares, with only Luxembourg remaining above average in 2008.⁶⁰

Capital tax data comprises tax revenues on stocks of capital/wealth as well as on capital income. As reviewed in chapter 2 the effects of capital income taxes and wealth taxes, such as property taxes, vary considerably. Hence, in order to assess the impact the observed changes in capital taxation might have on growth, it is important to analyse the two categories separately.

4.3.2.1. Taxes on stocks of capital/wealth

Taxes on stocks of capital/wealth, which account for about 1/3 of capital taxes, have been rather stable over the observation period. The significantly reduced shares of capital/wealth in Latvia and Luxembourg are rather due to the cycle than to policy measures, as the biggest reduction was observed in 2008. The sharp increase in the United Kingdoms' capital tax share was due to the introduction of capital levies, forming part of taxes on the stock of wealth. Unfortunately, data does not allow an in depth assessment of the development of property tax shares.

4.3.2.2. Taxes on corporate income

Given the relative stability of taxes on capital stocks, the changes in the capital tax share can be largely attributed to changes in the share of capital taxes on corporations, amounting to on average one third of overall capital taxation. The majority of EU Member States decreased their (top) statutory tax rates on corporate income between 2001 and 2008, which resulted in the fall of the average EU-27 statutory rate by 7.1

⁶⁰ These three countries still experience a sizable decrease in the capital tax share, when the boom year 2007 instead of 2008 is considered as the reference year.

percentage points to 23.6%. Nevertheless, the EU-average corporate tax share in total taxation increased over the observation period. Among those countries displaying the highest increase in capital tax shares, Malta and the United Kingdom did not decrease their statutory tax rates. Germany only decreased it in 2008, which due to collection lags might not be visible in the 2008 data; Slovenia decreased the tax rate on corporate income slightly. At the same time these countries experienced a significant increase in the capital tax base, namely corporate profits (proxied by the net operating surplus), in GDP. Ceteris paribus a more important tax base in % of GDP should lead to a higher tax share. This increase in the tax base is indeed the reason for a sizeable increase in the corporate tax share in all countries, but the United Kingdom. The decrease in the capital tax share experienced by the Netherlands, driven by the decrease in the corporate tax share, was due the large cut in corporate tax rates rather than a fall in the tax base. Only in Greece, rate cuts were accompanied by a fall in the tax base, resulting in a slump in the share of corporate taxation Lithuania stands out as a country with an increasing corporation tax share despite a significant rate cut and slight decrease in the net operating surplus in % of GDP. This shift in the tax share is mainly due to higher revenues accrued by a broadening of the base, taxes are actually levied on⁶¹.

Overall, it seems that while taxes on stock of capital / wealth – among which property taxes – remained rather stable, corporate taxes showed considerable increases causing the observed developments in capital taxation shares.

4.3.3. *Taxation on consumption*

The share of consumption taxes in total taxation, which according to tax-efficiency theory should be relatively high, increased in twelve Member States. Similar to labour tax shares, the Member States experiencing the most significant increases were those already gaining the largest shares of their tax revenues from consumption taxes. Bulgaria, that levied already the EU-wide highest share of total taxation (41.6%) on consumption in 2001, increased this share by a further twelve percentage points till 2008. Poland, Rumania (both + 3 pp), Cyprus and Slovakia (+2.6 pp and 2.5 pp, respectively) showed a similar development. The only old Member State displaying a similar change in consumption tax shares is Sweden; in contrast to the mentioned new Member States starting from below EU average. Such, countries already heavily relying on consumption taxes have increased this share further, while most of the old Member States have decreased their already low shares. Starting from at or below average in 2001, Italy and

⁶¹ The base a country levies corporate taxes on might actually differ from the broad definition of a tax base proxied by net operating surplus due to the existence of tax credits, tax allowances, depreciation rules etc.

Spain saw a decrease in consumption tax shares by -2.1 percentage points and -3.2 percentage points respectively.

Drivers of the above mentioned observations can be value added taxes, which amount for the largest part of consumption taxes, excise taxes on alcohol and tobacco and excise duties on energy products. An increase in the VAT rate of five percentage points serves as an explanation of the increase in the consumption tax share in Cyprus. Slovakia decreased its standard VAT rate by four percentage points and still experienced an increase in the consumption tax share. For the other countries no significant changes to the VAT rates or bases could be detected – Bulgaria and Romania even introduced reduced rates, and saw their tax base, namely final consumption expenditure slightly decrease. However, excise duties on alcohol, tobacco and energy products in new Member States were increased – sometimes considerably – to meet the EU minimum requirements. Additionally, an improved implementation of tax law including the fight of tax evasion and avoidance might have driven the increase in the respective consumption tax shares. Moreover, the decrease in tax revenue in one tax area, e.g. in labour taxation, increases *ceteris paribus* the other tax shares, i.e. of consumption and/or capital. This reinforced the tax shift in Bulgaria, Poland and Romania, characterised by an increase in consumption tax to GDP ratio as well as falling labour taxation in % of GDP. Large changes in labour taxation relative to consumption taxation in % of GDP were the driving forces for the changes observed in Sweden, Slovakia, Italy and Spain, as can be derived from Graph 5.

4.3.4. *Environmental taxation*

The share of environmental taxes in total taxation decreased on average in the EU-27 countries, driven by the decrease in 19 Member States. The only significant increases were recorded in Bulgaria, Denmark and Poland and Slovakia. The development of environmental taxation is in most countries driven by the development of energy taxes, which amount to 70% of environment taxation on the EU average. However, a decrease in the environmental tax share, and in particular in the energy tax share, does not necessarily indicate that environmental issues are not high on the policy agenda. If environmental taxes are effective they should reduce the use of environmentally harmful goods and hence erode the tax base. Indeed, between 2001 and 2008 final energy consumption, which is the proxy of the tax base for energy taxes, increased at a much slower pace than the tax bases for the other taxes analysed above.

A look at the deflated implicit tax rate (ITR) on energy^{62 63} – setting energy tax revenues in perspective with final energy consumption - confirms that the real ITR on energy has increased in almost all new Member States, and only decreased in 11 – mostly EU-15 – Member States. The decrease in the ITR in these Member States can be directly linked to lower taxation in real terms despite unchanged nominal rates. In difference to other taxes, excise duties on energy products are levied on measures per unit and are not indexed to inflation, so their real value decreases over time. The increase in the EU-12 was mostly driven by the need to achieve the EU-minimum rates (as explained above) by 2010.

The overall decrease of environmental taxation in % of GDP might not only be due to the reduction of the tax base as % of GDP and the real devaluation of energy taxation. The decreasing share in environmental taxation might also be due to a change in policy instruments. As pointed out in section 4.2, it has become widespread to levy fees instead of lump-sum taxes such as road pricing, fees on waste disposal, etc. This of course impacts on the tax share and the respective changes observed. However, neither increasing nor decreasing tax shares can guarantee that corresponding climate objectives have been achieved – this has to be assessed separately.

4.3.5. *Assessment of all tax categories – was there a tax shift before the crisis?*

After having assessed the reason of shifts in individual tax categories, this section looks at all categories together. It assesses to which degree the observed overall tax shifts have been in line with the suggestions in the literature and identifies the respective countries. As mentioned above, the literature considers a shift from capital and labour income taxation to consumption, property and environmental taxation as supportive for growth. The EU-12 average tax shift shows a decrease in labour taxes (-3.4pp), an increase in consumption taxes (+1.8 pp) as well as a slight increase in capital taxation, which is more or less in line with the literature. In contrast, the EU-15 Member States observed a decrease in both, labour and consumption taxes (-0.5 and -1.0 pp respectively) together with increasing capital taxation

In detail, eight Member States, namely Bulgaria, Germany, Cyprus, Poland, Romania, Slovenia, Slovakia and Sweden experienced a decrease in labour taxes together with an

⁶² The ITR on energy shows the amount of energy tax, in Euro, levied per unit of final energy consumption.

⁶³ See Table A5.1 in the Annex.

increase in consumption taxes.⁶⁴ However, only Bulgaria saw their capital tax share decreased at the same time. The decrease in capital taxation in Bulgaria was caused by the fall in taxes on income of corporations, which is reflecting the reduction of the top statutory corporate income tax rate from 28% in 2001 to 10% in 2008. Hence, Bulgaria is indeed shifting its tax system towards one which is said to be supportive for growth. In the above group, the all new Member States but Slovenia started their tax shifts from an above average share of consumption and a below average share of labour taxes. So the tax shifts further increased their dependency on consumption taxes as compared to labour taxes. Their average consumption tax share increased by 3.5 percentage points and now stands at 39% of total taxation – 11 percentage points above EU-27 average. Their labour tax share decreased by an average of six percentage points amounting to 39% of total taxation as compared to an average EU-27 labour tax share of 50%.

Only Sweden and Germany decreased their above average labour tax shares by almost 5 percentage points to 56% of total taxation while increasing their below average consumption tax shares by one percentage point to 27% of total taxation. These developments were obviously bringing Germany and Sweden more in line with EU average while the five new Member States, referred to above, deviated further from the EU-27 average.

This analysis shows that sizable shifts from labour towards consumption taxation were mostly performed by countries already relying heavily on consumption taxes. While the literature is silent about an optimal share of consumption taxes the marginal benefit of a shift towards consumption taxes might be higher for those countries with high labour taxation. However this shift could not be observed over the last eight years before the beginning of the financial and economic crisis.

5. HAS THE CRISIS BEEN USED TO MOVE TOWARDS 'HIGH QUALITY' TAX SYSTEMS?

The previous chapter assessed tax shifts as observed in the data, grouped the findings and presented possible causes for the observed developments. This approach cannot be applied for assessing the shifts during and after the crisis, as detailed data which enables an attribution of taxes to the economic functions consumption, labour, capital and environment is not yet available.⁶⁵ Moreover, the observed shifts in the 2008-2011 period might be considerably driven by the economic and financial crises. Hence, the actually observed tax revenue developments and tax shifts are substantially influenced by

⁶⁴ While sensitivity tests (see Annex) come to similar results, the exact degree to which these shifts reflect policy changes or just the effect of cyclical developments requires further analysis, as provided in the subsections 4.3.1-4.3.4.

⁶⁵ Detailed data is usually available with a lag of 1.5 years.

the cyclical situation; i.e. factors outside the decision makers' sphere of (direct) influence. Usually, in an unfavourable economic climate (company) profits fall much faster and more pronounced than labour and consumption. Accordingly, capital taxes and in particular corporate taxes should decrease more than labour and consumption taxes, resulting in an observed tax shift. To avoid giving a misleading picture, either years of similar economic activity should be compared – as it was done in the previous chapter – or tax measures in individual countries have to be assessed in detail. The latter approach is followed with respect to the 2008-2011 period.

Information on recent policy operations (2008-2011), taken since the beginning of the financial and economic crisis, allow the following observations:⁶⁶

5.1. Taxes on labour

5.1.1. Personal income taxation

In the field of taxation on labour policy reactions at the beginning of the crisis were characterised by reductions in the tax base mostly through increasing allowances, and tax credits for personal income taxation. In addition, some countries introduced major income tax reforms in 2009 such as Austria, Hungary, Latvia (temporarily), Lithuania and Poland to reduce the income tax burden, sometimes going hand in hand with major rate cuts such as in Poland and Lithuania. The few cases of increases in PIT rates were almost exclusively restricted to high incomes.

From 2010 onwards policy measures concerning labour taxation were more heterogeneous among Member States. While most countries have increased their tax bases (such as Austria, Czech Republic, Cyprus, Estonia, Ireland, France, Greece, Latvia, Luxembourg, Portugal, Romania, Slovakia, Spain and the United Kingdom) some have also increased their statutory tax rates. Top personal income tax rates were increased most significantly in the United Kingdom (+10pp), Greece (+5pp), Portugal (+4.5pp), Luxembourg (+3.1pp) and Spain (+2pp). The resulting increases in both, tax rate and tax bases, were, hence, largely reversing previous decreases.

Several Member States have lowered personal income taxes (Bulgaria, Denmark, Finland, Germany, Hungary, Lithuania, the Netherlands and Sweden), mostly though increased allowances and tax credits. Decreases in personal income tax rates have largely been targeted to low incomes (or disfavoured groups (Germany, Netherlands)) just like many of the decreases in the tax bases. An exception to this targeted measures are the general personal income tax rate decreases in Finland, Denmark and Hungary. Hungary

⁶⁶ Information on tax measures stems from European Commission (2010b and 2011b) as well as the IBFD (2011).

introduced a flat rate tax system with a rate of 16% in 2011 compared to the previous 40.6% top marginal income tax rate.⁶⁷ In Denmark, the 2010 reform revised tax brackets and decreased the lowest and, in particular, the highest marginal tax rate from 59.0% to 51.5%. Finland decreased the income tax rates by 0.5 percentage points across all income tax brackets.

5.1.2. Social Security Contributions

Apart from automatic adjustments, changes in the social security system were rather limited both with respect to rates as well as with respect to the bases at the beginning of the crisis. However, in particular since 2011, social security contribution bases but also the contribution rates have almost exclusively been increased; also in those countries that engaged in labour tax rate cuts. Moreover, in some countries obligatory pension payments to private pension funds have been redirected towards the state social security system. While not effectively changing the tax burden on labour, this results in a purely statistical increase in social security contributions to the state (Hungary, Poland and Romania).

While the economic situation in 2008 and 2009 clearly resulted in a decrease in the tax burden on labour, the following years marked differences across Member States as regards the direction of tax changes. Overall, a slight increase in the tax burden on labour might be concluded. The most significant changes (increases as well as decreases) are mainly observed in Member States with a below average tax burden on labour, with the exception of Hungary and Denmark, which have decreased the labour tax burden starting from an above average position.

5.2. Taxes on capital

5.2.1. Corporate income taxation

Since the beginning of the crisis corporate income tax rates have not been used as an active policy instrument, as opposed to labour taxation or VAT rates.. However, the crisis seems to have stopped the long lasting trend of lowering CIT rates in the EU Member States. Since the beginning of the decade the average decrease in the EU average top statutory CIT rate amounted to more than one percentage point per year. In contrast to that, since 2008 the overall decrease until 2011 amounted to less than 0.5 percentage points, i.e. a decrease of 0.15 percentage points per year.

⁶⁷ Several surcharges (e.g. the solidarity surcharge of 4%) however increase the top marginal tax rate to 20.3%. The top personal income tax rate of 40.6% also includes the solidarity tax.

Also the number of countries engaging in CIT rate changes has been considerably less than those changing personal income tax rates. Nine Member States changed their top statutory CIT rates over the 2008-2011 period, among which Lithuania that increased the rate in 2009 but cut it back to its previous level in the following year. From the remaining countries, three decreased their CIT rates from below average rates further, namely Czech Republic, Hungary, and Slovenia. Greece, Luxembourg, the Netherlands, Sweden and the United Kingdom decreased their rates from above average levels. Some Member States such as Italy increased taxes falling on corporate profits (Robin Hood tax) or introduced (progressive) surcharges on high profits such as Portugal, Greece and Hungary on specific sectors.

In contrast to CIT rates, the CIT base was clearly used to cushion the effects of the crisis. Almost all countries introduced (temporary) special tax regimes, by which the tax base was reduced. Member States attempted to support business activities through investment/environmental tax credits and tax allowances (e.g. Belgium, Italy, Netherlands, Poland, Portugal, Slovakia, Slovenia) more generous depreciation allowances (Austria, Germany, Netherlands, Portugal) or extended payment obligations (Italy, Netherlands, Romania, Slovakia). Some of these measures were targeted towards SMEs (Germany, France, Lithuania, Netherlands, Spain, UK) such as profit exemptions, rate cuts or taxation of turnover at lower rates instead of the taxation of corporate profits.

5.2.2. Financial Sector Taxation

The belief that those who have caused the crisis and benefited from substantial government support should make a fair contribution to its costs has led to augmented taxation of capital, in particular of the financial sector. Ten Member States, namely Austria, Belgium, Cyprus, Denmark, France, Germany, Hungary, Portugal, Sweden and the United Kingdom, have or are about to introduce some form of taxes on the financial sector. These levies differ considerably with respect to the exact base, the rate, the timing (temporary versus permanent) as well as the scope. For example in Austria, Hungary, Portugal and the United Kingdom, financial sector taxation is implemented as a bank levy based on the balance sheet total (excluding own capital and secured deposits).

From an EU-wide perspective these different schemes could lead to double "taxation", in case branches of foreign banks are taxed in the branch jurisdiction and also in the home jurisdiction. Moreover, given that some countries will not introduce such taxes, they might become an important factor in the decision where to install the corporate

headquarters of a financial institution. Both, double taxation as well as non-taxation can cause competitive distortions within the Internal Market.⁶⁸

5.2.3. *Property taxes and other taxes on capital*

Other taxes on capital recently coming into force include taxes on speculative gains in Austria and France and the taxation of church property and inheritances in Greece. Hungary introduced special taxes on retail trade activities (the special retail tax), on telecommunication activities and on the activities of energy providers (the special energy tax). However taxes on immovable property have stayed generally unchanged, with the exception of Bulgaria, Czech Republic, Greece (church property and progressive taxation on high value real estate), Portugal and parts of Germany.

Summing up, major changes in the taxation of capital were restricted to the introduction of bank levies in several Member States. However, having in mind the long-standing trend to decrease capital and in particular corporate taxation, this no-change policy since the beginning of the crisis might reflect a turning point in capital taxation.

5.3. **Taxes on consumption**

5.3.1. *VAT*

At the beginning of the crisis in 2008, Member States tried to cushion its effects by changes in the tax base. In particular in 2008 and 2009 a number of measures narrowing the tax base of the standard VAT, by applying reduced rates to more goods and services, were introduced. These measures were intended to boost demand for e.g. tourism, restaurant services and housing construction and renovation in countries like Belgium, Cyprus, France, Germany, Italy, Latvia, Lithuania, the Netherlands, Romania and Finland (in 2010). Only Portugal (2008) and the United Kingdom (2009) decreased temporarily their standard VAT rates.

Given the consolidation needs in many Member States, in particular from 2009 onwards Member States have started using the VAT rates as a policy instrument to raise revenues. Over the entire period 2008-2011 14 Member States increased their standard VAT rates at least once, and only in Ireland this increase was reversed in the following year. Reduced VAT rates were still increased in ten Member States. These increases in the standard VAT rates in individual Member States translate into an increase in the weighted EU average VAT rate by 1.3 percentage points to 20.7%.

⁶⁸ See KPMG (2011) for tax measures in the financial sector and Monti (2010) for considerations on the Internal Market

However, this increase underestimates the significant size of the rate hikes in individual Member States because large Member States like Germany, France and Italy did not change their rates. In the six old Member States that increased their tax rates (Greece, Spain, Portugal, Finland, UK, Ireland (temporarily in 2009)) the average tax rate hike was two percentage points. Eight new Member States (Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia, and Romania) hiked VAT rates by three percentage points on average.

The most sizeable individual increases took place in Hungary and Romania, which increased their standard VAT rates by 5 percentage points and in Greece, which increased the standard VAT rate by 4 percentage points.

It is interesting to note that four countries in the quartile of countries with the highest shares of consumption taxes in overall taxation increased their VAT rates (Estonia, Latvia, Poland and Romania). In contrast, only one country (Spain) in the quartile of the those with the lowest consumption tax burden hiked VAT rates. *Ceteris paribus*, this leads to a further reliance on consumption taxes of countries, which already rely heavily on them and hence more divergence in the in the tax structure between Member States.

5.3.2. *Excise duties*

The second important category in consumption taxes are excise duties, accounting for about 20% of consumption taxes. During 2008-2011 almost all Member States increased excise duties, in particular those on energy products but also, albeit to a lesser extent, those on alcohol and tobacco. At the beginning of the observation period mostly new Member States increased the rates – partly driven by the need to reach EU-minima levels on energy taxation by 2010. Since 2010 an increasing number of old Member States have joined the hike in excise duties, for revenue, environment or health reasons.

The need to bring public finances back to a sustainable path has also led to the introduction of new taxes in several Member States. Among the taxes that fall as excise duties on consumption are the nuclear energy tax in Germany and the taxes on airline tickets in Germany and Austria or emission taxes in Slovakia.⁶⁹

Overall, the tax burden on consumption has been clearly increasing since the beginning of the crisis, both with respect to the bases as well with respect to rates. The increase in consumption taxation is strongest in EU Member States that already rely heavily on consumption taxation, increasing tax systems' heterogeneity.

⁶⁹ The Netherlands abolished the tax on flight tickets in 2009.

5.4. Environmental taxes

As explained above, in the majority of Member States environmental taxes are dominated by energy taxes. These taxes are basically comprised by excise duties on the use of energy products just as fuels, gas and electricity. As excise duties have been raised in almost every Member States, energy taxes and hence environmental taxes have been increased since 2008. Moreover, some countries have introduced new environmental taxes. Germany introduced a nuclear energy tax, and Austria and Germany introduced taxes on airline tickets, while Slovakia introduced a tax on ETS quotas allocated free of charge.⁷⁰

Changes took also place in the field of transport taxation, in particular in the field of car taxation. Member States such as Austria, Belgium and the Netherlands linked the tax rate (Austria, Belgium) or the tax base (Netherlands) closer to CO₂ emissions to better reflect the damage caused to the environment by these emissions.

5.5. Any tax shifts since the beginning of the crisis?

The distress that the financial and economic crisis inflicted on government budgets has clearly marked fiscal policy since the crisis. In line with the European Economic Recovery Programme the first two years were characterised by tax measures to stabilise the economy. These measures took mostly the form of changes in the tax base, by granting more generous allowances, tax credits and narrowing the tax base of the standard VAT, or allowing for more generous tax payment delays. The above assessment of measures in individual tax categories, however, does not point towards a significant shift towards certain tax categories.

The latter years were characterised by consolidation needs. Indeed, the majority of the EU Member States have increased taxes in a wide range of categories, resulting in an increase in the tax burden. For capital and labour taxes, measures to broaden the tax base were prevalent, thus reversing earlier base narrowing measures. Tax rates were mostly increased for high incomes, while reductions were generally targeted to vulnerable groups. The tax burden on consumption and environmental taxation has been clearly increasing since the beginning of the crisis, both with respect to the bases but most frequently with respect to rates.

Given the general increase in consumption and environmental taxation in most Member States, a modest shift in the composition of the overall tax burden from labour and capital towards consumption taxation and environmental has taken place. However, the increase in consumption and environmental taxation was in general not accompanied by

⁷⁰ The decision if these taxes will be classified as environmental taxes in line with the definition currently applied in European Commission (2011b) is pending.

cuts in more distortive taxation on capital and labour, but also these categories taxes faced tax increased and the (uncoordinated) introduction of new taxes such as the bank levy, resulting in an increase in the overall tax burden. Hence, the overall tax shift is in general observed against a background of an increasing tax burden. The exceptions are clearly Hungary, which decreased the tax rate on labour while increasing the VAT rate and, albeit to a lesser extent, Denmark, Finland, and Lithuania. Germany and the Netherlands restructured their tax mixes slightly by decreasing the tax burden on capital and labour by mostly tax base measures.

6. CONCLUSIONS

As tax policies pursue many policy objectives, the topic quality of taxation covers many dimensions, economic growth being one of them. Given that economic growth is usually considered as a precondition for the general improvement of living conditions, the focus of the discussion on quality of taxation in this paper was on tax effects on GDP and on long-term and sustainable growth.

Economic theory links taxation to growth through its influence on the decisions of economic agents. Taxation – at least theoretically – changes economic decisions and can thereby affect economic growth. Considering a simple production function it is obvious that taxation can affect GDP and economic growth through its impact on i) physical capital ii) human capital and iii) through its effect on the total factor productivity. The theoretical effects of taxation on economic behaviour have been reviewed for the tax categories labour, consumption, capital and environment.

The provided theoretical arguments have been put into perspective with empirical research on the growth friendliness of tax categories. Certain findings indicate that corporate and personal income taxes are the most detrimental to growth, while consumption, environment and property taxes are least harmful. In particular, the reviewed simulation results indicate that smart consolidation of budgets – i.e. increasing the right taxes such as consumption taxes – might actually increase long term GDP, provided that the increased room for fiscal policy is used to cut labour taxation later on.

Based on this research the paper investigated whether over the recent past, i.e. 2001-2008, shifts towards tax systems that are supposedly less detrimental to growth could be observed in the EU. Overall, the average EU-27 tax mix has basically remained unchanged. Comparing developments in old and new Member States, however, shows that developments in the EU-12 seem to be largely in line with suggestions from the literature with decreasing labour tax shares and increasing consumption tax shares. In contrast, EU-15 Member States have experienced changes opposite to suggestions in the literature with an increasing capital tax share – due to increase corporate tax revenues – and a decreasing consumption tax share.

Sizable shifts from labour towards consumption taxation were mostly performed by new Member States, in particular by those already relying heavily on consumption taxes. As EU-15 Member States have not acted likewise, this has further increased divergence in EU Member States' tax systems. While it is not in the scope of the paper to investigate if there is a threshold above which a single tax category becomes too dominant to assure a 'growth enhancing' tax mix or if heterogeneity in tax systems is good or bad for the EU as a whole, it is certainly an interesting research question for future work.

The paper also analysed the question if the economic and financial crisis has triggered a rethinking and restructuring of tax systems towards growth enhancing structures. Tax policy at the beginning of the crisis was characterised by tax reductions in all tax categories to support the economy. These measures took mostly the form of changes in the tax base, by granting more generous allowances, tax credits and narrowing the tax base of the standard taxes, or granting tax payment extensions. Due to consolidation needs, the latter years have been dominated by tax increasing measures. Given the general increase in consumption taxation in most Member States and the heterogeneous measures concerning labour taxation, a modest shift in the composition of the overall tax burden from labour and capital towards consumption and environmental taxation has taken place in the EU. However, this shift materializes against a background of an increasing overall tax burden.

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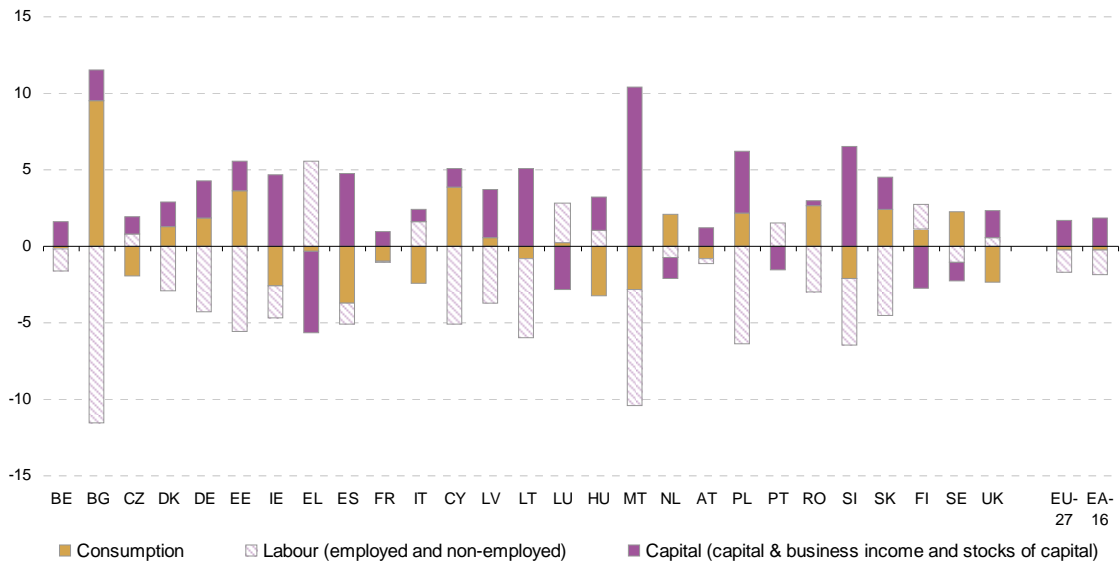
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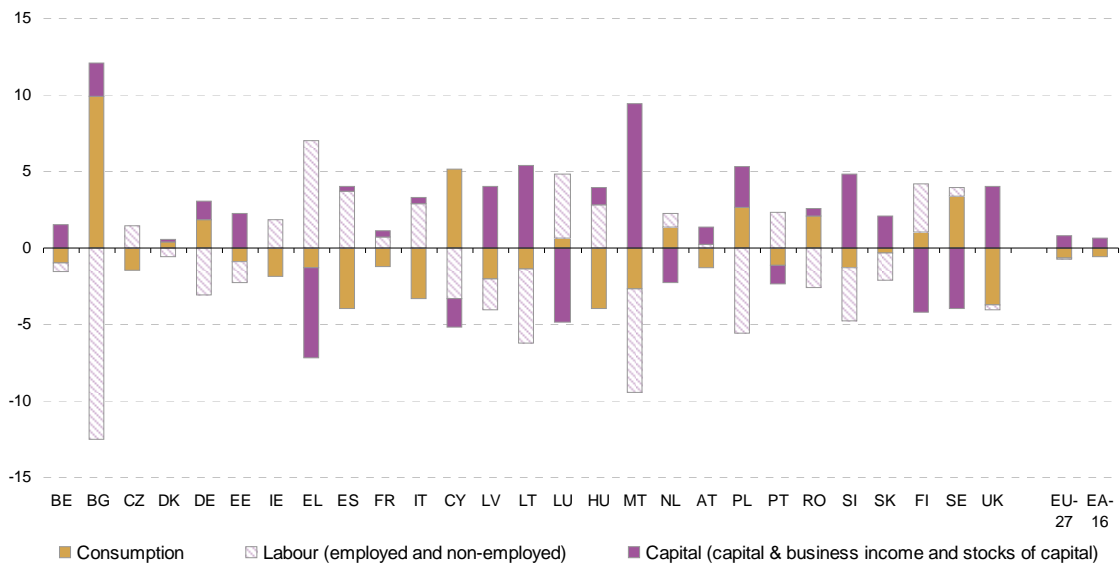
8. ANNEX

Graph A1: Tax Shift between 2000 and 2007, on the basis of total taxation



Source: European Commission (2011b), own calculations

Graph A2: Tax Shift between 2000 and 2008, on the basis of total taxation



Source: European Commission (2011b), own calculations

Table A1: Total Taxes (including SSC) as % of GDP

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	43.9	44.4	45.0	45.5	45.5	45.2	45.2	45.3	44.8	44.9	44.9	44.5	44.0	44.4	43.5	3
BG	30.8	28.6	27.6	32.1	30.8	31.5	30.8	28.5	31.0	32.5	31.3	30.7	33.3	32.3	28.9	23
CZ	36.2	34.7	35.0	33.3	34.0	33.8	34.0	34.8	35.7	37.4	37.1	36.7	37.2	35.5	34.5	16
DK	48.8	49.2	48.9	49.3	50.1	49.4	48.5	47.9	48.0	49.0	50.8	49.6	48.9	48.1	48.1	1
DE	39.8	40.7	40.7	40.9	41.7	41.9	40.0	39.5	39.6	38.7	38.8	39.1	39.3	39.4	39.7	8
EE	34.8	33.5	34.4	34.3	32.5	31.0	30.2	31.0	30.8	30.6	30.6	30.7	31.9	32.1	35.9	13
IE	33.1	33.1	32.4	31.7	31.9	31.5	29.7	28.4	28.9	30.2	30.7	32.2	31.4	29.7	28.2	25
EL	29.1	29.4	30.6	32.5	33.4	34.6	33.2	33.7	32.1	31.3	31.9	31.5	32.1	31.7	30.3	21
ES	32.7	33.1	33.2	33.0	33.6	33.9	33.5	33.9	33.9	34.5	35.6	36.4	37.1	33.2	30.4	20
FR	42.7	43.9	44.1	44.0	44.9	44.1	43.8	43.1	42.9	43.2	43.6	43.9	43.2	42.9	41.6	7
IT	40.1	41.8	43.7	42.5	42.5	41.8	41.5	40.9	41.3	40.6	40.4	42.0	43.0	42.9	43.1	4
CY	26.7	26.2	25.6	27.7	28.0	30.0	30.9	31.2	33.0	33.4	35.5	36.5	40.9	39.1	35.1	14
LV	33.2	30.8	32.1	33.7	32.0	29.5	28.5	28.3	28.5	28.5	29.0	30.4	30.5	29.1	26.6	27
LT	27.5	27.1	30.6	31.7	31.7	30.1	28.6	28.4	28.1	28.3	28.5	29.4	29.7	30.2	29.3	22
LU	37.1	37.6	39.3	39.4	38.3	39.1	39.8	39.3	38.1	37.3	37.6	35.9	35.7	35.3	37.1	12
HU	40.8	39.3	37.8	37.6	38.3	39.0	38.2	37.8	37.8	37.4	37.5	37.3	39.9	40.0	39.5	9
MT	26.8	25.4	27.5	25.6	27.3	28.2	30.4	31.5	31.4	32.9	33.7	33.4	34.3	33.9	34.2	17
NL	40.2	40.2	39.7	39.4	40.4	39.9	38.3	37.7	37.4	37.5	37.6	39.0	38.7	39.1	38.2	10
AT	41.4	42.9	44.4	44.4	44.0	43.2	45.3	43.9	43.8	43.4	42.3	41.8	42.0	42.6	42.7	6
PL	37.1	37.2	36.5	35.4	34.9	32.6	32.2	32.7	32.2	31.5	32.8	33.8	34.8	34.3	31.8	18
PT	29.5	30.2	30.2	30.3	31.0	31.1	30.9	31.5	31.7	30.6	31.5	32.3	32.9	32.8	31.0	19
RO	27.5	25.9	26.4	29.0	31.0	30.2	28.6	28.1	27.7	27.2	27.8	28.5	29.0	28.0	27.0	26
SI	39.2	38.1	37.0	37.8	38.2	37.5	37.7	38.0	38.2	38.3	38.6	38.3	37.8	37.2	37.6	11
SK	40.3	39.4	37.3	36.7	35.4	34.1	33.1	33.0	32.9	31.5	31.3	29.2	29.3	29.2	28.8	24
FI	45.7	47.1	46.4	46.3	45.9	47.2	44.8	44.7	44.1	43.5	43.9	43.8	43.0	43.1	43.1	5
SE	47.9	50.3	50.7	51.2	51.5	51.5	49.5	47.5	47.8	48.1	48.9	48.3	47.3	46.5	46.9	2
UK	34.7	34.4	34.8	35.9	36.2	36.7	36.4	34.9	34.7	35.1	36.0	36.7	36.3	37.5	34.9	15

Source: European Commission (2011b)

Table A2: Taxes on Labour as % of Total Taxation

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	55.4	54.4	54.3	53.8	53.5	53.6	54.7	54.8	54.8	53.4	52.9	51.8	52.3	53.1	54.6	9
BG	42.7	40.9	42.1	40.7	44.2	44.9	41.2	42.5	41.6	39.2	37.8	33.4	31.6	30.5	34.2	26
CZ	48.2	50.0	50.7	51.4	49.7	50.5	50.1	51.2	50.7	50.8	51.4	51.9	51.4	52.5	50.7	15
DK	55.9	55.5	55.0	53.3	53.8	53.9	55.6	54.5	54.1	51.4	48.8	49.6	51.0	53.1	56.5	4
DE	60.4	59.8	60.4	59.6	58.1	58.6	60.6	61.1	60.7	59.6	58.3	56.5	54.4	55.7	57.2	2
EE	56.3	55.4	53.6	54.9	57.2	56.4	56.0	55.0	54.3	53.6	50.2	49.9	50.8	55.2	52.1	10
IE	40.9	39.8	39.2	38.0	37.0	36.3	37.0	35.2	33.7	34.4	33.8	32.5	34.2	38.0	41.7	21
EL	36.1	37.0	37.4	37.1	36.5	35.9	36.8	38.9	40.7	40.4	40.6	39.6	40.3	41.0	41.2	22
ES	49.4	49.8	48.4	48.0	46.5	46.7	48.5	48.2	47.8	46.5	45.5	44.9	45.7	51.8	55.0	6
FR	53.2	52.2	51.9	51.7	51.6	52.0	52.2	52.7	53.4	52.9	52.8	52.1	52.0	52.6	54.9	7
IT	45.5	47.6	47.7	49.0	47.9	47.6	48.7	49.5	49.2	49.6	50.5	48.8	48.7	50.5	51.2	14
CY	37.0	36.0	38.0	36.3	34.6	31.5	32.1	31.9	32.3	31.5	31.8	30.4	26.4	28.2	34.8	25
LV	52.0	51.6	49.7	48.5	50.3	51.6	51.1	51.8	51.4	50.8	48.1	47.9	48.0	49.9	51.7	12
LT	46.8	48.9	48.6	50.2	52.6	54.1	53.9	52.4	51.9	52.0	50.7	49.8	49.0	49.3	51.4	13
LU	41.8	41.5	40.2	38.8	39.4	39.0	40.3	39.1	40.1	41.0	40.9	41.3	41.7	43.2	44.3	17
HU	49.8	49.5	51.4	50.5	48.8	48.7	49.8	50.3	48.8	47.8	48.9	49.2	49.8	51.5	49.9	16
MT	33.9	34.8	35.4	34.9	34.5	34.5	35.3	32.4	32.8	31.9	30.3	30.2	28.3	27.6	28.7	27
NL	54.5	51.8	50.3	50.1	50.5	51.2	47.0	48.7	50.3	49.6	48.5	50.3	50.3	51.8	54.8	8
AT	57.2	55.6	55.7	55.3	56.0	55.6	53.8	55.2	55.7	55.1	55.4	55.8	55.3	55.8	56.7	3
PL	45.9	46.1	46.4	47.6	45.0	43.7	44.8	41.1	41.1	39.7	39.1	39.6	37.4	38.1	38.2	24
PT	38.2	37.2	37.0	36.4	36.3	37.3	38.6	38.0	38.6	38.9	38.6	38.3	38.2	38.6	42.0	20
RO	43.0	43.8	38.6	41.7	41.8	43.8	44.9	43.9	40.1	39.4	39.6	40.6	40.8	41.2	44.0	18
SI	56.3	54.5	55.0	54.0	53.1	55.2	55.8	54.8	54.7	54.4	53.4	52.8	50.8	51.9	52.0	11
SK	38.2	41.9	44.4	44.5	43.8	44.1	45.5	45.3	43.8	42.1	40.0	39.5	39.6	42.3	43.5	19
FI	57.1	57.0	53.4	52.4	51.7	50.2	53.0	52.9	52.9	52.3	52.7	52.6	51.8	53.3	55.2	5
SE	62.1	62.5	61.8	62.5	61.4	59.7	62.3	62.5	62.6	61.5	59.5	58.8	57.6	59.7	58.5	1
UK	39.6	37.8	36.7	37.4	37.7	38.5	38.9	38.5	39.0	39.0	39.7	38.9	39.6	38.0	40.3	23

Source: European Commission (2011b)

Table A3: Taxes on Capital as % of Total Taxation

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	19.8	20.1	20.5	21.6	21.0	21.1	20.8	20.6	20.4	21.5	22.0	22.8	22.6	22.5	20.6	12
BG	17.9	20.4	20.5	15.6	14.8	13.3	17.1	15.9	13.9	13.1	11.4	12.5	18.9	16.1	14.8	18
CZ	20.3	17.5	18.5	18.0	18.7	18.2	19.8	19.8	20.2	19.2	18.3	19.0	19.3	17.2	16.8	15
DK	13.0	12.8	13.0	14.0	13.8	14.6	12.4	12.8	13.7	16.7	19.8	17.9	16.3	14.9	12.2	22
DE	13.7	15.2	15.0	15.7	16.7	16.3	13.3	12.7	12.9	14.2	15.6	17.7	18.6	17.3	14.9	17
EE	9.1	7.3	8.3	10.2	8.8	5.9	5.2	6.6	8.1	8.2	7.9	7.8	7.9	7.9	7.2	27
IE	19.8	21.3	22.0	23.2	25.1	25.4	26.3	26.1	28.8	28.5	29.0	31.8	30.1	25.2	22.9	9
EL	22.6	21.7	22.8	25.0	26.0	28.2	25.1	24.4	23.6	23.7	24.4	23.9	23.3	23.0	23.4	8
ES	23.4	23.0	25.0	25.0	25.8	25.9	24.9	25.8	25.7	26.8	28.3	29.8	30.3	24.9	24.5	7
FR	19.4	20.2	20.9	21.5	22.0	22.4	22.9	21.6	20.9	21.5	21.7	23.0	23.3	23.0	20.3	13
IT	28.5	28.3	28.7	25.8	26.3	26.2	26.2	25.6	26.9	25.8	24.8	26.6	27.6	26.5	26.0	5
CY	24.1	25.6	25.9	30.1	32.7	33.0	29.7	28.5	23.1	23.2	25.4	27.5	34.2	31.1	27.1	4
LV	11.3	10.5	12.4	12.6	12.1	9.8	11.7	10.8	8.8	9.2	9.5	9.9	12.9	13.9	9.3	26
LT	12.6	12.0	10.3	9.0	8.1	7.7	7.0	6.9	9.1	10.9	11.6	13.5	12.8	13.1	11.1	24
LU	31.2	32.2	33.0	34.3	33.2	33.6	33.1	33.6	32.1	28.9	30.0	30.6	30.8	28.8	28.3	3
HU	8.7	9.9	10.2	10.7	11.4	11.6	12.3	12.4	12.5	12.3	12.4	13.4	13.7	12.7	12.0	23
MT	22.9	21.7	21.6	22.2	21.8	22.5	22.8	25.2	27.8	27.7	27.0	28.3	31.4	32.0	32.0	1
NL	17.5	19.7	20.7	20.5	20.0	19.6	22.0	20.4	18.2	18.4	19.7	18.3	18.4	17.6	14.4	19
AT	14.8	16.3	16.0	16.6	15.4	15.9	18.9	16.5	16.1	16.5	16.1	16.3	17.1	17.1	15.3	16
PL	20.3	19.4	20.0	19.6	20.3	22.0	21.9	23.7	22.9	23.9	24.5	24.1	26.0	24.7	25.9	6
PT	21.4	22.5	23.7	23.3	24.3	25.0	23.5	24.0	23.3	21.4	20.5	21.0	23.4	24.0	22.8	10
RO	25.5	23.3	27.3	20.8	20.9	18.1	18.0	17.2	18.2	19.7	16.2	17.1	18.5	18.7	17.6	14
SI	5.3	6.7	7.7	8.0	8.0	7.9	8.6	9.1	9.3	10.2	12.0	12.9	14.4	12.5	11.0	25
SK	26.8	24.6	21.7	21.5	22.3	20.2	21.2	21.3	20.9	19.9	20.6	22.3	22.4	21.8	20.7	11
FI	12.6	13.4	15.4	17.1	17.5	21.0	17.6	17.1	15.5	16.4	16.2	16.5	18.3	16.9	13.7	20
SE	10.1	11.7	12.9	12.2	13.8	16.3	12.5	10.9	11.1	12.7	14.7	15.6	16.2	13.0	13.0	21
UK	25.8	27.2	28.9	29.5	28.9	29.3	29.6	28.4	27.9	28.3	29.8	31.6	31.0	33.3	30.1	2

Source: European Commission (2011b)

Table A3.1: Taxes on Income of Corporations as % of Total Taxation

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	5.3	6.0	6.3	7.4	7.1	7.1	6.9	6.7	6.4	6.9	7.4	8.0	7.9	7.6	5.8	18
BG	14.6	17.6	18.4	12.6	10.7	9.1	12.9	10.9	9.3	8.4	6.3	7.4	13.7	10.3	9.4	7
CZ	12.7	9.7	11.0	10.1	11.2	10.3	12.0	12.3	12.8	12.5	12.0	13.1	13.4	11.7	10.5	4
DK	4.8	5.1	5.5	6.1	4.8	6.6	5.8	6.0	6.1	6.5	7.7	8.8	7.8	6.8	5.1	23
DE	5.2	5.9	6.3	6.5	6.8	7.1	4.3	4.2	4.7	5.7	6.5	7.7	7.7	7.0	5.1	22
EE	6.7	4.6	5.1	7.1	6.0	2.9	2.3	3.6	5.1	5.4	4.7	4.9	5.2	5.1	5.2	21
IE	8.3	9.4	9.9	10.6	12.1	12.0	12.1	13.1	13.1	12.2	11.4	12.3	11.3	9.8	8.8	9
EL	8.0	6.8	7.5	8.6	9.4	12.0	10.1	10.0	9.1	9.6	10.3	8.6	7.9	7.9	8.0	10
ES	5.8	6.1	8.1	7.7	8.7	9.2	8.6	9.6	9.3	10.0	11.0	11.6	12.8	8.8	7.6	13
FR	4.2	4.7	5.2	5.3	5.9	6.3	7.0	5.9	5.0	5.4	5.3	6.6	6.7	6.4	3.0	27
IT	7.1	8.0	8.6	6.6	7.6	6.9	8.9	7.7	8.6	7.6	7.1	8.3	9.2	8.7	8.0	12
CY	15.8	17.8	18.0	20.9	23.9	20.6	20.1	19.2	13.1	11.1	13.1	15.0	16.6	18.0	18.4	2
LV	5.5	5.9	6.8	6.8	6.3	5.3	6.6	7.1	5.3	6.1	6.9	7.5	8.9	10.9	5.9	17
LT	7.4	6.4	5.0	4.1	2.6	2.3	1.9	2.1	4.9	6.6	7.3	9.4	8.7	9.1	6.3	16
LU	17.7	18.1	19.0	19.4	17.4	17.8	18.4	20.4	19.2	15.3	15.4	13.8	14.8	14.3	14.7	3
HU	4.5	4.5	4.9	5.5	5.9	5.6	6.0	6.1	5.9	5.7	5.8	6.4	7.1	6.7	5.8	19
MT	9.8	9.0	9.5	9.7	10.0	10.3	10.6	12.3	14.5	12.6	13.3	14.8	17.7	19.8	19.7	1
NL	8.1	10.1	11.4	11.4	11.0	10.9	11.0	9.4	8.1	8.8	9.7	9.4	9.1	8.8	5.6	20
AT	3.8	4.9	5.0	5.3	4.5	5.0	7.2	5.5	5.3	5.6	5.5	5.6	6.2	6.2	4.4	26
PL	7.3	7.1	7.5	7.3	6.9	7.5	5.8	6.2	5.6	7.0	7.6	7.1	7.9	7.9	7.2	14
PT	7.8	8.9	10.2	10.1	11.3	12.0	10.6	10.5	8.8	9.4	8.5	9.1	10.9	11.2	9.3	8
RO	13.8	12.5	16.3	12.8	12.3	9.8	9.3	9.3	10.1	11.6	9.8	10.0	10.5	10.7	9.7	5
SI	1.3	2.4	2.8	2.6	3.1	3.1	3.4	4.1	4.6	5.0	7.2	7.7	8.6	6.7	4.9	24
SK	16.5	12.7	11.7	11.2	11.7	10.1	10.2	9.8	10.3	9.4	9.4	10.8	11.1	11.6	9.4	6
FI	5.0	6.0	7.5	9.4	9.4	12.5	9.4	9.3	7.7	8.1	7.6	7.7	9.0	8.1	4.7	25
SE	5.4	5.1	5.6	5.1	5.9	7.3	5.3	4.3	4.6	6.0	7.3	7.5	8.0	6.3	6.4	15
UK	7.9	9.2	11.1	10.8	9.8	9.7	9.5	8.1	7.9	8.1	9.4	10.8	9.5	9.6	8.0	11

Source: European Commission (2011b)

Table A3.2: Taxes on Stocks of capital / wealth as % of Total Taxation

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	6.6	6.9	7.3	7.5	7.5	7.4	7.3	7.5	7.8	8.4	8.2	8.5	8.3	8.3	8.3	3
BG	1.2	1.2	0.6	0.9	1.3	1.3	1.3	1.8	2.0	2.2	2.5	2.7	2.9	3.4	3.2	17
CZ	2.9	3.1	2.8	3.0	2.8	3.0	2.8	2.5	2.5	1.8	1.8	2.0	1.9	1.9	1.8	26
DK	3.8	3.6	3.7	4.0	4.0	4.9	5.3	5.6	5.7	5.7	5.5	5.5	5.6	6.0	6.0	9
DE	2.9	3.0	2.7	2.7	2.8	2.6	2.8	2.6	2.7	2.8	2.8	2.8	2.8	2.6	2.5	21
EE	1.6	2.0	1.9	1.9	2.0	2.1	2.0	2.0	1.8	2.0	1.9	1.7	1.7	1.9	1.7	27
IE	6.1	6.3	6.1	6.2	6.6	6.4	6.6	6.3	7.5	7.9	8.8	9.8	9.1	7.5	7.4	6
EL	5.2	5.7	6.1	5.5	6.8	6.9	5.9	4.9	4.8	4.3	4.5	5.4	5.5	5.5	5.0	11
ES	7.4	7.1	7.5	8.0	8.3	8.4	8.3	8.5	9.0	9.6	10.1	10.5	9.6	8.4	8.0	4
FR	10.0	10.2	10.5	10.8	10.5	10.3	10.2	10.1	10.2	10.6	10.7	10.6	10.8	10.4	11.0	2
IT	9.7	8.6	8.7	7.9	7.0	6.3	6.0	7.0	6.3	6.9	6.6	6.5	6.4	5.8	6.7	8
CY	5.3	5.1	5.2	5.6	5.1	8.2	5.8	4.9	5.2	7.4	7.6	6.4	8.3	6.5	4.9	13
LV	5.7	4.4	5.4	5.5	5.6	3.9	4.6	3.0	3.0	2.7	2.4	2.0	3.4	2.6	3.0	19
LT	3.2	3.6	3.2	2.8	3.1	2.9	2.6	2.5	2.3	2.4	2.1	2.0	1.9	1.7	2.3	24
LU	7.3	7.8	8.2	8.9	10.1	10.8	9.9	8.4	7.7	8.0	8.7	9.5	10.0	7.7	7.0	7
HU	1.6	2.1	2.1	2.4	2.5	2.5	2.6	2.7	3.1	3.6	3.6	3.5	3.2	3.3	3.5	16
MT	4.8	4.7	4.2	4.5	4.2	4.0	4.2	4.9	5.2	7.5	6.5	6.2	6.1	5.3	5.0	12
NL	4.6	5.0	5.1	5.3	5.4	5.5	5.7	6.0	5.7	5.9	6.1	5.3	5.4	4.9	4.7	14
AT	2.9	2.7	2.5	2.6	2.5	2.6	2.5	2.5	2.5	2.4	2.4	2.5	2.4	2.2	2.3	23
PL	5.8	5.7	5.8	5.3	4.8	5.0	5.3	5.9	5.6	5.8	5.6	5.8	5.4	5.4	5.8	10
PT	6.8	6.4	6.5	6.6	7.1	7.0	7.1	8.1	9.1	7.0	7.2	7.5	7.8	7.7	7.9	5
RO	2.3	1.1	3.6	2.0	3.5	3.9	4.2	3.9	3.7	3.2	3.1	3.6	3.9	3.6	3.6	15
SI	1.6	1.6	1.9	2.4	2.3	2.3	2.5	2.3	2.1	2.3	2.4	2.4	2.4	2.3	2.4	22
SK	2.2	3.1	2.3	2.2	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.2	2.1	2.0	2.2	25
FI	2.5	2.7	2.7	2.8	2.8	2.8	2.8	2.8	2.8	3.2	3.2	3.0	3.1	3.1	3.1	18
SE	3.1	4.1	4.4	4.1	4.1	4.1	3.8	3.8	3.7	3.7	3.5	3.6	3.1	2.9	3.0	20
UK	10.5	10.7	10.8	10.9	11.3	12.0	11.8	12.2	12.1	12.2	12.3	12.5	12.8	15.0	12.8	1

Source: European Commission (2011b)

Table A4: Taxes on Consumption as % of Total Taxation

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	24.4	25.1	24.8	24.2	25.1	25.0	24.1	24.2	24.3	24.5	24.7	25.1	24.7	24.0	24.4	25
BG	39.4	38.6	37.4	43.7	41.0	41.8	41.6	41.6	44.5	47.8	50.7	53.9	49.3	53.2	50.8	1
CZ	31.6	32.5	30.8	30.6	31.7	31.3	30.1	29.1	29.1	30.0	30.4	29.1	29.3	30.4	32.5	15
DK	31.6	32.2	32.4	33.1	32.7	31.8	32.3	33.0	32.5	32.3	31.8	32.8	33.0	32.2	31.6	16
DE	25.9	25.0	24.6	24.7	25.2	25.2	26.2	26.2	26.4	26.2	26.1	25.9	27.0	27.0	27.8	22
EE	34.6	37.2	38.1	34.9	34.0	37.7	38.9	38.4	37.6	38.1	41.8	42.3	41.3	36.8	40.6	2
IE	39.2	38.9	38.8	38.8	37.9	38.4	36.7	38.7	37.5	37.1	37.2	35.7	35.7	36.8	35.4	13
EL	41.3	41.3	39.8	37.9	37.4	35.9	38.1	36.7	35.7	36.0	35.0	36.5	36.4	36.0	35.5	12
ES	27.3	27.4	27.7	29.1	29.8	29.2	28.4	27.9	28.2	28.0	27.5	26.7	25.4	25.2	23.6	26
FR	28.2	28.3	27.8	27.5	27.0	26.2	25.7	26.1	26.0	26.0	25.8	25.3	25.2	25.0	25.6	24
IT	25.9	24.1	23.6	25.3	25.8	26.2	25.1	24.9	23.9	24.7	24.7	24.7	23.7	23.0	22.8	27
CY	38.9	38.4	36.1	33.6	32.7	35.5	38.2	39.6	44.6	45.4	42.8	42.2	39.4	40.7	38.1	8
LV	36.8	37.8	37.9	38.9	36.9	38.4	37.2	37.5	39.9	39.3	41.8	41.6	39.0	36.5	38.4	4
LT	40.7	39.1	41.2	40.7	40.3	39.1	40.2	41.3	39.4	37.4	37.9	36.9	38.4	37.8	38.2	6
LU	26.9	26.2	26.8	26.9	27.4	27.4	26.5	27.3	27.7	30.1	29.1	28.1	27.5	28.0	27.4	23
HU	41.5	40.6	38.4	38.8	39.8	39.7	37.9	37.2	38.7	39.8	38.7	37.4	36.5	35.9	38.1	7
MT	43.2	43.5	43.1	42.9	43.8	43.1	41.9	42.4	39.4	40.4	42.6	41.5	40.2	40.4	39.3	3
NL	28.0	28.6	29.0	29.4	29.5	29.3	31.1	30.9	31.5	31.9	31.8	31.4	31.3	30.6	30.8	18
AT	28.1	28.1	28.4	28.2	28.7	28.6	27.4	28.5	28.4	28.5	28.7	28.1	27.7	27.2	28.2	21
PL	34.2	34.9	34.1	33.3	35.2	34.8	34.5	36.2	37.0	37.4	37.6	37.3	37.1	37.6	36.2	10
PT	40.4	40.3	39.3	40.3	39.4	37.8	37.9	37.9	38.1	39.7	40.8	40.7	38.4	37.4	35.2	14
RO	31.5	32.9	34.0	37.5	37.3	38.1	37.1	38.9	41.7	40.9	44.2	42.3	40.7	40.1	38.4	5
SI	38.5	39.0	37.4	38.1	39.0	37.0	35.6	36.2	36.1	35.4	34.7	34.4	34.9	35.9	37.3	9
SK	35.0	33.5	33.9	34.0	34.0	35.7	33.2	33.4	35.3	37.9	39.4	38.2	38.1	35.8	35.9	11
FI	30.3	29.6	31.2	30.5	30.8	28.8	29.4	29.9	31.7	31.3	31.1	30.9	29.9	29.8	31.1	17
SE	27.9	25.8	25.3	25.2	24.8	24.0	25.2	26.5	26.4	25.9	25.8	25.7	26.2	27.3	28.5	20
UK	34.7	35.0	34.5	33.1	33.3	32.2	32.0	32.9	33.4	32.5	31.1	29.8	30.0	28.3	29.8	19

Source: European Commission (2011b)

Table A5: Environmental taxes as % of Total Taxation

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Ranking 2009
BE	5.1	5.6	5.6	5.4	5.4	5.0	5.0	4.9	5.0	5.2	5.2	4.8	4.7	4.4	4.7	27
BG	5.9	3.7	4.8	7.1	7.8	8.4	8.2	8.2	9.5	9.8	9.6	9.4	10.1	10.7	10.5	1
CZ	8.0	7.8	7.3	7.3	7.7	7.6	7.7	7.3	7.4	7.1	7.3	7.0	6.7	6.9	7.2	13
DK	9.3	9.8	9.9	10.7	10.8	10.7	10.8	11.2	10.8	11.4	11.8	12.4	12.0	11.9	10.0	3
DE	5.8	5.4	5.3	5.2	5.5	5.7	6.3	6.4	6.7	6.5	6.3	6.1	5.7	5.6	5.7	23
EE	2.7	4.3	4.6	5.7	5.2	5.5	7.0	6.4	6.1	6.9	7.4	7.1	7.0	7.3	8.3	8
IE	9.2	9.4	9.3	9.4	9.3	9.1	7.9	8.3	8.1	8.3	8.2	7.7	7.9	8.4	8.4	7
EL	10.7	10.5	10.1	8.9	8.2	6.7	7.7	6.8	6.7	6.9	6.6	6.4	6.4	6.1	6.5	19
ES	6.7	6.6	6.4	6.9	6.9	6.5	6.2	6.1	6.1	5.8	5.4	5.1	4.9	4.9	5.4	25
FR	6.4	6.4	6.1	6.1	6.0	5.6	5.1	5.4	5.3	5.4	5.1	5.0	4.9	4.8	5.0	26
IT	8.8	8.2	7.8	7.8	8.0	7.4	7.1	6.9	7.1	6.8	6.7	6.4	6.0	5.7	6.1	21
CY	10.7	10.7	9.8	9.1	8.8	8.9	9.6	9.4	11.4	11.9	9.9	9.0	8.2	8.0	8.2	9
LV	3.7	5.5	6.8	9.0	7.6	8.1	7.6	8.1	8.8	9.1	9.1	7.8	6.8	6.7	8.7	6
LT	6.8	6.9	7.0	8.0	9.1	8.0	8.8	9.7	9.8	9.6	8.1	6.2	6.0	5.5	7.0	15
LU	8.0	7.8	7.5	7.4	7.3	7.1	7.1	7.1	7.3	8.2	7.8	7.3	7.1	7.0	6.6	18
HU	7.2	7.2	7.5	8.8	8.6	7.6	7.4	7.4	7.0	7.3	7.3	7.6	7.0	6.7	6.6	17
MT	11.9	12.0	12.8	15.4	14.9	13.1	12.1	10.9	10.9	9.3	9.8	10.0	10.9	10.2	9.8	4
NL	9.1	9.6	9.5	9.7	9.8	9.8	9.9	9.7	9.9	10.3	10.5	10.3	9.8	9.9	10.4	2
AT	5.2	5.0	5.4	5.2	5.3	5.6	5.8	6.1	6.3	6.3	6.2	6.0	5.8	5.6	5.7	24
PL	5.0	5.2	5.0	5.2	6.0	6.4	6.4	7.3	7.6	8.2	8.1	8.2	7.7	7.6	8.0	11
PT	11.5	11.4	10.7	11.2	10.5	8.5	9.3	9.7	9.5	9.8	9.4	8.9	8.6	7.8	8.1	10
RO	6.4	6.8	10.6	10.6	12.6	11.4	8.2	7.6	8.5	8.7	7.2	6.8	7.1	6.3	7.0	14
SI	10.8	11.5	12.2	13.4	10.9	7.9	8.6	8.6	8.7	8.7	8.3	7.9	8.0	8.1	9.5	5
SK	5.8	5.4	5.5	5.2	5.6	6.5	5.9	6.6	7.4	7.9	7.6	7.8	7.2	7.0	6.8	16
FI	6.4	6.6	7.2	7.2	7.5	6.6	6.6	6.8	7.2	7.4	7.0	6.9	6.4	6.3	6.2	20
SE	5.8	6.2	5.8	5.8	5.5	5.4	5.6	6.0	6.0	5.8	5.8	5.6	5.5	5.8	6.0	22
UK	8.3	8.5	8.3	8.6	8.5	8.1	7.6	7.8	7.7	7.4	7.0	6.5	6.8	6.4	7.4	12

Source: European Commission (2011b)

Table A5.1: Implicit tax rate on energy

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
BE	91.6	90.8	90.6	91.1	92.4	92.4	92.2	97.3	97.2	109.2	116.3	115.2	128.0	114.6	119.0
BG	14.7	6.5	13.0	24.7	31.5	40.6	42.9	40.4	50.5	61.6	62.7	65.7	93.1	110.0	108.4
CZ	38.7	41.4	42.0	46.0	51.9	55.2	65.3	74.1	71.9	81.1	95.9	102.5	113.6	132.6	130.8
DK	200.3	213.1	217.7	248.7	283.9	301.0	316.2	325.6	325.5	323.7	315.7	310.9	310.6	316.6	330.7
DE	168.3	151.9	149.6	150.3	177.5	192.7	200.4	211.6	221.1	214.2	209.3	206.8	209.6	203.9	215.5
EE	6.3	13.1	18.4	30.0	30.0	31.6	43.4	46.2	50.3	61.9	75.3	84.3	93.9	105.1	127.8
IE	112.2	121.1	139.5	140.4	144.7	140.7	126.7	150.4	155.0	172.4	170.8	170.8	189.2	175.2	199.2
EL	157.7	161.3	157.0	138.6	132.2	117.3	118.0	110.8	111.1	115.4	115.7	114.8	125.3	126.4	135.5
ES	128.1	134.3	128.9	138.5	144.0	137.9	134.8	143.0	141.8	141.4	140.3	146.7	148.2	148.7	157.5
FR	169.6	167.5	169.6	171.3	177.2	174.2	159.3	177.7	172.8	178.3	176.1	180.2	181.2	177.5	182.2
IT	236.3	259.1	269.6	257.8	261.8	245.8	240.4	235.9	242.2	229.6	229.2	237.4	236.4	233.1	259.6
CY	26.4	27.1	26.4	29.3	31.9	43.1	61.2	64.6	125.3	145.4	145.8	146.5	147.5	138.3	142.1
LV	10.1	18.1	26.7	44.7	41.3	48.2	43.2	48.3	51.8	60.4	71.8	75.7	82.9	92.3	96.5
LT	12.3	16.4	25.0	38.9	54.5	57.9	64.8	75.6	79.7	77.7	81.7	83.3	92.6	102.7	116.5
LU	140.9	138.6	143.0	151.2	158.8	164.4	164.3	169.7	173.9	185.7	193.7	194.6	202.8	212.3	210.1
HU	58.5	53.1	62.2	77.0	79.3	79.7	82.4	92.9	96.5	96.6	100.8	103.8	118.6	121.6	:
MT	67.5	82.4	100.9	181.4	193.2	180.8	160.5	163.4	122.1	113.6	135.5	154.1	221.3	176.0	202.4
NL	110.4	109.2	123.9	129.6	144.3	153.4	158.6	162.2	167.6	178.5	197.9	213.9	207.3	224.6	230.3
AT	122.9	116.7	136.3	129.7	135.0	141.6	146.2	151.3	151.7	163.0	155.7	155.5	165.4	170.6	171.5
PL	20.6	26.0	27.5	37.5	47.8	59.0	66.8	77.4	72.1	75.3	96.1	101.4	116.4	128.6	107.3
PT	164.6	163.5	152.5	159.4	151.4	111.8	133.4	157.7	167.7	167.4	167.5	171.7	178.2	175.0	:
RO	15.1	13.6	25.3	36.1	56.0	58.2	37.8	36.5	43.7	51.5	59.4	67.2	87.8	79.1	86.0
SI	126.2	126.0	138.9	177.7	155.5	118.6	136.3	144.9	141.8	146.1	145.4	147.7	165.9	168.4	226.8
SK	29.9	29.5	32.1	32.2	33.2	42.4	37.1	44.2	59.3	70.3	77.2	82.8	95.6	108.3	100.8
FI	96.7	96.2	106.6	104.6	109.8	108.7	112.4	113.4	112.0	112.8	115.4	111.0	110.8	124.2	129.9
SE	133.5	163.4	162.5	166.6	170.8	179.7	176.1	191.0	202.7	207.5	211.0	218.7	220.1	218.8	210.0
UK	142.6	147.8	185.7	208.2	222.3	245.8	236.6	244.2	225.6	235.5	233.8	237.6	252.6	218.7	221.1

Source: European Commission (2011b)

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