

I. Shifting taxes away from labour to strengthen growth in the euro area

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In the euro area taxes are strongly skewed towards labour. Structural tax reforms aimed at shifting taxation away from labour are needed to strengthen the euro area's economic growth and job potential. This section examines how different tax bases affect potential growth and investigates the effect of tax shift reforms over the last decade. The section first analyses the benefits of reducing the taxation of labour in terms of increased labour market participation. Next, the section discusses other tax bases that are less detrimental to growth. Finally, applying a reduced-form regression analysis, the section investigates to what extent tax structures affected output between 2006 and 2017 in the euro area and presents scenarios that illustrate the long-run impact on output of tax shift reforms.

Overall, the analysis presented below confirms that shifting taxation away from labour to other tax bases can contribute to improving output. However, to stimulate growth, a shift in taxes should be part of a broader reform package that aims also to simplify and modernise tax systems, to address tax fraud, evasion and avoidance, to ensure that tax systems favour the deepening of the single market, and to remove the debt bias in taxation. ⁽¹⁾

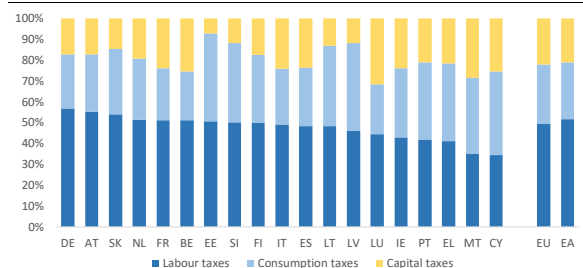
I.1. Introduction

The tax structure in the euro area is skewed towards labour, as labour taxes constitute the largest share of tax revenues in almost all euro area Member States (Graph I.1). An excessive tax burden on labour is a clear impediment to an efficient and smooth functioning of labour markets and may hamper economic activity and employment growth. As such, a well-designed shift ⁽²⁾ away from labour to tax bases that are less detrimental to growth ⁽³⁾, together with more efficient public spending and sustainable public debt, could significantly strengthen GDP growth and job creation potential in a number of euro area Member States.

Shifting taxes away from labour is high on the agenda of policy makers. ⁽⁴⁾ In the years prior to

the 2008 economic and financial crisis, several Member States took measures to gradually reduce taxation on labour although these were often of limited ambition. In the context of the crisis, however, many Member States raised taxes, including labour taxes, to contribute to consolidation efforts. When circumstances allowed, some Member States again implemented labour tax reductions, which were often targeted at low-income earners.

Graph I.1: Share of tax revenues according to tax type, 2017



⁽¹⁾ Labour taxes comprising all taxes directly linked to wages paid by employers and employees including social security contributions.

Source: European Commission Services.

⁽¹⁾ The authors wish to thank an anonymous reviewer for useful comments. This section represents the authors' views and not necessarily those of the European Commission.

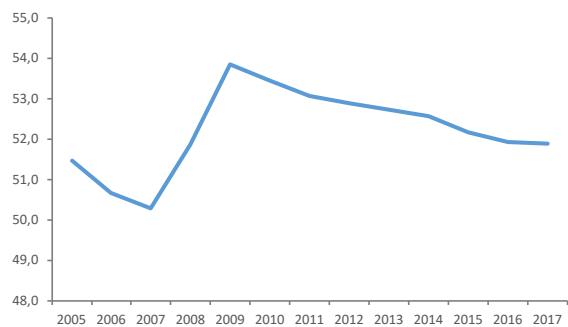
⁽²⁾ See, for instance, Baiardi, D., Profeta, P., Puglisi, R. and S. Scabrosetti (2017), 'Tax Policy and Economic Growth: Does it Really Matter?', SIEP Working Paper No. 718 who argue that the design of a tax is at least as important as the type of tax.

⁽³⁾ Along with reforms that (i) simplify and modernise tax systems, (ii) address tax fraud, evasion and avoidance, (iii) ensure that tax systems favour the deepening of the single market, and (iv) remove the debt bias in taxation – see for instance European Commission (2018), 'Analysis of the Euro Area economy', Commission Staff Working Document, SWD(2018) 467 final .

⁽⁴⁾ For instance, in 2015, the Eurogroup reaffirmed that reducing taxation on labour is a clear policy priority and agreed on common reform principles as well as a benchmark in this policy area. The group agreed on using indicators measuring the tax

wedge on labour for average wage and low wage earners. Since the benchmark was agreed, the annual assessment of draft budgetary plans is used to take stock of progress and of plans for the coming years. Moreover, in 2018, the euro area received a Council recommendation to shift taxation away from labour.

Graph I.2: Revenues from labour taxation, as % of total tax revenues (Euro area average), 2005-17



Source: European Commission Services.

The academic and policy debate on how tax structures affect the economy brought about a ranking of taxes in terms of their impact on growth. ⁽⁵⁾ Recurrent taxes on immovable property were found to be the least detrimental to growth, followed by consumption taxes and then by personal income taxes. Corporate income taxes appeared to have the most negative effect on economic growth. These findings suggested that a growth-favourable environment could be created by shifting taxation from labour taxes towards other taxes less detrimental to growth. While these findings steered economic tax policy during the last decade, the still sluggish growth in the post-crisis period renewed interest in the link between the structure of the tax system and economic growth.

Increased attention on inequality and fairness is another reason behind the reopening of the debate on the relationship between the tax structure and economic growth. Inequality issues had to be better addressed when rethinking the tax structure and shifting taxation away from labour. First, in the context of a tax shift away from labour, those in work will benefit from the labour tax reductions whereas others like pensioners will not. Moreover, when considering potential increases in consumption taxes, including taxes on energy, one should take into account the re-distributional effects of such a reform, which may be regressive if not combined with policy measures favouring the most vulnerable population groups. Likewise, raising revenue from recurrent property taxes, i.e. mainly housing taxes, would also require

⁽⁵⁾ See, for instance, Arnold (2008), 'Do Tax Structures Affect Aggregate Economic Growth? Empirical Evidence from a Panel of OECD Countries?', *OECD Economics Department Working Papers* No. 643.

consideration of how housing affordability can be maintained.

This section examines how much scope there is to shift taxation away from labour to other tax bases less detrimental to growth. First, it assesses the need for reducing the labour tax burden in euro area Member States and analyses how the tax burden affects labour market participation. Next, it discusses the taxes less detrimental to employment and growth as well as the political economy barriers to tax reforms. Finally, it investigates econometrically to what extent tax structures affected potential output between 2006 and 2017. ⁽⁶⁾ This involves exploring illustrative scenarios in which taxation is shifted in a revenue-neutral way away from labour to other tax bases to promote growth in the long run. ⁽⁷⁾ The last section draws some conclusions.

1.2. The tax burden on labour

Reducing taxation on labour – which includes personal income taxes as well as employee and employer social security contributions – has the potential to stimulate labour supply and demand and hence also employment and growth. ⁽⁸⁾ Labour taxation also impacts consumption, cost-competitiveness and firms' profitability.

The overall tax burden on labour, as measured by the tax wedge of a single earner at average earnings ⁽⁹⁾, is considered very high in some euro area countries (Graph I.3). To gauge the need to reduce labour taxes it is however also necessary to consider labour market outcomes.

⁽⁶⁾ Time horizon (partly) set by data availability.

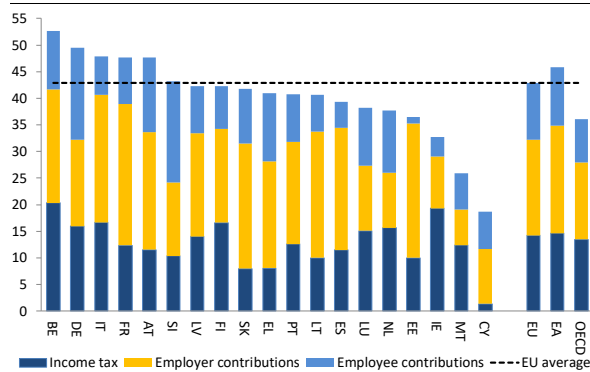
⁽⁷⁾ i.e., the supply side effects of tax reforms. The analysis does not provide estimates as to how in the short to medium run tax reforms may affect output via changes in aggregate demand - as in the case of, for instance, an increase in disposable income following a cut in labour income taxes (assuming a non-Ricardian setting).

⁽⁸⁾ For a general overview of labour taxation and labour market performance, see for instance, Econpublica (2011), *The Role and Impact of Labour Taxation Policies*, Università Bocconi.

⁽⁹⁾ The tax wedge on labour income provides a detailed insight into the burden on an individual and provides a measure of the difference between total labour costs to the employer and the corresponding net take-home pay of the employee. The tax wedge is the sum of personal income taxes and social security contributions net of family allowances, as a percentage of total labour costs (the sum of the gross wage and social security contributions paid by the employer).

When it comes to boosting labour market participation, what matters is also the distribution of the tax burden over the different income groups. ⁽¹⁰⁾ While the tax structure plays a crucial role in boosting growth and employment, the design of taxation is of even greater importance to address labour market participation and inequality issues.

Graph I.3: Tax wedge on labour, single earner, average wage (2018)



Source: European Commission Services based on OECD data

The negative impact of high labour taxes is particularly pronounced for groups facing more elastic labour supply and demand such as low-income and second earners. ⁽¹¹⁾ It is therefore essential to have a special focus on those segments of the labour market and identify for which of these groups labour taxation substantially contributes to under-participation in the labour market.

Targeting the most vulnerable groups can maximise the employment effect of labour tax reductions. At higher income levels, these effects are much less relevant, as demand elasticity tends to be lower and the fixed cost of participation in the labour market becomes comparatively lower. ⁽¹²⁾

⁽¹⁰⁾ Kalyva, A., S. Princen, A. Leodolter and C. Astarita (2018), 'Labour taxation and inclusive growth', *European Economy Discussion Paper* No 084.

⁽¹¹⁾ See, for instance, http://www.oecd-ilibrary.org/taxation/tax-design-for-inclusive-economic-growth_5jlv74ggk0g7-en.

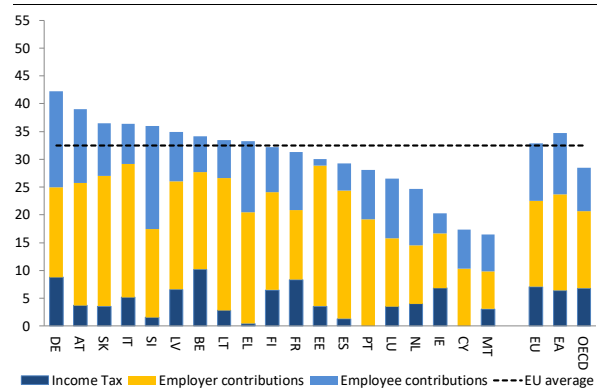
⁽¹²⁾ See, for instance, CPB Netherlands Bureau for Economic Policy Analysis (Consortium leader) (2015), 'Study on the effects and incidence of labour taxation', *European Commission Taxation Papers*, Working Paper No. 56 – 2015

Low-income earners

Several Member States have a relatively high tax wedge for low-income earners (Graph I.4), which may substantially discourage labour market participation. Workers with a low level of income are particularly responsive to changes in taxation, which tend to have a substantial impact on their decision to work or not.

Taxation, however, is only one of several factors contributing to financial disincentives to work. The level of unemployment benefits, social assistance and housing benefits may also contribute substantially to the (dis)incentive to take up work, while varying widely from one country to another.

Graph I.4: Tax wedge on labour, single earner, 50% of average wage (2018)



Source: European Commission Services based on OECD data

Second earners

In some Member States, labour taxation is designed in such a way that it discourages second earners from taking up work. When comparing the average tax rate for second earners with the average tax rate for a single earner at 67% of the average wage, substantial differences can be observed. Those differences are mainly due to the design of the labour tax system, which in many countries aims to ensure that families with the same total income pay the same total income tax, irrespective of who has earned the income.

While ensuring fairness between households, features of family-based taxation may also lead to an unequal tax treatment of individuals within a household. Since the primary earner benefits from the family-based features, including the lower tax brackets, the non-working partner or secondary earner will be subject to a higher effective tax rate

when increasing their labour supply. It should also be kept in mind that a wide variety of other policies, such as out-of-work benefits and the availability and quality of child care facilities, also impact on secondary earners' participation decisions.

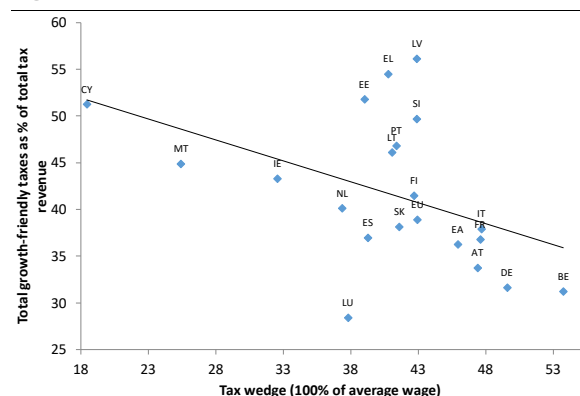
I.3. Taxes less detrimental to employment and growth

Whereas personal and corporate income taxes are considered to have a particularly negative effect on growth and employment, recurrent taxes on immovable property, consumption taxes and environmental taxes are considered less distortive in terms of market outcomes. ⁽¹³⁾ ⁽¹⁴⁾

A first look at the data suggests that several euro area Member States have potential scope to shift from labour taxes to consumption, property and environmental taxes as they combine a high tax wedge and rather low revenue from taxes less detrimental to growth (see Graph I.5).

This sub-section describes how changes in taxes may affect output at the margin. However, it should be remembered that some taxes less detrimental to growth have more potential than others to raise revenue because of differences in the size of the potential tax base. Consumption taxes are therefore often preferred over environmental and recurrent property taxes.

Graph I.5: Correlation of tax wedge with total taxes less detrimental to growth, 2017



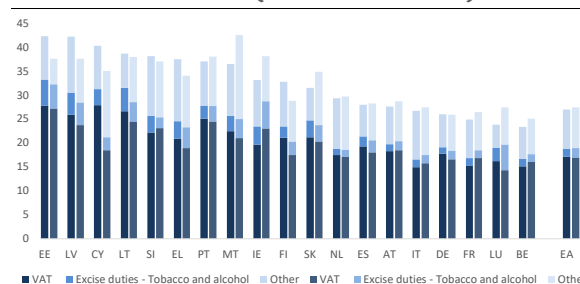
(1) Some energy taxes may be considered both as consumption and as environmental taxes.

Source: European Commission Services partly based on OECD data.

I.3.1. Consumption taxes

Given the above, consumption taxes and in particular value-added tax (VAT) are an important revenue source for most Member States.

Graph I.6: Share of consumption taxes in total tax revenue (2017 and 2000)



Source: European Commission Services

There are significant differences between Member States. In general, central European Member States tend to raise a higher proportion of their revenue from consumption taxes. For instance, in Belgium, Luxembourg and France consumption tax revenues constitute about 25% of total tax revenue while in Estonia and Latvia it is more than 40%. In most Member States this share remained fairly stable between 2000 and 2017 (Graph I.6).

Redistributive effect

Higher consumption taxes are often associated with lower tax progressivity and higher levels of

⁽¹³⁾ Some recent economic literature, though, points to heterogeneity of responses, non-linear effects and differences in amplitude between the short-term and long-term effects of a tax shift from labour to other tax bases. See, for instance, Mastrogiacomo, M., N. Bosch, M. Gielen and E. Jongen (2017), 'Heterogeneity in Labour Supply Responses: Evidence from a Major Tax Reform', *Oxford Bulletin of Economics and Statistics*, Vol.79, No. 5, pp. 769-796.

⁽¹⁴⁾ OECD (2010), Tax Policy Reform and Economic Growth.

inequality. ⁽¹⁵⁾ In fact, VAT and excise duties have a regressive effect when the cost to households is measured as a percentage of income, and are generally either proportional or slightly progressive when their effect is measured as a percentage of expenditure. ⁽¹⁶⁾

Reduced VAT rates and exemptions may not be the most (cost) efficient instrument to address distributional issues. ⁽¹⁷⁾ For instance, while many of the reduced rates introduced to support low-income households increase the purchasing power of these households, they are a poorly targeted and costly way of achieving this aim. ⁽¹⁸⁾ At best, rich households receive as much benefit from a reduced rate as do poor households. At worst, rich households benefit vastly more than poor households do. Hence, support to low-income households can be better achieved through more direct mechanisms such as income-tested cash transfers.

Allocative inefficiencies

Apart from the distributional effects described above, VAT generates allocative inefficiencies (i.e. deadweight losses), the size of which depends on the price elasticity of labour demand and supply. A consumption tax affects the real purchasing power of workers and households. As such, a rise in VAT may curb labour supply, lower work intensity and may trigger a rise in nominal wages ⁽¹⁹⁾ depending on the bargaining power of labour. ⁽²⁰⁾

Overall, the available empirical evidence suggests that a reduction of labour taxes compensated by an increase in the implicit consumption tax rate leads

to an increase in the levels of employment and GDP. ⁽²¹⁾

I.3.2. Environmental taxes

Environmental taxes ⁽²²⁾ are used both as a way of raising revenue and to help a country achieve its environmental objectives. ⁽²³⁾

To guarantee a stable level of revenue and to achieve the desired environmental outcome by internalising the external cost linked to certain goods and/or behaviours, environmental taxes need to be carefully designed. While in all Member States energy taxes are the most revenue-generating and the most macro-relevant environmental taxes, vehicle taxes also play an important role in some countries.

The revenues generated by environmental taxes differ significantly among EU Member States. Moreover, overall, revenues have not evolved much over the last decade (see Graph I.7). While total environmental tax revenues slightly dropped in 2008, by 2017 they were back at their 2005 level of 2.3% of GDP. Hence, environmental taxation seems to be underused in many Member States.

⁽¹⁵⁾ N. Pestel and E. Sommer (2015), 'Shifting Taxes from Labor to Consumption: More Employment and more Inequality', *ZEW Discussion Paper* No. 15-042.

⁽¹⁶⁾ See, for instance, Price, R., T. Dang and J. Botev (2015), 'Adjusting fiscal balances for the business cycle: New tax and expenditure elasticity estimates for OECD countries', *OECD Economics Department Working Papers*, No. 1275.

⁽¹⁷⁾ idem.

⁽¹⁸⁾ Lustig, N. (2018), 'Measuring the distribution of household income, consumption and wealth', in Stiglitz, J., J. Fitoussi and M. Durand (eds.), *For Good Measure: Advancing Research on Well-being Metrics Beyond GDP*, OECD Publishing.

⁽¹⁹⁾ In turn, higher wage cost will reduce the efficient allocation of resources if not compensated by increases in labour productivity.

⁽²⁰⁾ The presence of a more heterogeneous workforce will amplify such effects.

⁽²¹⁾ See, for instance, Varga, J., Roeger, W. and J in 't Veld (2012), 'Growth effects of structural reforms in Southern Europe: the case of Greece, Italy, Spain and Portugal', *European Economy Economic Papers* No. 511. The paper reports that increasing the consumption tax in EL, IT, ES and PT to the average of the highest three euro area rates, while simultaneously lowering labour taxes in a budgetary neutral way, would increase GDP after 5 years by 0.5% in PT up to 1.4% in Greece - with the long run GDP gain ranging from 1.9% (PT) to 4.5% (EL). De Castro, Fernández, F., Perelle, M. and R. Priftis (2018), 'The Economic Effects of a Tax Shift from Direct to Indirect Taxation in France', *European Commission Discussion Paper* No. 077, making use of the QUEST III for France model, report that a 0.5% increase in the implicit VAT rate would bring about a cumulative GDP rise of 0.25% at the most after ten years. Using a panel data of 18 OECD countries, Garcia-Escribano and Mehrez (2004), report that lowering the share of direct taxes in total tax revenues by 3 percentage points compensated by a rise in indirect taxes raises growth by 0.25 percentage point.

⁽²²⁾ Environmental taxes refer to taxes whose tax base is a physical unit (or a proxy of a physical unit) of something that has a proven, specific negative impact on the environment. They comprise taxes on energy, transport, pollution and resources. Officially denoted as 'environmentally related taxes'. See Eurostat (2013), *Environmental taxes, A statistical guide*.

⁽²³⁾ For a comprehensive discussion of the design and scope of environmental taxes, see, for instance, OECD (2011), *Taxation, Innovation and the Environment*

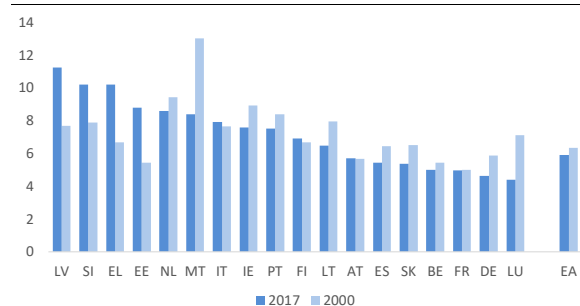
Relatively less distortive

Environmental taxes are considered among those taxes relatively less distortive in terms of market outcomes.⁽²⁴⁾ ⁽²⁵⁾ While they may raise prices, lead to lower output and higher output prices, their positive growth impact is expected to materialise through different channels. They help reduce negative externalities, such as environmental and health damages⁽²⁶⁾, as well as stimulate productivity⁽²⁷⁾ and innovation.⁽²⁸⁾ Moreover, they may contribute to creating ‘green jobs’⁽²⁹⁾ and reducing inequality⁽³⁰⁾ when additional revenue is used to reduce other taxes which disproportionately affect poorer households.⁽³¹⁾

Moreover, a well-designed recycling of these revenues may improve overall technological and

economic efficiency, especially in combination with investment in green infrastructure.⁽³²⁾

Graph I.7: Share of environmental taxes in total tax revenue



Source: European Commission Services.

Shrinking tax base

Finally, in the long run, this tax base will be eroded by increased energy efficiency, the development of renewable energy sources and national environmental regulations. This will in turn reduce the tax revenue from non-renewable energy taxes.⁽³³⁾ In this light, environmental taxes should be designed to achieve the desired environmental outcomes, while continuing to generate tax revenue.

I.3.3. Immovable property taxes

The share of recurrent taxes on land, buildings and other structures in total tax revenue varies markedly across Member States, although it is low on average (at about 3.3% in the euro area in 2017). In some Member States this share increased notably such as in Greece where it has increased from 0.6% in 2000 to 6.6% in 2017 (see Graph I.8).

In 2017, revenue from property taxes was equivalent to 2.6% of GDP in the euro area on

⁽²⁴⁾ See, for instance, OECD (2010), ‘Tax Policy Reform and Economic Growth’, OECD Publishing.

⁽²⁵⁾ This section does not study the impact of taxes compared to regulation to address environmental externalities in the production process – which both have their impact on technological and economic efficiency. Energy taxes are more efficient than regulation as they leave producer the choice of the level and the method of abatement and require lower administration costs, especially when environmental damages are not location-specific and do not vary with the source of pollution. This section focusses on the level of environmental tax as such.

⁽²⁶⁾ See, for instance, Allcott, H., S. Mullainathan and D. Taubinsky (2014), ‘Energy policy with externalities and internalities’, *Journal of Public Economics*, Vol. 12, pp. 72–88.

⁽²⁷⁾ See, for instance, Franco, C. and G. Marin (2017), ‘The Effect of Within-Sector, Upstream and Downstream Environmental Taxes on Innovation and Productivity’, *Environmental and Resource Economics*, No. 66, pp. 261–291.

⁽²⁸⁾ See, for instance, Bretschger, L. (2015), ‘Energy prices, growth, and the channels in between: Theory and evidence’, *Resource and Energy Economics*, Vol. 39, pp. 29–52, and Karydas, C. and L. Zhang (2017), ‘Green Tax Reform Endogenous Innovation and the Growth Dividend’, *Journal of Environmental Economics and Management*, October.

⁽²⁹⁾ See, for instance, Maxim, M., K. Zander and R. Patuelli (2019), ‘Green Tax Reform and Employment Double Dividend in European and Non-European Countries: A Meta-Regression Assessment’, *International Journal of Energy Economics and Policy*, Vol. 9, pp. 342–355.

⁽³⁰⁾ See, for instance, Hailemariam, A. and R. Dzhumashev (2019), ‘Income Inequality and Economic Growth: Heterogeneity and Nonlinearity’, in Bruce Mizzrach (ed.), *Studies in Nonlinear Dynamics & Econometrics*.

⁽³¹⁾ See, for instance, Oueslati, W., V. Zipperer, D. Rousselière and A. Dimitropoulos (2017), ‘Energy taxes, reforms and income inequality: An empirical cross-country analysis’, *International Economics*, Vol. 150, pp. 80–95.

⁽³²⁾ For instance, Cambridge Econometrics, GHK, Warwick Institute for Employment Research and IER (2012), *Studies on Sustainability Issues – Green Jobs; Trade and Labour* estimates the impact on GDP ranging from -0.2% when revenue is recycled via a reduction in employer’s social security rates to 0.75% when investment is spread across transport, machinery, buildings and renewables.

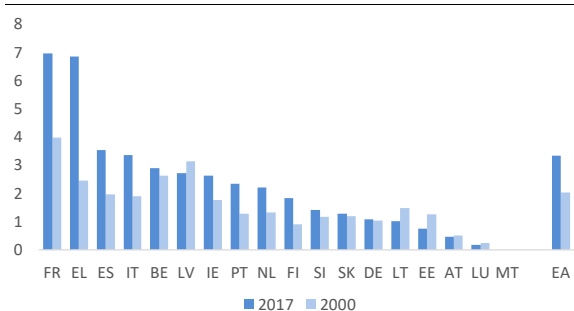
⁽³³⁾ However, as energy efficiency improves and the demand for cheaper energy increase (the so-called ‘rebound effect’) this tax loss may be tempered somewhat. See, for instance, Barker, T., A. Dagoumas and J. Rubin (2009), ‘The macroeconomic rebound effect and the world economy’, *Energy Efficiency*, Vol. 2, pp. 411–427.

average and more than a third of it came from taxes on transactions.

Although recurrent property taxes ⁽³⁴⁾ are generally considered to be the least harmful taxes to economic growth ⁽³⁵⁾, several Member States (Malta, Croatia, Luxembourg, Austria) have either none or very little revenues collected from recurrent property taxation.

Taxes related to immovable properties used in the production process ⁽³⁶⁾ have a direct impact on output as these properties are a production factor. Nevertheless, they are generally considered to be the least distortive taxes as they have only a negligible direct impact on decisions to work or invest. Moreover, as they are almost impossible to hide, only a limited amount of resources gets wasted evading these taxes.

Graph I.8: Share of recurrent taxes on immovable property in total tax revenue



(1) Recurrent property taxes are levied on land and buildings in the form of a percentage of an assessed property value based on a national rental income, sales price, or capitalised yield; or in terms of other characteristics of real property, (for example size or location) from which a presumed rent or capital value can be derived. They can be levied on proprietors, tenants, or both.

Source: European Commission Services.

⁽³⁴⁾ Generally speaking, property taxes apply to immovable properties used in the production process such as land and buildings as well as to residential buildings – which have each their specific impact on output.

⁽³⁵⁾ OECD (2010), *Tax Policy Reform and Economic Growth*, OECD Publishing.

⁽³⁶⁾ Such taxes have to be distinguished from taxes on immovable non-productive properties such as residential buildings. The latter taxes affect GDP via their impact on disposable income which is an aggregate demand not covered in this section. See, Romer C. and D. Romer (2010), 'The Macroeconomic Effects of Tax Changes: Estimates Based on a New Measure of Fiscal Shocks,' *American Economic Review*, Vol. 100, No. 3, pp. 763–801.

Taxation of residential buildings affects incentives to purchase and invest into residential property. Residential buildings are easily identified, and taxes are hard to evade and easy to collect. While updating cadastral values may be a challenge, decisions on these are mainly political and are not more complicated than for other taxes such as labour taxes that need an in situ inspection to check labour employed and the accuracy of the declaration.

Taxation of residential buildings can also have important side effects. First, a preferential tax treatment of owner-occupied housing inherent in most Member States' tax systems in the form of untaxed imputed rents, deductibility of interest on housing loans and/or exemption from capital gains tax may lead to misallocation of capital towards housing, potentially reinforcing an emerging housing bubble. ⁽³⁷⁾

Moreover, excessive taxes on property transactions may hinder the geographical mobility of labour which in turn may reduce overall output growth. ⁽³⁸⁾ Transaction taxes could reduce speculation and thus help reduce the risk of housing bubbles, but the empirical evidence remains ambiguous. ⁽³⁹⁾

⁽³⁷⁾ For instance, empirical analysis by Fatica, S. and D. Prammer (2017), 'Housing and the tax system: how large are the distortions in the euro area?', *ECB Working Paper* No 2087, making use of the Household Finance and Consumption Survey for 15 euro area Member States, suggests that preferential tax treatment of owner-occupiers affects adversely the business and financial cycles by i) altering relative prices whereby tax benefits lead to excess investment in owner-occupied housing potentially crowding out corporate investment and by ii) lowering the cost of debt thereby incentivising household leverage which in turn limits households' capacity to adjust in the face of a negative income shock. On average, excess housing consumption is estimated at 30 percent of the holdings of financial assets in homeowners' portfolios in 2017.

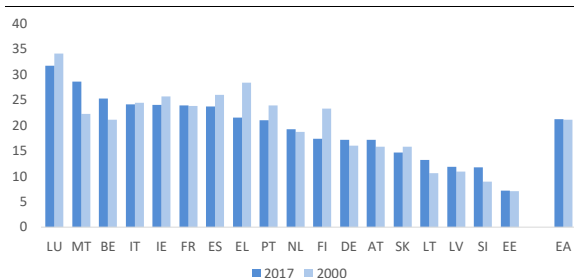
⁽³⁸⁾ Available evidence suggests a negative impact of transaction taxes on labour mobility. For instance, using a panel data set for the Netherlands covering the x period, Van Ommeren, J. and M. Van Leuvensteijn (2003), 'New evidence of the effect of transaction costs on residential mobility', *CPB Discussion Paper* 18, report that a 1 percentage-point increase in the value of transaction costs—as a percentage of the value of the residence—decreases residential mobility rates by at least 8 percent. Focus on the system of stamp duty on residential transactions that had been in place until December 3, 2014 covering the 1996 to 2008 period, Hilber, C. and T. Lyytikäinen (2017), 'Transfer Taxes and Household Mobility: Distortion on the Housing or Labor Market?', report that a 2 percentage-point increase in the British stamp duty reduced household mobility by about 37 percent.

⁽³⁹⁾ See Crowe, C., Dell'Ariccia, G., Igan D. and P. Rabanal (2011), 'How to Deal with Real Estate Booms: Lessons from Country Experiences', *IMF Working Papers* WP/11/91.

I.3.4. Capital taxes

Overall, revenues from capital taxes (i.e. taxes levied on the values or transfers of assets or net worth⁽⁴⁰⁾) – and in particular capital income taxes are low if compared to labour or consumption taxes. In 2017 capital taxes constituted 21.2% of total tax revenue in the euro area as a whole (see Graph I.9).

Graph I.9: **Share of capital taxes in total tax revenue**



Source: European Commission Services.

Optimal tax theory suggests that a well-designed tax system should tax income from all sources — land, labour and capital — comprehensively and at equal rates. ⁽⁴¹⁾ However, due to the high cross-border mobility of capital, capital income taxes were long considered to be inefficient revenue sources, as they could easily be avoided. Many Member States therefore tax capital income at a lower – and often flat – rate.

However, recent advances in the automatic exchange of information have increased international cooperation on the reporting of capital income. This strengthens Member States' capacity to raise taxes from mobile tax bases such as corporate taxes.

Moreover, taxation has a central role to play in shaping a fair society and a strong economy of which the taxation of capital is an important component. Inheritance and gift taxes would be

⁽⁴⁰⁾ Capital taxes consist of taxes levied at irregular and infrequent intervals on the values of the assets or net worth owned by institutional units or on the values of assets transferred between institutional units as a result of legacies, gifts inter vivos or other transfers. They include capital levies and taxes on capital transfers.

⁽⁴¹⁾ Under the comprehensive income definition, the taxable income is the total amount that an individual spends on consumption in a given period plus the increase in the economic wealth. This includes cash flows, such as wages, interest, dividends and rents, as well as accrued capital gains and imputed rents from owner-occupied housing.

particularly well suited to counteract wealth concentration and inequality, both in terms of their behavioural effects ⁽⁴²⁾ and because they are relatively easy to administer.

In practice however, revenue from these taxes is relatively low. First, political reluctance to using inheritance and gift taxation seems to be non-negligible. Another obstacle is tax avoidance and high offshore tax evasion related to inheritance taxes. Part of the tax gap due to offshore tax evasion can be attributed to missing inheritance tax revenues, which may also imply potentially large effects on the wealth distribution. ⁽⁴³⁾

I.4. Long-run impact of the tax structures on real GDP

The previous subsections highlighted that there is room to shift taxes away from labour to sources that are less detrimental to growth and employment. It also briefly discussed some of the channels via which taxes may affect growth and employment.

The following empirical analysis focusses on the long-run supply effects of tax reforms. However, it would be beyond the scope of this section to rigorously specify all channels via which taxes affect output. ⁽⁴⁴⁾ Therefore, building on a large

⁽⁴²⁾ According to the recent empirical literature inheritance and gift taxes have little to no negative effect on the donor of the inheritance, while they act favourably on the behaviour of the recipient by making them increase their labour supply. (See Princen S., Kalyva A., Leodolter A., Denis C. and A. Reut (forthcoming), 'Taxation of household capital in EU Member States - Impact on economic revenue efficiency and redistribution', ECFIN Discussion Paper.

⁽⁴³⁾ Princen et al. (forthcoming), *op cit*.

⁽⁴⁴⁾ In addition, a specific challenge specifying a regression equation is also that economic theory is not unambiguous about the impact of taxes on GDP. Classical economic theory, such as the Solow model, suggests that in the long-run the tax level and its composition affect the level of output but not its growth rate as decreasing returns in production impede permanent growth. In this model trend growth is driven by exogenous technological and population growth. On the other hand, endogenous growth theory suggests that taxes affect GDP growth via their impact on key factors such as physical and human capital as well as the creation of new ideas. Importantly, in these models the accumulation of physical and human capital can persist along a balanced growth path due to externalities. At the same time, the incentive to invest in any form of capital depends on the net return, which in turn is affected by taxes. See, for instance, Ireland, P. (1994), 'Two Perspectives on Growth and Taxes', *Federal Reserve Bank of Richmond Economic Quarterly*, Vol. 80, No. 1 and Karras (1999), 'Taxes and growth: Testing the Neoclassical and Endogenous Growth Models', *Western Economic Association International*, Vol. 17, No. 2, pp. 177-188.

strand of empirical literature, this sub-section will specify a reduced-form regression equation to estimate the long-run impact of taxes on output in the euro area. ⁽⁴⁵⁾

Other studies

The literature reports regression analyses in which the dependent variable is usually real GDP (per capita) ⁽⁴⁶⁾ in levels ⁽⁴⁷⁾ or in growth rates ⁽⁴⁸⁾, while the explanatory variables cover the overall tax burden, the tax structure as well as other explanatory variables. Taxes are either measured in terms of statutory rates, effective rates or shares in total revenue. Available studies usually make a distinction between the short- and long-run impact of tax structures ⁽⁴⁹⁾ and the data of countries are often pooled to increase the sample variability. ⁽⁵⁰⁾

The available econometric evidence on the impact of tax structures on GDP does not all point in the same direction with some evidence even suggesting that no direct effects are to be found. ⁽⁵¹⁾ Difference in econometric findings are due, among other things, to: (i) the relative impact of direct tax rates such as labour income and profit taxes ⁽⁵²⁾; (ii) the time-horizon which shows a stronger impact in the long run than in the short run ⁽⁵³⁾, and (iii) level versus growth effects. ⁽⁵⁴⁾ ⁽⁵⁵⁾

A reduced form regression analysis

This section estimates the impact of the tax structure on real GDP (adjusted for the impact of terms of trade) per employed person across the euro area over the long run. ⁽⁵⁶⁾ Within a panel data

⁽⁴⁵⁾ Two alternative strategies are mentioned here. The first of these is to use dynamic stochastic general equilibrium models assessing the impact of tax policies on macro-economic outcomes. See, for instance, de Castro Fernández, F., Perelle, M. and R. Pflütsch (2018), 'The Economic Effects of a Tax Shift from Direct to Indirect Taxation in France', European Commission Discussion Paper No. 077, Varga et al. (2012) *op cit*, and Varga, J. and J. in 't Veld (2014), 'The potential growth impact of structural reforms in the EU. A benchmarking exercise', *European Economy Occasional Papers* No. 541. The second strategy involves microeconomic analyses using micro-data estimating the income tax elasticity of the labour supply. See for instance, Saez, E., Slemrod, J. and Giertz, S. (2012), 'The elasticity of taxable income with respect to marginal tax rates: A critical review', *Journal of Economic Literature*, Vol. 50, pp. 3–50.

⁽⁴⁶⁾ See, for instance, Johannesson Lindén, A. and C. Gayer (2012), 'Possible reforms of real estate taxation: Criteria for successful policies', *European Economy Occasional Papers* 119, for a bottom-up-approach estimating the impact of taxes on TFP and investment-to-capital ratio at industry level.

⁽⁴⁷⁾ See, for instance, Arnold, J., Brys, B., Heady, C., Johansson, A., Schwelnus C. and L. Vartia (2011), 'Tax policy for economic recovery and growth', *The Economic Journal*, Vol. 121, No. 550, pp. F59-F80. Making use of a dataset covering annual data for 21 OECD countries over the period 1971 to 2004 in an error-correction set-up, the reduced-form regression analysis (complemented with an econometric analysis at industrial level of the impact of tax structures on investment and productivity) suggests that the most harmful taxes are corporate taxes, personal income taxes, consumption taxes and property taxes.

⁽⁴⁸⁾ See, for instance, Acosta-Ormaechea, S. and J. Yoo (2012), 'Tax Composition and Growth: A Broad Cross-Country Perspective', *IMF Working Paper* WP/12/101.

⁽⁴⁹⁾ I.e. the behavioural relations are specified as an error correction mechanisms.

⁽⁵⁰⁾ As tax structures may remain stable for some time in a country, country data on their own may lack enough variability to perform meaningful tests. Such data pooling may also call for heterogeneity in the parameters across (groups of) countries. See, for instance, Xing, J. (2012), 'Tax Structure and Growth: How Robust is the Empirical Evidence?', *Economic Letters*, Vol. 17, No. 1, pp. 379-382.

⁽⁵¹⁾ For instance, Arachi, G., Bucci, V. and A. Casarico (2015), 'Tax Structure and Macroeconomic Performance, International Tax and Public Finance', *International Tax and Public Finance*, Vol. 22, No. 4, pp. 635-667 using a panel data covering 15 OECD countries from 1965 to 2011 report that there is no clear evidence supporting the claim that tax structure, either measured by implicit tax rates or by tax ratios, has an impact on GDP. Baiardi, D., P. Profeta, R. Puglisi and S. Scabrosetti (2019), 'Tax policy and economic growth: does it really matter?', *International Tax and Public Finance*, Vol. 26, No. 2, pp 282–316, making use of a sample covering 34 OECD countries over the 1995–2014 period and a sample covering 23 OECD from 1971 to 2014 report that there are no robust relationships between revenue-neutral tax shifts and economic growth. Such outcome may be due to a low income tax elasticity of labour supply so that lower income taxes have only a limited impact on labour supply in the long run.

⁽⁵²⁾ For instance, Arnold (2008), *op cit*. show that increasing corporate income taxes has a higher negative impact than increasing personal income taxes on long-run GDP per capita across OECD countries. However, Acosta et al (2012), *op cit*. reports, using a set of 70 countries worldwide, that a reduction in personal income taxes has a stronger impact on growth rates than a reduction in corporate income taxes.

⁽⁵³⁾ For instance, European Commission (2006), *op cit*. reports a significant negative correlation between the revenue-neutral shift from indirect to direct taxes and the level of GDP per capita in the EU15 in the long run. However, a shift from labour income tax to indirect tax in the EU15 is negative in the first year (0.11% below baseline) but turns positive in the second year and GDP is 0.7 per cent above baseline after 10 years. The differences between the short and the long run can be partly explained by lower elasticity of the labour supply in the short run and transition costs due to political constraints and administrative burden .

⁽⁵⁴⁾ Mendoza, E., Milesi-Ferretti, G.M. and P. Asea (1997), 'On the ineffectiveness of tax policy in altering long-run growth: Harberger's superneutrality conjecture', *Journal of Public Economics*, vol. 66, pp. 99-126 argue using the implicit tax rate that while both theory and empirical evidence corroborate that changes in tax policy may affect investment rates and improve welfare through efficiency gains they do not affect growth.

⁽⁵⁵⁾ See, for instance, Kneller, R., M.F. Bleaney, and N. Gemmell (1999), 'Fiscal Policy and Growth: Evidence from OECD Countries', *Journal of Public Economics*, 74, pp. 171-190.

⁽⁵⁶⁾ It would be beyond the scope of this section to investigate also short- to medium-run dynamics, including the business cycle dynamics.

setting, covering 14 euro area and 6 non-euro area Member States ⁽⁵⁷⁾ over the 2000-2017 period, real GDP per employed person is regressed upon the economy's capital intensity and a measure of human capital as well as taxes affecting technological and economic efficiency, as specified in Box I.1.

More specifically, technological and economic efficiency is assumed to be affected by labour taxes (i.e. personal income tax and social security contributions) ⁽⁵⁸⁾, corporate taxes ⁽⁵⁹⁾, consumption taxes ⁽⁶⁰⁾ and the labour tax wedge gap ⁽⁶¹⁾, as well as by environmental taxes ⁽⁶²⁾ and

taxes on capital and real property such as land and buildings related to the production of goods and services.

The baseline regression relates real GDP per employed person to a whole range of tax categories – which are expressed as statutory tax rates or as shares in total tax revenue, depending on data availability ⁽⁶³⁾ (see Box I.1). Various variants of the baseline equation have been estimated; these differing in terms of the variables excluded.

Across the variants, the point estimates are fairly stable, and have the expected sign. However, not all point estimates are significant, especially taxes on capital. ⁽⁶⁴⁾

Making use of the point estimates in Box I.1, the next sub-section examines how past changes in the tax structure (during the 2006-2017 period) ⁽⁶⁵⁾ affected GDP per employed person, while the subsequent sub-section explores the long-run GDP effects of revenue-neutral tax reforms. These scenarios are of an illustrative nature and do not prejudice any specific policy action.

The following simulations (i) focus on long-run effects on the supply side; ⁽⁶⁶⁾ (ii) presuppose that the physical and human capital stock are predetermined ⁽⁶⁷⁾; (iii) assume ex-ante revenue

⁽⁵⁷⁾ I.e. BE, DE, IE, EL, ES, FR, IT, LV, LU, NL, AT, PT, SI and SK, as well as DK, CZ, HU, PL, SE and UK. Non-euro area Member States are included to increase sample variability.

⁽⁵⁸⁾ A priori, a tax change may have an ambiguous impact on labour market participation and hours worked as the income and substitution effect of a tax change point in the opposite direction. For a general discussion of the ambiguous impact of income tax on labour supply and efficiency see, for instance, Røed, K. and S. Strøm (2001), 'Progressive Taxes and the Labour Market: Is the Trade-off Between Equality and Efficiency Inevitable?', *Journal of Economic Surveys*, Vol.16, No. 1, pp. 77-110.

⁽⁵⁹⁾ Corporate taxes have an unambiguous negative direct impact on the incentives to start a business, invest in R&D, innovate and optimise the allocation of resources. For instance, Mukherjee, A, M. Singh and A. Žaldokas, 'Do corporate taxes hinder innovation?', *Journal of Financial Economics*, Volume 124, Issue 1, April 2017, pp. 195-221 report that tax increases triggers a lower number of patents, less investment in R&D, and fewer new products coming to the market, which may suggest that higher corporate taxes reduce innovations and risk-taking. A high corporate tax rate (compared to other countries) may also reduce foreign direct investments which in turn lowers the cross-border transfer of technologies and knowledge. See, for instance, Edmiston, K. (2004), 'Tax Uncertainty and Investment: A Cross-Country Empirical Examination', *Economic Inquiry*, Vol. 42, No. 3, pp. 425-440. In addition, higher corporate tax rates lower internal cash flows, which are a major source of finance innovation. See, for instance, Himmelberg, C. and B. Petersen (1994), 'R & D and Internal Finance: A Panel Study of Small Firms in High-Tech Industries', *The Review of Economics and Statistics*, Vol. 76, No. 1, pp. 38-51.

⁽⁶⁰⁾ For instance, a loss of efficiency may arise when a VAT increase pushes some firms into the informal sector or triggers an increase in relatively inefficient household production such as production of own food. See, for instance, Piggott, J. and J. Whalley (2001), 'VAT Base Broadening, Self Supply, and the Informal Sector', *The American Economic Review*, Vol. 91, No. 4, pp. 1084-1094.

⁽⁶¹⁾ This is measured in this section as the difference between the labour tax wedge of a single person without children earning 167% of average earnings, and the labour tax wedge of single person without children with average earnings. The tax wedge gap affects relative earnings which in turn may affect the efficiency of the production process. For instance, a strong tax wedge gap (i.e. a small difference in net earnings) may discourage workers' efforts such as acquiring new skills. Higher labour income taxes may also adversely affect the effort performed during a given time period when it is imperfectly observable. See, for instance, Prendergast (1996), 'What happens within firms? Survey of empirical evidence on compensation policies', *NBER Working Paper* 5802 and Koskela E. and R. Schöb (2007), 'Tax Progression under

Collective Wage Bargaining and Individual Effort Determination', *CESifo Working Paper* No. 2024. Even so, a low tax wedge gap may undermine collaboration on the work floor as workers at the lower end may envy the higher net wage earners.

⁽⁶²⁾ Revenues from environmental taxes include taxes on transport, energy, pollution and resources - Resource Efficiency Scoreboard definition. Environmental taxes are taxes levied to correct market failures such as CO2 emissions. On their own, such taxes may have a negative impact on economic activity as they raise, for instance, energy prices. However, a well-designed recycling of these revenues may improve overall technological and economic efficiency. See, for instance, Cambridge Econometrics, et al. (2012), *op cit.*

⁽⁶³⁾ See footnote 2 in the Box I.1, for an interpretation of the corresponding point estimates.

⁽⁶⁴⁾ This insignificance may be partly due to the fact that the data do not show enough variability, as these taxes remain fairly stable over the sample period.

⁽⁶⁵⁾ The first and last year are the years for which data are available for all Member States in the sample.

⁽⁶⁶⁾ Implicitly assuming that some taxes such as taxes on residential buildings do not have an impact on the production process, or more generally speaking, on economic agents' decisions related to labour market participation, production and innovation. See, for instance, Johannesson Lindén and Gayer (2012), *op cit.*

⁽⁶⁷⁾ Human capital and real capital formation are responsive to taxes. However, due to their specific properties they do not react in the

neutrality of the tax shift ⁽⁶⁸⁾; (iv) do not take into account possible changes in administrative and compliance costs or their impact on output efficiency; and (v) allow for time-varying tax semi-elasticities. ⁽⁶⁹⁾

I.5. Past changes in tax structures and GDP

Graphs I.10 and I.11 show the impact of the various changes in taxes on real GDP per employed person over the 2006-2017 period ⁽⁷⁰⁾ making use of the point estimates shown in variant V1 of Table C in Box I.1.

Graph I.10 suggests that tax developments had an overall negative impact on real GDP per employed person between 2006 and 2017. Focussing on the specific taxes, Graph I.11 suggests that developments in net social security contributions had a positive impact on GDP in Germany especially, followed by Portugal, but a marked adverse impact in Slovakia.

Increases in the statutory VAT rate had the strongest negative impact in Spain ⁽⁷¹⁾, followed by Germany ⁽⁷²⁾. Changes in the taxes on land and buildings used in the production of goods and services had a particularly negative impact in Ireland, Spain and Italy.

same way. For instance, individuals cannot purchase others' human capital or sell any which they accumulate themselves. Moreover, human capital also cannot be bequeathed or given away. See, for instance, Davies and Whalley (1989), 'Taxes and Capital Formation: How Important is Human Capital?', *NBER Working Paper* No. 2899. The usual approach in the available literature is to assume physical and human capital to be predetermined explanatory variables in the reduced form regression analysis is.

⁽⁶⁸⁾ i.e. it does not take into account the second-round effects of tax reforms.

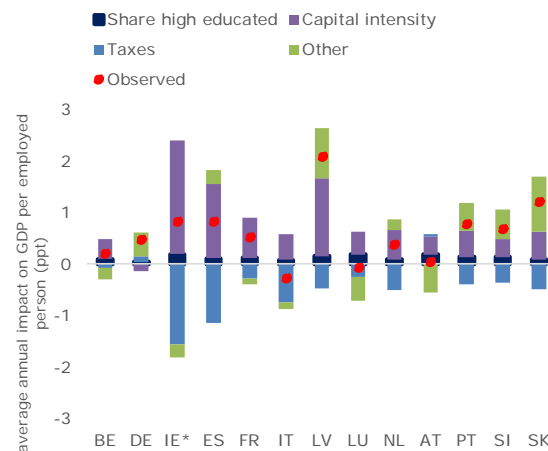
⁽⁶⁹⁾ See footnote 1 in Box I.1.

⁽⁷⁰⁾ 2006 is the first year for which all data for all Member States are available. 2007 is the last year in the sample.

⁽⁷¹⁾ In Spain, the standard VAT rate increased from 16% to 18% in 2010, and to 21% in 2013.

⁽⁷²⁾ In Germany, the standard VAT rate increased from 16% to 19% in 2007.

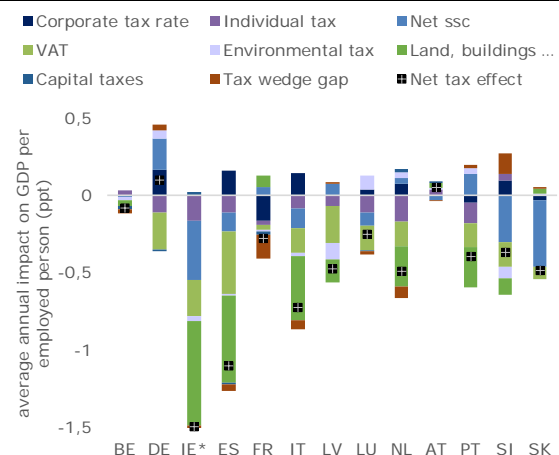
Graph I.10: Factors affecting GDP per employed person between 2006 and 2017



(1) Effects estimated using variant V1 of Table C in Box I.1
(2) Ireland 2006-2013 period – structural break

Source: Authors' estimates

Graph I.11: Breakdown of total tax effect on GDP per employed person between 2006 and 2017



(1) Effects estimated using variant V1 of Table C in Box I.1
(2) Ireland 2006-2013 period – structural break

Source: Authors' estimates

I.6. Illustrative simulations of the long-run effects

Making use of the estimation results reported in Box I.1, this sub-section discusses two structural tax reform scenarios involving a rebalancing of labour income and consumption taxes and a cut in labour income taxes compensated by an increase in environmental taxes. These scenarios are of an illustrative nature and do not prejudice any specific policy action.

Rebalancing labour income taxes and consumption taxes

Starting from the situation in 2017, Graph I.12 shows the impact on real GDP per employed person of an illustrative tax reform, in which the Member States reduce their labour to consumption tax revenue ratio ⁽⁷³⁾ to the lowest ratio in the euro area in 2017 ⁽⁷⁴⁾ by increasing consumption taxes and using the fiscal space to reduce personal income taxes (i.e. ex ante revenue neutrality).

Although the empirical results on tax reforms reported in the literature are not unambiguous, ⁽⁷⁵⁾ the simulation results suggest that on average this would increase GDP per employed person by about 1.5% ⁽⁷⁶⁾, with, on average, a 1.9% decrease stemming from the increase in consumption taxes and a 3.4% increase triggered by the cut in labour taxes. Among the Member States for which all data are available, Germany would record the strongest increase in GDP followed by the Netherlands and Slovakia.

Such tax shift from labour to consumption taxes towards the ‘best performer’ in the euro area, i.e. the euro area Member State with the lowest ratio of labour and consumption taxes, obviously translates to shifts of different size for Member States depending on how far they are from the benchmark. Alternatively, it is also insightful to look at the effects of a tax shift away from labour that is of equal magnitude for each Member State relative to their existing labour tax revenues.

⁽⁷³⁾ Technically speaking, the amount X by which one has to increase consumption tax revenue and reduce labour tax revenue to reach the desired ratio in a budget neutral way is equal to $X = (H - zC) / (1 + z)$ with H the labour tax revenue and C the consumption tax revenue in the base year, and with z the desired labour to consumption tax revenue ratio. In the available sample z is equal to the ratio observed in Latvia.

⁽⁷⁴⁾ I.e. Latvia among the Member States for which the data are available.

⁽⁷⁵⁾ See, the brief discussion of the literature in sub-section 5.

⁽⁷⁶⁾ These simulation results based on a reduced form regression analysis are in line with results obtained from simulations with dynamic stochastic general equilibrium models reported elsewhere in the literature. For instance, making use of the estimated DSGE model QUEST, Varga, J. and J. in 't Veld (2014), ‘The potential growth impact of structural reforms in the EU A benchmarking exercise’, *European Economy Economic Papers* 541 report similar results and an average net impact of 1.6%.

Raising environmental taxes

Another illustrative simulation looks at the long-run effect of a 1 pp reduction in the share of labour income taxes in total tax revenue (see Graph I.13). ⁽⁷⁷⁾ If this tax cut could be compensated by an increase in taxes that do not have an impact on production process such as taxes on residential buildings, real GDP would on average increase by 0.11% with the highest rise in Ireland and Italy. ⁽⁷⁸⁾

However, if taxes on residential buildings cannot be increased, additional revenue has to be obtained by raising other taxes, such as environmental taxes.

For example, Graph I.13 shows a scenario in which the cut in labour income tax is compensated by an increase in environmental taxes. The increase in environmental taxes by itself decreases real GDP per employed person by about 0.08 % for the euro area on average.

All in all, the net effect of the 1 pp cut in the share of income tax in total tax revenue and the accompanying rise in environmental tax is an increase by about 0.04% in real GDP per employed person for the euro area as a whole. ⁽⁷⁹⁾ Among the Member States for which all data are available, Ireland would record the strongest increase in

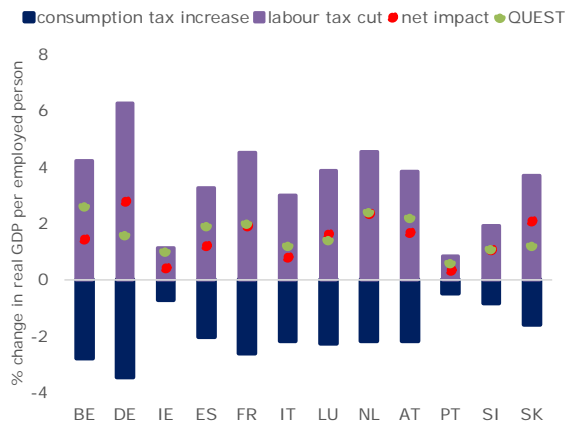
⁽⁷⁷⁾ The regression analysis shows a higher point estimate for social security contributions than for income taxes, suggesting that cutting social security contributions would have a stronger impact. However, from a political-economy point of view it may be less straightforward to cut social security contributions. Reducing social security contributions can be positive from a distributional point of view. However, as they often have an upper threshold and are therefore regressive, a shifting of the financing of social benefits towards other taxes may not be politically straightforward and could instead result in a reduction of social benefits provided.

⁽⁷⁸⁾ Other studies report similar results. For instance, Acosta-Ormaechea, S. and J. Yoo (2012), ‘Tax Composition and Growth : A Broad Cross-Country Perspective’, *IMF Working Paper* WP/12/101, applying an econometric analysis to medium- and high-income countries, report that a percentage point increase in income taxes would induce a slowdown in growth by about 0.1; Coenen, G., McAdam, P. and R. Straub (2007), ‘Tax Reform and Labour-Market Performance in the Euro Area a Simulation-Based Analysis Using the New Area-Wide Model’, *ECB Working Paper Series* No 747, making use of the ECB DSGE NAWM model report that lowering the euro area tax wedge (i.e. 64% in 2007) to levels prevailing in US (37%) would increase aggregate output by about 12% in the long run. Meyermans, E. (2004), ‘The macro-economic effects of labour market reforms in the European Union. Some selected simulations with the NIME model’, *Belgian Planning Bureau Working Paper* 12-04, making use of the macro-econometric model NIME reports that a 1 pp cut in the social security tax rate for the euro area as a whole, accompanied by a revenue neutral increase in the indirect tax rate, would induce a 0.12% increase in GDP in the long run.

⁽⁷⁹⁾ Unweighted average.

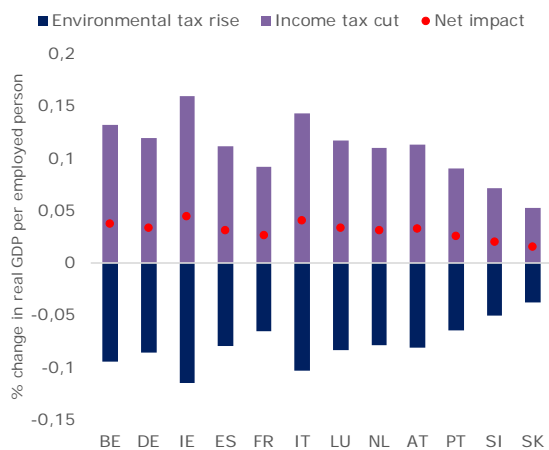
GDP followed by Italy and Belgium; while the lowest is recorded for Slovakia and Slovenia.

Graph I.12: **A labour to consumption tax revenue ratio shift – long- run effects (base year 2017)**



(1) Effects estimated using variant V1 of Table C in Box I.1 QUEST: the results reported in Varga and in't Veld (2014), *op. cit.* making use of the QUEST model
Source: Authors' estimates

Graph I.13: **1 ppt cut in the labour income tax share in total tax revenues and revenue-neutral rise in environmental taxes – long -run effects (base year 2017)**



(1) Effects estimated using variant V1 of Table C in Box I.1
Source: Authors' estimates

Policy insights

Subsections 2 and 3 highlighted that in several euro area Member States labour taxes are very high. At the same time, the econometric analysis shows that most taxes related to the production of goods and services have a significant impact on output in the

long run.⁽⁸⁰⁾ It also shows that the size of the impact of the various taxes differs, creating room for shifting taxation.⁽⁸¹⁾

The empirical analysis in this section therefore suggests that there is room to shift taxes away from labour, and that its net effect is highest when taxes are shifted to tax bases least detrimental to growth. The illustrative simulations suggest, for instance, that cuts in income taxes compensated by increases in environmental taxes could raise output in a environmentally sustainable way.⁽⁸²⁾

Nevertheless, while these simulations focus on long-run effects by impacting incentives at the margin, they do not take into account the technological innovations that may be triggered by environmental tax increases. However, such innovations will put additional downward pressure on, for instance, the use of non-renewable energy thereby eroding the tax base. This will then call for appropriate measures to offset any fall in tax revenue.

Even so, the analysis did not take into account explicitly the distributional effects of tax reforms such as the regressive nature of some environmental taxes. When not flanked by appropriate policies, such socio-economic risks may hinder a smooth implementation of structural tax reforms in the short to medium run as well as reduce the net growth effect of the reform.

I.7. Political economy barriers to fiscal reforms

The previous econometric analysis suggests that several Member States have a strong potential to shift from labour taxes to consumption, property and environmental taxes. However, while there may be room for comprehensive tax reforms, political-economy factors may hinder a speedy and full implementation of such reforms. Such barriers can take many forms.

⁽⁸⁰⁾ i.e. the supply side of the economy.

⁽⁸¹⁾ As already suggested by earlier research covering other areas and time periods, such as Arnold (2008), *op cit.*

⁽⁸²⁾ This is a net effect: the simulations are based on a reduced form regression which does not allow to disentangle the growth effect stemming from a change in tax rates on their own and from their distributional effects, such as a rise in environmental taxes may be regressive. Disentangling such effects would require more disaggregated data, which would be beyond the scope of this section.

First, a lack of clear communication about the policy goals and adequate consultation as well as a weak involvement of the main stakeholders may obstruct the reforms.

Even so, gradual reform may be necessary to ameliorate the large shifts in tax burdens that may result ⁽⁸³⁾ and to overcome the status quo bias. ⁽⁸⁴⁾ However, a gradual approach may mean that the benefits of the reforms materialise more slowly. ⁽⁸⁵⁾

The implementation of tax reforms may also be obstructed when there are widely dispersed winners but the losers are politically well organised.

The international context also matters. First, a coordination of tax reforms such as a rise in the taxation of fossil fuels among the Member States of a currency union will facilitate the implementation of such reforms as such coordinated action has the potential to offset potential losses in international price competitiveness among the Member States.

Moreover, when other (neighbouring) countries have already implemented similar tax reforms

successfully, political support for the reforms may rise.

I.8. Conclusions

This section examined the scope and limitations of structural tax reforms that involve shifting part of the tax burden on labour towards taxes that are less detrimental to growth.

While the available research suggests that property and consumption taxes are least detrimental to growth, the available empirical literature provides a mixed picture of the size of this potential, as results depend on the set of countries and years examined as well as methodology.

⁽⁸³⁾ This is for instance, well illustrated in the literature on property taxes. See, for instance, Slack, E. and R. Bird (2011), 'The Political Economy of Property Tax Reform', *OECD Working Papers on Fiscal Federalism* No. 18.

⁽⁸⁴⁾ A bias towards the status quo may arise when, for instance, voters and politicians – as is often the case – want to avoid the uncertainty and opposition that reforms entail; or when some of the individual gainers and losers from the reform cannot be identified beforehand. See, for instance, Castanheira, M., Nicodème, G. and P. Profeta (2012), 'On the political economics of tax reforms: survey and empirical assessment', *International Tax and Public Finance*, Vol. 19, No. 4, pp. 598–624 and Fernandez, R. and D. Rodrik (1991), 'Resistance to Reform: Status Quo Bias in the Presence of Individual-Specific Uncertainty', *The American Economic Review*, Vol. 81, No. 5, pp. 1146–1155. A preference for the status quo can also be an expression of legitimate concerns that too frequent policy changes create uncertainty, inconsistencies and adjustment costs, if not implemented in a credible and coherent way.

⁽⁸⁵⁾ For instance, Bouis, R. and R. Duval (2004), 'Raising Potential Growth After the Crisis: A Quantitative Assessment of the Potential Gains from Various Structural Reforms in the OECD Area and Beyond', *OECD Economics Department Working Papers* No. 835, make a distinction between 'slow reform implementation', referring to phasing in reforms over 10 years, and 'fast reform implementation', referring to phasing-in over 5 years. They estimate that OECD countries cutting their labour tax wedges from 2013 onwards towards the average level observed in the six OECD countries with the highest employment rate in 2007 (i.e. Denmark, Iceland, the Netherlands, Norway, Sweden, and Switzerland) could raise employment levels by over 0.75% and 2% after 5 and 10 years respectively; while under fast reform implementation, employment levels could be raised by over 1½ and 3% over 5 and 10-year horizons respectively.

However, by focussing on the euro area since the launch of the euro, this section suggests that there might be some room for a tax shift away from labour.

Nevertheless, such a tax shift should not be seen in isolation and should be part of a more comprehensive set of tax reforms. More particularly, the EU and national tax systems are in urgent need of better capturing ongoing and accelerating technological changes and new business models in the digital world. There is also an urgent need for simpler tax systems, which can contribute to addressing tax fraud, evasion and avoidance.

Box 1.1: Tax structures and output in the long run

A. Specification

The empirical analysis seeks to assess, within a standard approach, the existence of long-run relationships between real GDP per employed person and the tax structure in the euro area. In econometric terms, this involves estimating the long-run equilibrium relation and testing for cointegration. ⁽¹⁾

More specifically, the following long-run equation is estimated applying pooled least squares:

$$(1) \quad \log \frac{GDP_{i,t}}{EMPL_{i,t}} = \alpha_i + \beta EDUC_HIGH_S_{i,t} + \gamma \log(CAP_{i,t}) + \sum_{j=1}^k \delta_k TAX_{k,i,t} + u_{i,t}$$

with GDP referring to real GDP, EMPL to total employment, EDUC_HIGH_S to the share of tertiary educated people in the population (approximating human capital), CAP to capital intensity, and TAX_k to a tax indicator ⁽²⁾. The subscripts *i* and *t* refer to the country and year respectively. The country-fixed effects α_i capture country-specific factors affecting overall efficiency in production not covered by the tax structure.

As in similar reduced-form regressions reported in the literature, the reduced-form equation does not allow for assessment of the impact of taxes on the accumulation of physical and human capital, nor of the impact of government expenditures (partly financed by tax revenues) on these capital stocks.

B. Data

The sample covers 14 euro area Member States as well as the Czech Republic, Denmark, Hungary, Poland, Sweden and the UK for the period from 2001 to 2017.⁽³⁾ The data sources are briefly described in Table A.

Table A: Data

AMECO database		Eurostat - Main national accounts tax aggregates (% of total revenue)	
Real GDP per capita	Gross domestic product at 2010 reference levels adjusted for the impact of terms of trade	Capital taxes	Taxes levied at irregular and infrequent intervals on the values of the assets or net worth owned by institutional units or on the values of assets transferred between institutional units as a result of legacies, gifts inter vivos or other transfers. They include capital levies and taxes on capital transfers.
Capital intensity	net capital stock at 2010 prices per person employed: total economy	Environmental taxes	Total revenues for environmental taxes include taxes on transport, energy, pollution and resources. Resource Efficiency Scoreboard definition.
Eurostat - Labour force Survey		net social contributions	include employers' actual social contributions, households' actual social contributions, imputed social contributions and households' social contribution supplements. Social insurance scheme service charges are deducted from the items above to reach net social contributions.
Human capital	share of people with tertiary education level in total population	Taxes on land, buildings and other structures	Recurrent taxes on land, buildings or other structures consist of taxes payable regularly, usually each year, in respect of the use or ownership of land, buildings or other structures utilised by enterprises in production, whether the enterprises own or rent such assets.
OECD Tax database (%)			
Statutory tax rates	- corporate income tax - dividend tax - Value Added Tax (VAT) - top marginal income tax rate		
Tax wedge	difference between total labour costs to the employer and the corresponding net take-home.		

Table B shows the correlation between the different (standardised) tax rates, suggesting a low overall correlation between the different tax rates.

⁽¹⁾ More specifically, the econometric analysis is based on the Engle-Granger two-step method. Applying this method, one estimates first the long-run equilibrium relation and tests for cointegration. Next, one estimates the short-run dynamic equation including the error correction term, i.e. the lagged residual of the first step. This section only focuses on the long-run interactions.

⁽²⁾ Limited data availability over a long period implies that some taxes are measured in terms of statutory rates (including personal and corporate income as well as consumption taxes) while others as a share in total tax revenues (including property, capital and environmental taxes as well as net social security contributions). In the case of the statutory tax rates the point estimates in equation (1) are constant semi-elasticities, whereas in the case of shares, the point estimates relate to time-varying semi-elasticities.

Indeed, in that case the third term on the right-hand side of equation (1) can be rewritten as $\delta_k TAX_{kit} = \delta_k \frac{TR_{kit} B_{kit}}{TOTREV_{it}} = \left[\delta_k \frac{B_{ikt}}{TOTREV_{it}} \right] TR_{kit}$ with δ_k the point estimate, B the tax base, TR the tax rate and TOTREV total tax revenue so that the semi-elasticity is captured by the term between brackets - which changes over time.

⁽³⁾ The six non-euro area Member States have been added to increase variability in the sample.

(Continued on the next page)

Box (continued)

Table B – Correlation between tax rates: 2000 -2017

	Net social contributions	Labour tax wedge	Labour tax wedge gap	Statutory corporate tax	Statutory VAT	Pollution tax	Property	Capital tax	Dividend tax
Net social contributions	1,00								
Labour tax wedge	-0,01	1,00							
Tax wedge gap	-0,01	0,32	1,00						
Statutory corporate tax	0,05	0,24	0,30	1,00					
Statutory corporate tax	-0,11	0,01	-0,05	-0,36	1,00				
Pollution tax	-0,26	0,04	0,04	-0,11	0,40	1,00			
Property	-0,01	0,02	-0,10	-0,15	0,49	0,68	1,00		
Capital tax	-0,01	0,05	-0,02	0,07	-0,07	-0,13	-0,15	1,00	
Dividend tax	-0,07	0,30	0,47	0,17	-0,01	0,13	0,00	-0,03	1,00

Note: data standardised; correlation after stacking data per country

Note: Tax wedge gap measures difference between tax wedge gap of single earner without children earning 167% of average earnings and tax wedge gap of single earner without children earning 100% of average earnings

C. Estimation

Various variants of the baseline equation (1) have been estimated. Variants V0 and V1 in Table C are the base variants covering (i) the euro area and (ii) the euro area plus a further six other EU Member States. The other variants differ from variant V1 by dropping each time a specific tax rate. The Null Hypothesis of no cointegration can be rejected for all variants at a fairly high confidence level applying the Kao residual cointegration test. Allowing for heterogeneous coefficients across cross-sections the Pedroni tests (4) confirms that the null-hypothesis of no cointegration can be rejected. See Table D.

Table C: Factors affecting GDP per employed person

Dependent variable: log of real GDP per employed person

	V0	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10
Share of high educated in population	0.14 *** (2.62)	0.13 *** (2.87)	0.08 (1.56)	0.06 (1.46)	0.11 ** (2.33)	0.20 *** (4.37)	0.08 * (1.75)	0.10 ** (2.00)	0.22 *** (4.40)	0.14 *** (3.03)	-0.03 (-0.28)
Capital intensity	0.74 *** (18.34)	0.76 *** (34.12)	0.71 *** (25.44)	0.77 *** (33.79)	0.77 *** (34.32)	0.77 *** (33.01)	0.74 *** (31.74)	0.78 *** (30.12)	0.69 *** (28.95)	0.76 *** (34.22)	0.80 *** (-20.62)
Net social security contributions (% of total tax revenue)	-1.32 *** (-7.96)	-1.12 *** (-10.61)		-0.94 *** (-9.53)	-1.12 *** (-10.76)	-1.25 *** (-12.46)	-1.07 *** (-9.94)	-1.35 *** (-12.24)	-1.09 *** (-9.72)	-1.09 *** (-10.39)	-0.75 *** (-4.22)
Individual income tax (% of total tax revenue)	-0.84 *** (-5.64)	-0.51 *** (-4.55)	-0.03 (-0.23)		-0.52 *** (-4.81)	-0.58 *** (-7.94)	-0.42 *** (-3.90)	-0.76 *** (-6.42)	-0.48 *** (-4.18)	-0.44 *** (-4.18)	-0.33 ** (-2.08)
Tax wedge gap	-0.01 *** (-5.26)	-0.01 *** (-3.79)	-0.00 *** (-2.89)	-0.00 *** (-3.20)		-0.01 *** (-4.81)	-0.00 *** (-3.51)	-0.00 *** (-3.12)	-0.00 *** (-3.35)	-0.01 *** (-4.21)	-0.01 *** (-3.01)
Statutory corporate tax	-0.07 * (-1.85)	-0.19 *** (-4.58)	-0.33 *** (-6.34)	-0.24 *** (-5.38)	-0.21 *** (-5.09)		-0.14 *** (-3.56)	-0.21 *** (-4.54)	-0.20 *** (-4.64)	-0.19 *** (-4.49)	-0.13 (-1.46)
Statutory VAT	-0.92 *** (-3.50)	-0.94 *** (-5.46)	-0.79 *** (-4.22)	-0.88 *** (-5.14)	-0.97 *** (-5.61)	-0.89 *** (-5.02)		-1.58 *** (-9.14)	-0.95 *** (-5.71)	-0.91 *** (-5.25)	-1.46 *** (-6.21)
Taxes on land, buildings etc (% of total tax revenue)	-2.83 *** (-3.97)	-4.39 *** (-8.26)	-5.40 *** (-9.08)	-4.94 *** (-9.19)	-4.27 *** (-7.85)	-4.27 *** (-8.14)	-5.32 *** (-10.00)		-4.13 *** (-7.69)	-4.45 *** (-8.34)	-4.67 ** (-8.07)
Capital taxes (% of total tax revenue)	-1.73 * (-1.92)	-0.87 * (-1.70)	-0.82 (-1.61)	-1.14 ** (-2.12)	-0.77 (-1.58)	-0.95 * (-1.85)	-0.62 (-1.37)	-0.89 (-1.44)		-0.81 (-1.56)	-0.63 (-0.80)
Environmental taxes (% of total tax revenue)	-0.77 ** (-2.58)	-0.37 * (-1.70)	-0.20 (-0.78)	-0.01 (-0.03)	-0.58 ** (-2.58)	-0.33 (-1.54)	-0.32 (-1.43)	-0.76 *** (-3.11)	-0.56 ** (-2.51)		0.04 (0.14)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time fixed effects	No	No	No	No	No	No	No	No	No	No	Yes
Pedroni statistic	See Table D										
Kao residual cointegration test (p-values)		0,0094	0,0005	0,0023	0,0075	0,0036	0,0018	0,0124	0,0092	0,0084	0,0013
Number of observations	272	380	380	380	380	380	380	396	398	380	380
Number of explanatory variables (including country fixed effects)	26	32	31	31	31	31	31	31	32	31	49

Note: Pooled Estimated Generalised Least Squares (cross-section weights), sample 2001-2017.

Note: t-values between brackets; ***p<0.01, **p<0.05 and *p<0.1

(4) See Pedroni, P (2004), 'Panel Cointegration: Asymptotic and Finite Sample Properties of Pooled Time Series Tests With an Application to the PPP Hypothesis', *Econometric Theory*, Vol. 20, pp. 597-625.

(Continued on the next page)

Box (continued)

Table D: Pedroni test statistics

Table D: Pedroni test statistics

	Variables included											Group PP-Statistic
	Real GDP per employed person	Share of high educated in population	Capital intensity	Net social security contributions	Individual income tax	Tax wedge gap	Statutory corporate tax	Statutory VAT	Taxes on land, buildings etc	Capital taxes	Environmental taxes	
V1	X	X	X									0,35
V2	X	X	X	X	X	X	X					0,00
V3	X	X	X					X	X	X	X	0,00
V4	X	X	X	X	X			X			X	0,00
V5	X			X	X			X	X		X	0,00
V6	X					X	X	X	X	X	X	0,05

Note: Null Hypothesis: No cointegration \square
 Note: Estimated with Eviews with the Pedroni test only available for groups containing seven or fewer series

For the point estimates in Table C the following caveats should be taken into consideration. First, the primary focus of the analysis is on the long-run economic relationship. Applying the Engle-Granger two-step methodology, one estimates first the long-run equilibrium relation and tests for cointegration. Next, one estimates the short-run dynamic equation including the error correction term, i.e. the lagged residual of the first step. This section only focuses on the long-run interactions between real GDP and the tax structure, it does not cover short-term dynamics. Asymptotically, there should be no simultaneity bias applying generalised least squares estimating a cointegrated long-run relationship. However, the distribution of the t-ratio is generally not known. Developing test statistics to assess the significance of each of the estimated parameters would be beyond the scope of this section

Second, while the use of the statutory tax rates and tax ratios may pose some challenges in terms of their accuracy for measuring the fiscal transmission channels, it should be noted that alternatives such as effective tax rate also pose challenges. For instance, several methodologies can be used to calculate the effective corporate tax rate, including those based on macro-data (e.g. national accounts) and those based on financial statements (e.g. BACH database). ⁽⁵⁾

Finally, variant (V10) includes time-fixed effects. The inclusion of time-fixed effects (measuring ‘common shocks’) may prevent an omitted variable bias, provided the countries were to respond in the same way to a common shock of this nature, but that would assume that the countries’ responses to a common shock would be conditioned by country specific factors. However, it would be beyond the scope of this article to elaborate on this. The Kao residual cointegration test does not show an improvement in the test statistic when including time-fixed effects.

⁽⁵⁾ See also footnote 2 on this.