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The Structure of Ireland's Tax System and Options for Growth Enhancing Reform

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1. Introduction

As Ireland prepares to exit its EU/IMF programme of financial assistance at end-2013, attention is turning to the economic strategies that Ireland could pursue over the medium term. A central issue is how the economy's growth potential can be increased in order to provide greater employment opportunities and sustainable improvements in living standards. This imperative requires that policies across a range of areas be examined with a view towards assessing whether growth-friendly changes could be made having regard to wider societal objectives. This paper seeks to contribute to this discussion by analysing the role – both positive and negative - that the specific area of taxation policy can have on economic growth.

After a period of significant fiscal adjustment, it is worth reviewing where Ireland's tax structure stands in an international context. Cross-country differences in overall tax levels largely reflect societal choices as to the appropriate level of State provision in the economy and the resulting levels of public spending.[1] However investigating how tax structures could best be designed or altered to promote economic growth is a key issue for tax policy making. As acknowledged in the Mirrlees Review, improvements in tax structure and design can reap very valuable dividends in terms of increased economic efficiency and greater fairness.[2] It is therefore relevant to look at the structure of Ireland's tax system in an international context (see Section 2).

As well as comparing the tax structure with that of peer countries, the paper considers what can be learned from the microeconomic literature on optimal taxation and the macroeconomic question of the interaction between tax policy and economic growth (see Section 3). The paper then considers the types of growth friendly tax reforms that emerge from the literature on tax and economic growth (see Section 4). An obvious issue that emerges from the discussion is whether scope exists to pursue growth friendly reforms to the tax structure in Ireland and what the impact of these reforms on employment and economic growth might be. Results from two macrosimulation models on the output and employment impacts are presented in Section 5.

Whilst the purpose of the paper is to stimulate thought and discussion on how tax policy can contribute towards improved economic performance, it should be acknowledged that a trade-off can exist between growth-orientated tax policy and equity and progressivity concerns. This paper does not attempt to address this trade-off, although it notes the highly progressive nature of the Irish personal income taxation system by international standards.

[1] Johansson, A. et al. (2008), "Taxation and Economic Growth", OECD Economics Department Working Papers, No. 620, OECD Publishing

[2] Tax by Design Section 1 Introduction, pp. 6

2. Structure of taxation in Ireland

High taxation levels are often regarded as an important contributor towards low employment levels and unsatisfactory economic performance in Europe.[3] High taxes on labour and corporate income can discourage labour supply and demand and reduce incentives for investment and human capital formation. Accordingly, some commentators recommend a substantial reduction in tax levels, particularly on taxes on employment, to revitalise European economies.

On the other hand, some EU Member States have been able to combine relatively high levels of taxation with a strong economic performance and low unemployment. This indicates that the determination of the optimal aggregate level of taxation is not straightforward.

A number of broad arguments have been put forward as regards the size and distribution of the tax burden in Ireland in recent years. Some observers have argued that the burden of taxation is too low and that scope exists to raise the level of taxation as a share of output, whereas others have argued that there is no further scope for fiscal adjustment on the revenue side. In a related debate, some have suggested that the tax burden on labour is too high while others have argued that the burden is not high enough on high earners. Very little comment has addressed the potential for (revenue neutral) shifts in the structure of taxation in Ireland.

The discussion that follows seeks to present data on the structure of the tax system and in the process identify whether evidence can support any of the arguments referred to above. It also seeks to identify whether opportunities exist for a shift in the structure. The paper does not seek to address wider normative issues regarding the optimal size of the State.

The overall tax burden

The tax burden in Ireland is generally expressed as a share of gross domestic product (GDP). GDP is an estimate of the total value of all final goods and services produced within a country in a given year and is generally regarded as an appropriate measure of the tax base. Using GDP as the relevant tax base, Ireland had one of the lowest tax burdens in the EU-27 in 2011, the most recent year for which outturn data are available.[4] On this basis, it might appear at first sight that Ireland has the capacity for generating greater tax revenue by international comparisons.

An alternative measure of the tax base is a country's gross national product (GNP). While GDP measures the total output of the economy in a period i.e. the value of work done by employees, companies and self-employed persons, this work generates incomes but not all of these incomes remain the property of residents (and residents may earn some income abroad). The total income remaining with Irish residents is the GNP and it differs from GDP by the net amount of incomes sent to or received from abroad. The difference between GDP and GNP are net factor flows to/from abroad and in Ireland's case the factor flow out of Ireland is very large and negative. Ireland's GNP is therefore less than its GDP.

[3] Public Finances in EMU, European Commission, 2008

[4] Taxation trends in the European Union, European Commission, 2013

As shown in Callan et al (2013),[5] after Luxembourg Ireland had the largest difference between GDP and GNP in Europe in 2011 when GDP represented 124% of GNP, with the rest of the EU-27 in a range between 97% (Denmark) and 108% (Czech Republic). Due to this difference some commentators (McCarthy 2004, 2010) have argued the lower potential tax yield from net factor outflows means that GNP should be preferred.[6]

Another view is that the "true" base for Ireland is likely to be somewhere between GNP and GDP. The Irish Fiscal Advisory Council (IFAC) used a linear regression to empirically estimate an economic relationship between tax revenues and output.[7] Using this approach IFAC suggested a 'hybrid' measure of GNP plus 40% of net factor flows, in other words GNP plus 40% of the difference between GDP and GNP.

The graph below looks at the tax burden as a share of economic output for the EU-27 in 2011 with three bases used for Ireland; GDP, GNP and the IFAC hybrid measure. Ireland would have a tax burden in excess of the European average if GNP was used as the relevant base and just below the EU average using IFAC's hybrid approach.

Thus from a purely benchmarking perspective, the capacity for Ireland to raise additional revenue as a share of output depends on one's view as to the appropriate measure of the tax base taking into account the structure of the Irish economy and the size of factor flows out of the country.

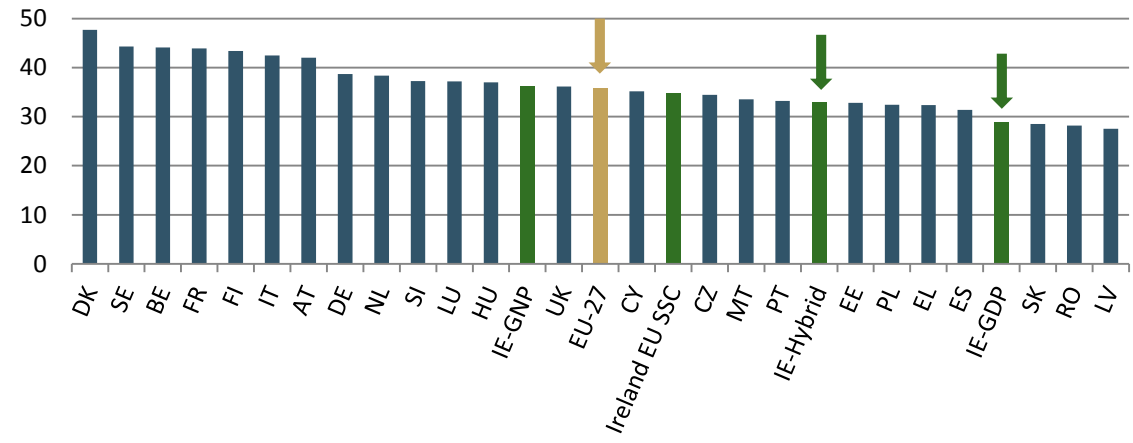


Figure 1: Tax as a share of GDP, 2011
Source: Taxation Trends in the EU, European Commission, 2013 and author's calculations

Sticking with GDP as the relevant base it is worth asking what it is that results in Ireland looking like an outlier in such benchmarking comparisons. Figure 1 above includes social security contributions (SSC) as a tax revenue. SSC in Ireland at

[5] Callan, T., Savage, M. "Tax and Taxable Capacity: Ireland in Comparative Perspective", ESRI *Research Note* 2012/4/1

[6] However as shown in Fitzgerald (2013) GNP itself has been distorted in recent years by the arrival of re-domiciled UK plcs since 2008 which are estimated to have added up to 4% to the level of GNP in 2012, while having very little impact on GDP.

[7] IFAC (2012)

5% of GDP are the second lowest in the EU-27 after Denmark,[8] and are less than half the EU-27 average of 11% and just under half the OECD average of 9%.[9] In some countries social insurance is genuine form of insurance whereas others (such as Ireland) the link between contributions and benefits is less clear-cut. Given this heterogeneity it is worth benchmarking Ireland against other countries without (SSC) to compare how 'core' taxation compares in an international context.

The graph below presents total taxation as share of GDP without social security contributions. At 24% of GDP it is clear that after stripping out the impact of SSC Ireland's 'core' tax burden is in line with the EU average of 25%, and is above the EU average when the alternative measures of economic output are used.[10]

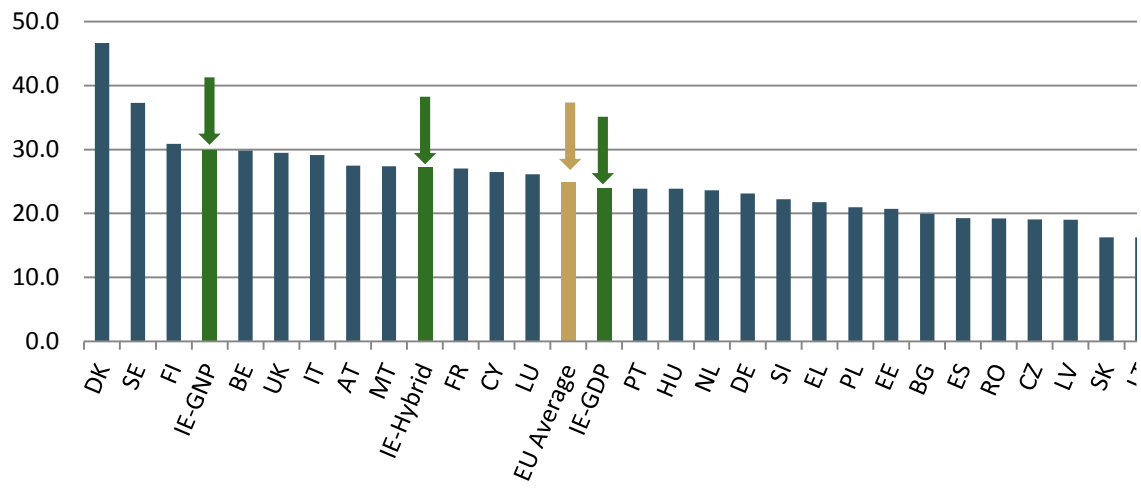


Figure 2: Tax as a share of GDP excluding Social Security Contributions, 2011
Source: Taxation Trends in the EU, European Commission, 2013 and author's calculations

At the level of tax type, the discussion below looks at labour taxes, corporate income tax, consumption tax, property tax and environmental tax, as a share of GDP and as a share of the total tax base.

Labour taxes

At €19 billion in 2011, labour taxes in Ireland represented 12% of GDP.[11] This placed Ireland as the fifth lowest in the EU-27 and approximately five percentage points below the EU-27 ratio. Such an outcome is consistent with the findings from the economic literature on the need to keep the overall tax burden on labour

[8] There was a total of €7.9 billion in contributions in Ireland in 2011, with €5.5 billion in employer contributions, €2.0 in employee contributions, and €0.3 billion in contributions by self and non-employed.
[9] See Taxation Trends in the European Union and OECD Revenue Statistics
[10] Similarly if Ireland's level of SSC as a share of GDP were at the EU average of 11% it would add an additional 6% of GDP to the tax burden and bring Ireland up to the EU average.
[11] See Taxation Trends, European Commission, 2013

low (Prescott, 2004)[12] and the EU trend of shifting the tax burden away from Labour (Taxation Trends in the European Union, 2013).

In the same year labour taxes accounted for 42% of total taxation, a share in the mid-range of EU Member States but below the EU average of 47%. As with the preceding discussion on total taxation, a cross country comparison is somewhat distorted by the inclusion of social security contributions in this measure.[13]

When social security contributions are excluded Ireland's labour taxes at 7% of GDP would exceed the EU average of 6%. Similarly the share of total taxation would stand at 24% as against the EU average of 16%. This shows that the 'core' burden of taxation on income is relatively high in an EU context and that the lower headline level is explained by SSC.

	Ireland	Ireland Rank in EU-27	EU Average
Share of GDP			
Labour including SSC	12%	23	17%
Labour excluding SSC	7%	8	6%
Share of Taxation			
Labour including SSC	42%	19	47%
Labour excluding SSC	25%	3	16%

Table 1: Taxation on labour as a share of GDP and total taxation, 2011
Source: Taxation Trends in the EU, European Commission, 2013

Whilst the analysis above benchmarks Ireland's tax burden on labour against other European Union Member States it is worthwhile also to look at how the burden is distributed by income levels and how this compares internationally.

In 2012 the top 1% of earners, roughly equating to tax units with income in excess of €200,000, paid 19% of income taxation including the universal social charge (USC) in Ireland. The top 5% of earners, which equates to tax units with income in excess of about €100,000, paid approximately 40% of income tax and the USC) and the top 23% of tax units, with income in excess of €50,000, paid approximately 77% of tax and USC.[14] It is clear, therefore, that the burden of taxation mostly falls on higher paid tax units.

[12] Prescott, E. C. (2004), 'Why do Americans work so much more than Europeans?', *Quarterly Review, Federal Reserve Bank of Minneapolis*, July, pp. 2-13.

[13] The Mirrlees Review by the Institute for Fiscal Studies did not regard UK SSC (NIC) as a true SSC and instead regarded it as a tax on labour. It argued that for some countries the SSC is a pure SSC and for others a tax.

[14] The most recent year for which data is disaggregated by the Revenue Commissioners into single and married tax units is 2010. In that year 77% of single tax units which represented a gross income of €35,000 or less contributed 15% of all tax paid by that cohort, while for married (jointly assessed) tax units 79% of tax units representing a joint gross income of €75,000 or less contributed 23% of all tax paid by that cohort. Overall for that year the first 78% of tax units contributed 18% of tax, or equivalently the last 22% of tax units paid 82% of all tax. The year 2010 included the income and health levies but not the USC or the changes in income tax credits and bands that were introduced in Budget 2011 and are represented in Figure 3.

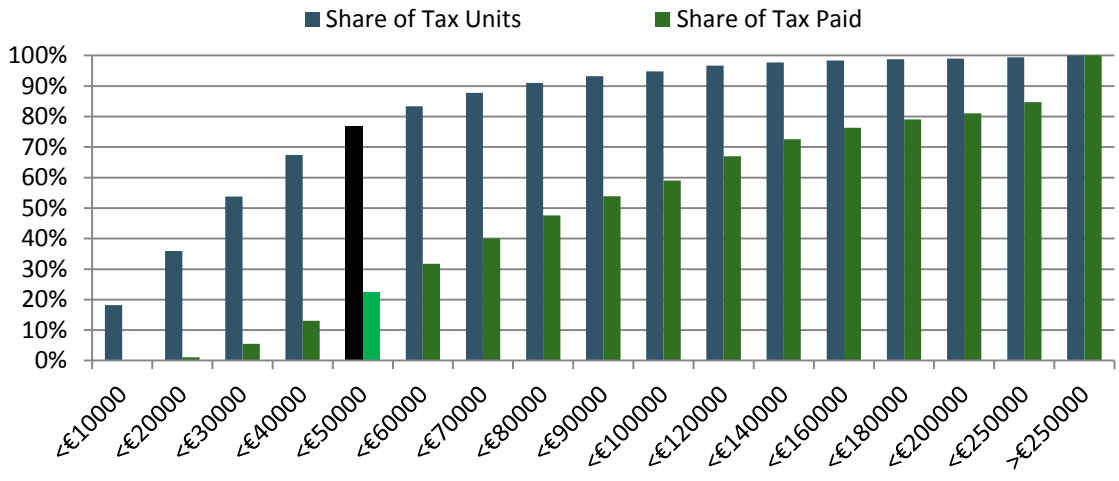
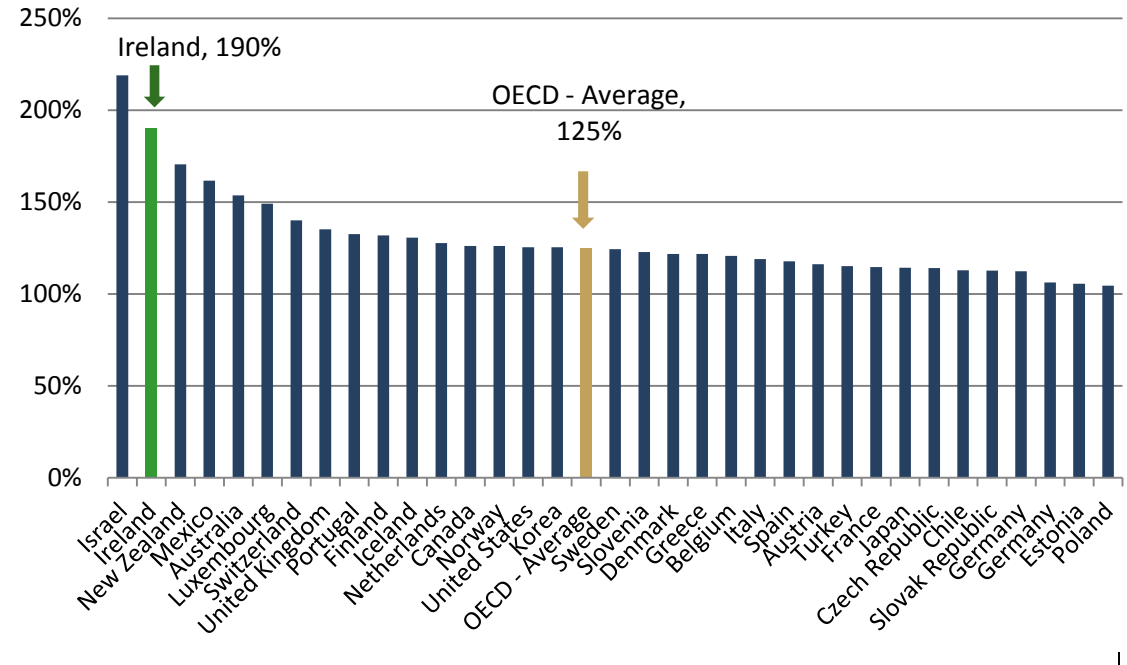


Figure 3: Cumulative income tax and USC paid by income level, 2012
Source: Authors analysis based on data from the Revenue Commissioners

According to OECD data,[15] the Irish income tax system is one of the most progressive in the world, as measured by the OECD metric of comparing the ratio of the tax wedge of a single individual at 166% of the average wage with an individual at 66% of the average wage.[16] Using this approach Ireland's progressivity score of 190% was the second highest in the OECD after Israel.



[15] OECD, Taxing Wages, 2013
[16] These income levels were approximately €54,400 and €21,800 based on an average wage of €32,600 in 2012

Figure 4: OECD progressivity measure, single tax payers, 2012
Source: OECD, Taxing Wages 2013

This outcome is not surprising given the low effective tax rates at the low end of the income distribution. According to OECD data, the effective rates of tax on workers (including social security contributions) for a single individual in Ireland are below the OECD average at both 66% of the average wage and at the average wage, and only converge with the OECD average at 166% of the average wage. When SSC are excluded the effective rates at 66% of the average wage are still below the OECD average and converge at the average wage. The effective rate on an individual at 166% of the average is almost seven percent higher than the OECD average.

	66% of AW	100% of AW	166% of AW
Income tax (incl USC) and SSC			
Ireland	11.5%	18.0%	31.5%
OECD average	21.1%	25.1%	30.5%
Income tax only (incl. USC)			
Ireland	8.7%	14.8%	28.0%
OECD average	11.2%	15.3%	21.3%

Table 2: Effective rates of taxation, single individuals, no children, 2012
Source: OECD, Taxing Wages, 2013

In terms of the entry points to core income tax (excluding USC and SSC), Abbas (2012)[17] identified the entry point to core income tax of €16,500, which corresponds to 51 percent of the average wage, as being by far, the highest in the OECD. The next closest ratio according to Abbas is 27.6% in Italy, with the average for both OECD and English-speaking economies being 9%. If USC were included the entry point in 2012 would reduce to €10,036 which, at just under one third of the average wage would, remain unusually high.

Against this Ireland has one of the lowest entry points, as a multiple of the average wage, to the top marginal tax rates (MTR) in the OECD. Ireland's top marginal rate of 52% including SSC and 48% excluding SSC begins at the average wage.[18] Excluding the four countries that operate a flat tax system (Estonia, Czech Republic, Slovakia and Hungary), Ireland in fact has the joint lowest entry point to the top MTR in the OECD.

In short, entry to core income tax in Ireland is relatively high but progression to the highest marginal rate is relatively swift.

[17] S. M. Ali Abbas "Medium-Term Fiscal Consolidation In Ireland: Growth-Friendly, Targeted, Sustainable", Ireland, Selected Issues, IMF, 2012

[18] The top marginal tax rate commences at €32,800 while the average wage in 2012 was estimated by the OECD in Taxing Wages 2013 as €32,626

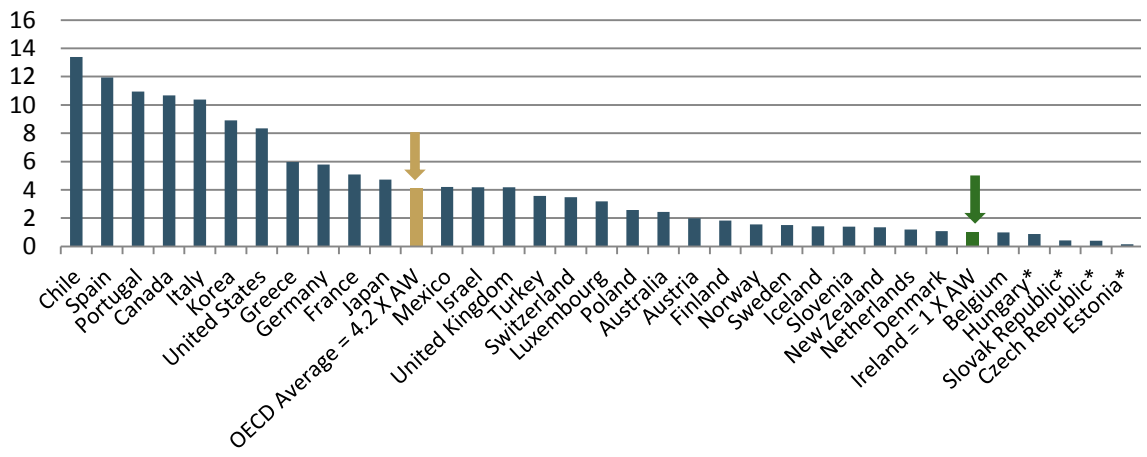
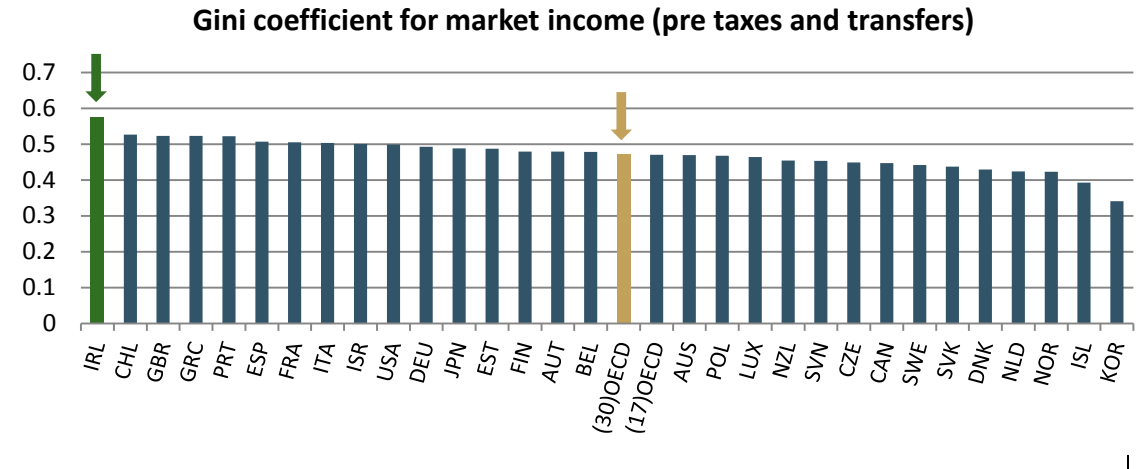


Figure 5: Threshold for top marginal tax rate as a multiple of the average wage, single tax payers, 2012
Source: OECD, Taxing Wages 2013

Finally the role played by the taxation (and benefits) system in achieving redistributive objectives should be acknowledged. For Ireland the Gini coefficient, which is a measure of income inequality,[19] when calculated after accounting for taxation and social transfers is in line the OECD average suggesting less inequality than the average OECD economy.[20] However when estimated before taxes and transfers – i.e. on the basis of market incomes only - it has one of the highest Gini coefficients in the OECD. This illustrates the very significant impact that Ireland's taxation (and benefits) system currently has in redistributing income.



[19] The Gini coefficient is a number between 0 and 1 representing income distribution in a population. Zero being the case where everyone has the same income and one the case where one individual has all the income. It is commonly used as a measure of income inequality.
[20] See OECD, Income Distribution Database, 2013, see http://www.oecd.org/social/inequality.htm

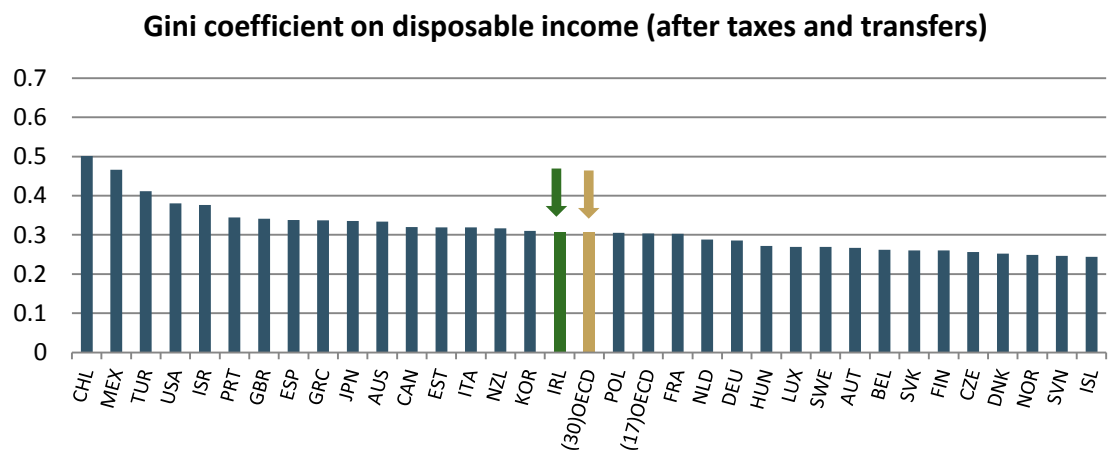


Figure 6: Gini coefficient for market and disposable income, 2010
Source: OECD, Income Distribution Database, 2013

Consumption taxes

Consumption taxes which include VAT, excise taxes and other consumption taxes account for on average 12% of GDP in the EU-27 compared with 10% of GDP in Ireland which is the second lowest level amongst EU member states after Spain. Using the IFAC hybrid measure or GNP brings the ratio for Ireland to within one percentage point either side of the EU average. As a share of total taxation, Ireland is at the mid-point of the EU Member States at a level equal to the EU average. In terms of VAT (i.e. excluding excise and other consumption taxes), Ireland also has one of the lowest shares of GDP but a share of taxation in line with the EU average.[21]

	Ireland	Ireland Rank in EU-27	EU Average
Consumption Taxes			
Share of GDP	10%	14	12%
Share of Taxation	35%	26	34%
VAT			
Share of GDP	6%	26	8%
Share of Taxation	21%	15	22%

Table 3: VAT and Consumption Taxes, 2011
Source: Taxation Trends in the EU, European Commission, 2013

[21] VAT receipts in Ireland increased in 2012 following an increase in the standard rate from 21% to 23%. Whilst data on other EU member states are not publicly available with respect to 2012, Ireland's VAT as a share of GDP in 2012 remained constant relative to 2011 at 6%.

Thus for both VAT and consumption taxes in general, Ireland appears to have a low yield as a share of GDP but a share of total taxation in line with the EU average.[22] This fact was noted by the European Commission (2012)[23] in pointing out that the potential exists to shift towards consumption taxes and away from taxes that are more harmful to growth, a topic that is returned to in Section 4 of this paper.

For comparison purposes VAT and consumptions taxes are presented as a share of GDP, GNP and the IFAC hybrid in the cross country comparison in Figure 2. This shows that using GDP as the relevant tax base Ireland's share of consumption taxes is quite low but closer to the EU average using the alternative measures.

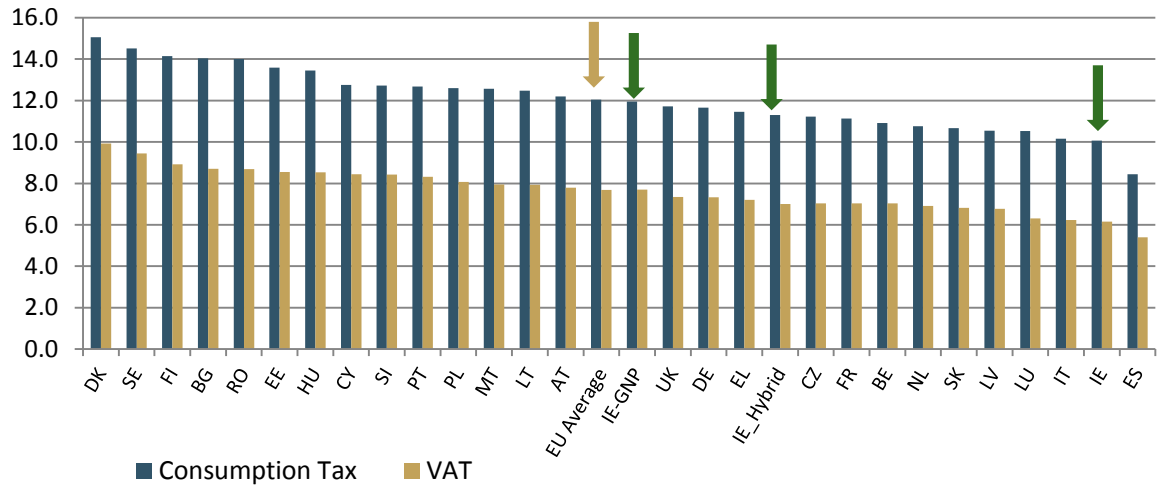


Figure 7: Consumption Tax and VAT as a share of GDP, 2011
Source: Taxation Trends in the EU, European Commission, 2013 and author's calculations

Corporate Income Tax

As a share of GDP the amount of corporate income tax collected in Ireland at 2.4% of GDP in 2011 was only marginally behind the EU-27 average of 2.7%. As a share of total tax revenue Ireland's outcome of 8.3% placed it eighth highest in the EU and higher than the EU average of 7.5% (see below).

[22] It was noted by the European Commission that Ireland's low ratio of consumption taxes to GDP is due to the "high share of multinational companies in the Irish economy and that a comparison of consumption taxes to GNI would provide a more favourable picture".
[23] See Table 5.8, Tax Reforms in EU Member States, Tax policy challenges for economic growth and fiscal sustainability, 2012 Report, European Commission

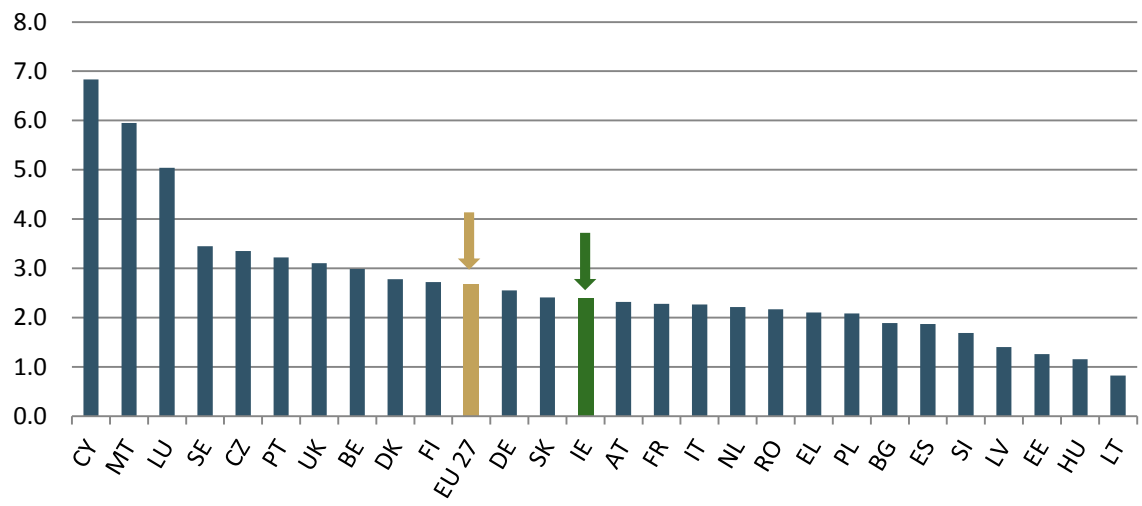


Figure 8: Corporate Income Tax as a share of GDP, 2011
Source: Taxation Trends in the EU, European Commission, 2013 and author's calculations

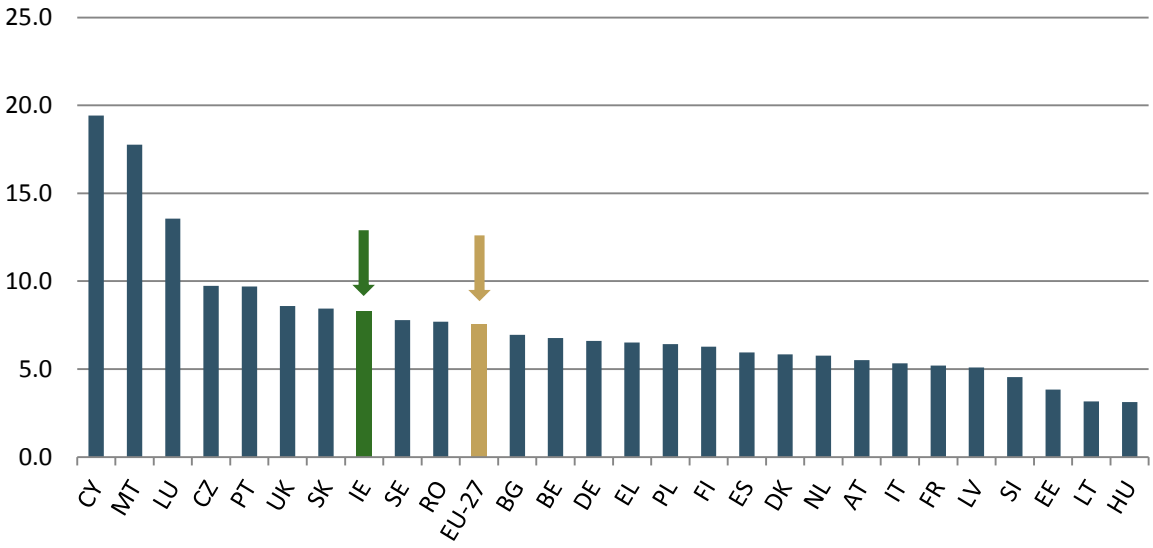


Figure 9: Corporate Income Tax as % of Total Taxation, 2011
Source: Taxation Trends in the EU, European Commission, 2013 and author's calculations

Environmental Taxation

Under the ESA-95 classification environmental taxes refer to the Transport (excl fuels), Energy (incl. transport fuels) and pollution/resources taxes

As a share of GDP, environmental taxes were about 2.6 percent in 2011, a level equivalent to the EU average, and at €4.1bn equated to approximately 9% of total taxation, as against the EU average of 7%, and represented the sixth highest share of taxation in the EU.

Property Taxation

Property taxation in Ireland in 2011 was accounted for by a transactional tax in the form of stamp duty on non-residential and residential property, and two recurring charges in the form of a non-principal private residence charge and commercial rates levied by local governments on commercial premises.

A household charge was introduced on all residential properties in 2012 and in 2013 this was replaced by a market value 'band based' recurrent tax on residential property. The non-principal private residence charge will be removed in 2014 coinciding with the first full year of the recurring tax on residential property known as the local property tax (LPT).

The 2011 benchmarking data presented below therefore relates to a year in which Ireland did not have a recurring tax on all immovable property and with transaction-based taxes at a cyclical low. In any event as a share of GDP Ireland's property taxes as a whole (i.e. including the transactional stamp duty tax) and recurring taxes on immovable property were in line with the EU average and were above the EU average in terms of the share of total taxation.

	Ireland	Ireland Rank in EU-27	EU Average
Property Taxes			
Share of GDP	1.2%	10	1.3%
Share of Taxation	4.0%	8	3.6%
Recurring taxes on immovable property			
Share of GDP	0.9%	8	0.8%
Share of Taxation	3.2%	6	2.3%

Table 4: Property taxes as share of GDP and taxation, 2011
Source: Taxation Trends in the EU, European Commission, 2013

While Ireland may have had a high share of property related taxation relative to other European Union Member States, Abbas (2012) shows that, when compared with other English speaking OECD countries, Ireland has a comparatively low level of property taxation, especially for recurrent taxes on immovable property. With a similar ratio to GDP in 2010 as 2011 (0.9 per cent),Ireland compared unfavourably with the average of 3 percent of GDP for the four English-Speaking economies cited by the author; with the share of recurrent property taxation in total property taxes of 56.6 percent well below the 83.3 percent in these economies.

Norregaard (2013) outlines the benefits of higher recurrent property taxation on immovable property which include their relatively stable source of revenue,[24] which is important in small open economies with volatile tax bases such as Ireland.

[24] Norregard, John, "Taxing Immovable Property: Revenue Potential and Implementation Challenges", IMF Working Paper, WP/13/129

What conclusions can be drawn?

Ireland's capacity to increase its tax burden very much depends on what one views as the appropriate measure of economic output for the purposes of taxation taking into account the structure of the economy and the size of the foreign owned sector. In terms of tax take as a share of total activity, Ireland is not an outlier when one uses GNP or the IFAC hybrid measure of output. In terms of share of GDP the Irish tax system mainly differs from EU in terms of social security contributions.

Adjusting for SSC, the burden of taxation in terms of total revenues and labour taxation is in line with the EU average. Excluding SSC, labour's share of total tax revenues is the third highest in EU.

Ireland's tax take is highly progressive. The burden of labour taxation falls to a considerable extent on higher income tax payers while low earners benefit from unusually low effective rates in an international context. Ireland is also an outlier in terms of the low entry point to the top marginal tax rate.

In GDP terms, taxation of consumption is below the EU average. This suggests that there may be some scope to use consumption taxes to reduce the burden on labour. As share of total tax revenues, consumption is in line with the EU average (35%).

Corporation tax as a share of GDP is in line with EU average and above average as a share of tax revenues.

Other types of tax (environmental, property,) are either at or above EU average. However when compared with other English speaking OECD countries Ireland has a comparatively low level of property taxation, especially for recurrent taxes on immovable property.

In overall terms, when allowance is made for some specific features of the Irish economy and the nature of its social security system, the size and broad distribution of the tax burden across tax types in Ireland is not greatly out of line with that of other EU states.

3. Economic theory of tax policy and economic growth

Taxation can impact on the economy through microeconomic and macroeconomic channels. The macroeconomic factors are discussed in greater detail below and relate to the drivers of economic growth, labour supply and participation, capital formation and total factor productivity. Before this it is worth discussing the microeconomic aspects of taxation through its impacts on individual incentives and decisions as it is the aggregate impacts of these decisions that drive the macroeconomy.[25]

Key Microeconomic Principles

The microeconomic principles of taxation relate to the impacts that taxation can have on individual's decisions and the 'deadweight' losses that can arise from distortions to these decisions caused by taxation.

A key goal for tax design should be to reduce the deadweight cost of taxation across the system. Taxes disrupt the economic signals that prices send in market economies by driving a wedge between the price paid by the buyer of a good or service and that received by the supplier. Income tax results in employers paying more for an hour of work than employees receive, while consumption taxes result in retailers receiving less for a product than customers pay. By increasing prices and reducing quantities bought and sold, taxes impose a cost on consumers and producers alike. The sum of these welfare costs almost always exceeds the revenue that the taxes raise – the difference is referred to as the deadweight cost of taxation.[26]

An established framework for considering the impact of taxation on an individual's decisions involves analysing the impact of income and substitution effects.[27] When a tax is introduced or increased, an individual's after tax income declines, making them comparatively poorer, and thereby incentivising greater labour supply to maintain the same after tax income. Thus increases in average rates increase incentives. This is referred to as the income effect. However, at the margin the increased tax reduces the return to labour which incentivises less labour supply. Thus increases in marginal rates reduce incentives. This is referred to as the substitution effect as individuals are incentivised to substitute from labour to leisure. The income and substitution effects have the opposite impacts on an individual's incentives, however most empirical work suggests that the substitution effect dominates.[28]

Taxing negative externalities can promote welfare by internalising the costs of the externality into an individual's decision,[29] for example the taxation of social or

[25] The foregoing discussion relies heavily on the insights and learnings from the Mirrlees Report 'Tax by Design' of the Institute of Fiscal Studies

[26] Two other costs of taxation include compliance and administrative costs

[27] See Lecture 2, in *Lectures on Public Economics*, A.B. Atkinson and J.E. Stiglitz, McGraw Hill, 1980

[28] See Mirrlees Review, Section 2 the Economic Approach to Tax Design, pp. 29

[29] An externality represents a cost or benefit from an activity that does not accrue to the individual or organisation carrying out the activity. A negative externality includes costs such as pollution or noise which have to be borne by others but not those who carried out the activity that created the externality, while a positive externality may include society's benefit from R&D investments by private companies. Because the costs of a negative externality (or the benefits of a positive externality) are not are not priced in the cost of the action that created the externality private individuals or

environmental 'bads', such as tobacco, alcohol or carbon. Taxation can also remedy market failure, such as underinvestment by the private sector in R&D relative to the socially optimum level.

An optimal tax is one which is neutral to decisions and in the process minimises deadweight effects.[30] The principle of neutrality requires that a tax system treats similar activities in similar ways, in other words individual's decisions should not be distorted in respect of different forms of consumption, income or savings. A neutral system minimises welfare losses arising from these distortions.

An individual's labour supply decisions can be impacted by the non-neutral treatment of earned and non-earned income. A consumer's expenditure basket can be distorted by different VAT rates for similar goods and services. Other examples of a non-neutral system include differential taxation of debt and equity and differential taxation of owner occupied housing and other assets. In a limited set of circumstances a departure from neutrality can be a good thing, in particular to remedy a market failure (e.g. the taxation of environmental or social bads, incentives for business expenditure on R&D, lighter taxation of goods which are complementary to work such as childcare costs), or to create incentives for pensions savings. .

Optimal tax theory balances efficiency losses against a government's desire for redistribution and the need to raise revenue. A progressive system will set taxes on earnings at higher rates for higher earners, but higher tax rates impose distortions and disincentives. An income tax system is optimal when the gain through redistribution, and raising revenue, exceeds the deadweight cost from lowering labour incentives.

Optimal taxation does not always support taking distributional effects into account when considering taxation on goods and services – e.g. by used differentiated rates. If taxes on earnings are well designed they can do the "heavy lifting" as far as achieving progressivity is concerned. If progressivity is achieved in the income tax system the rest of the system should focus on efficiency.

The Macroeconomics of Taxation on Growth

By distorting individual decisions, taxation can impact on economic output (Y) and growth by affecting any of the three components of output that are described in the production function below, namely human capital (L), physical capital (K) and total factor productivity (A);

$$Y = F(L, K, A)$$

The early literature on growth focused only on human and physical capital with productivity considered to be exogenous (i.e. determined outside the model). The key finding from these 'exogenous' growth models was that growth occurs only through the accumulation of capital, which itself is determined by the level of savings and depreciation in an economy. Additions of capital to a fixed supply of labour result in decreasing returns to capital over time and a long run limit on the

organisations will over-produce these costs relative to the socially optimum level (or under produce in the case of positive externalities)

[30] As well requiring that a system be neutral, optimal taxation also requires the system to be simple and stable (see Mirrlees Report, Section 2, the Economic Principles of Tax Design, pp. 40-44)

growth in living standards. Chamley (1986)[31] and Judd (1985)[32] showed in the exogenous model the link between capital formation and savings leads to a long run optimal tax on capital income of zero. Consequently all taxation should fall on labour income under these models.[33]

The drawback of the exogenous growth model is that it ignored the critical driver of permanent increases in growth, namely productivity. Endogenous growth models allow for sustained growth and explain its sources. These endogenous models focus on the drivers of total factor productivity and include explicit models of improvements in human capital, learning by doing, innovation, technology transfer.

According to Myles (2009), the common property of endogenous growth models are that choices are made by economic agents which lead to productivity growth and these choices can be influenced by economic policies such as taxation. This allows the effects of taxation to be traced through the economy and an assessment to be made as to possible impacts on growth. For instance an increase in taxation reduces the returns to investment (in both physical and human capital) and research and development (R&D). Lower returns mean less accumulation of human and physical capital and innovation in terms of productivity, and hence a lower rate of growth.

Taxes that have a smaller negative impact on the economic decisions of individuals and firms are less negative for economic growth. The economic literature and empirical work by the OECD suggests a tax and economic growth hierarchy with recurrent taxes on immovable property being the least distortive tax instrument in terms of reducing long-run GDP per capita, followed by consumption taxes and other property taxes as well as environmentally-related taxes, personal income taxes and corporate income taxes. Viewed against this hierarchy, recent policy changes such as the elimination of tax expenditures, the raising of consumption and other indirect taxes and the introduction of a local property tax, may be regarded as growth friendly initiatives.

It is useful to think of how the structure of the tax system can impact on GDP per capita in terms of a framework described by the OECD. GDP per capita can be impacted by affecting the amount of hours worked in the economy (labour utilisation), and the amount of output that is produced per hour (labour productivity) or both (see below).

[31] Chamley, C. (1986), "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives", Econometrica, 54, pp. 607-622

[32] Judd, K. (1985), "Redistributive Taxation in a Simple Perfect Foresight Model", Journal of Public Economics, 28, pp. 59-83

[33] See Myles, G. D. (2009), "Economic Growth and the Role of Taxation-Theory", for a derivation of this outcome

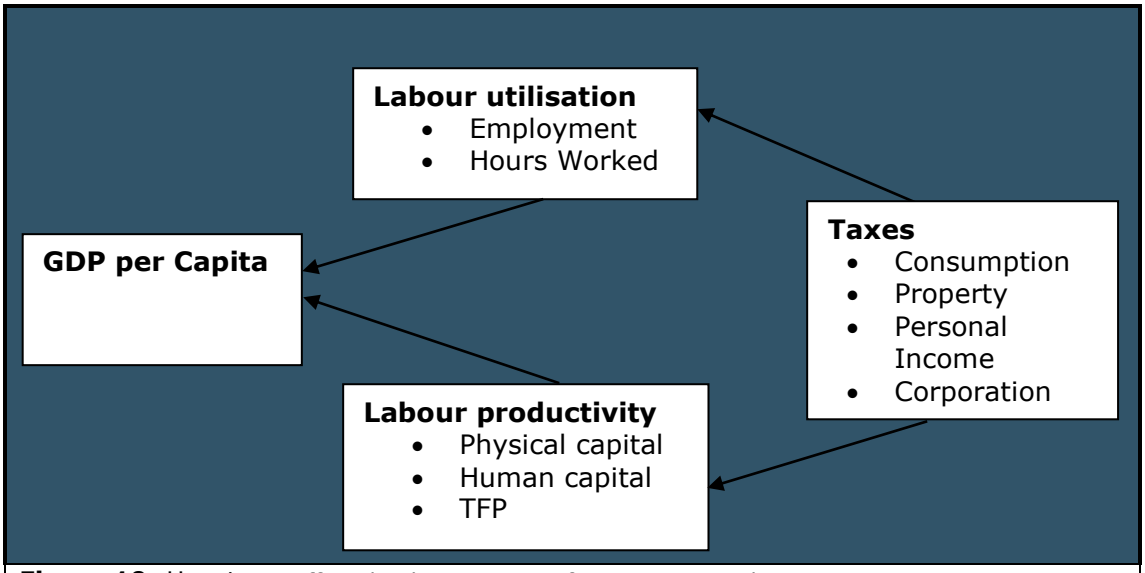


Figure 10: How taxes affect the determinants of economic growth
Source*: OECD, Tax policy reform and economic growth, OECD tax policy studies, OECD, 2010*

The discussion below considers the impact that individual taxes have on the determinants of growth. The lessons from this section and those from the structure of the Irish tax system are brought together later in the paper (see section 5).

Property Taxes

Recurrent taxes on land and buildings have a small adverse effect on economic performance. This is because these taxes do not affect the decisions of economic agents to supply labour, to invest in human capital, to produce, invest and innovate to the same extent as some other taxes.

As buildings and land are highly visible and immobile, these taxes are difficult to evade, and the immovable nature of the tax base may be particularly appealing at a time when the bases of other taxes become increasingly internationally mobile.

Norregard (2013) argues that taxation of immovable property is highly efficient (in terms of collection and the difficulty for individuals to evade), benign on growth and to the extent that property taxes are based on market values are regarded as equitable. However the author acknowledges their unpopularity which relates to their visibility and difficulty in terms of avoidance.

Consumption taxes

Consumption taxes are neutral with respect to saving, as in the absence of rate changes they apply the same rate to current and future consumption. They therefore do not affect the supply of funds for investment and physical capital formation.

Consumption taxes tend not to be progressive and therefore have a lower impact on growth more per unit of tax revenue than progressive income taxes which tend to vary with income. However changes in consumption taxes lower the purchasing power of real after tax wages and therefore impact labour supply in the same way as labour taxation. Whilst this principle is undoubtedly true in the long term consumption taxes may be less harmful in the short term with evidence from behavioural economics suggesting consumption taxes result in less negative incentives than income taxes even though the impact on the actual household budget would be equivalent.[34]

Personal Income Taxes

Personal income taxes are seen as more harmful to growth than consumption taxes. They are generally progressive, with marginal tax rates that are higher than their average rates. This means that they discourage growth more per unit of tax revenue than consumption taxes which do not vary with income.

Tax progressivity through higher top marginal tax rates affect both labour utilisation and productivity, thus suggesting a non-trivial trade-off between tax policies that enhance GDP per capita and distributional objectives.[35] In addition the tax wedge between labour cost and take-home pay is found to have a negative effect on the employment rate and thus labour utilisation.[36]

Top marginal statutory rates mainly affect productivity with a negative relationship between top marginal tax rates and the long run level of TFP.[37] By affecting the relative price of labour and capital, i.e. through non-neutral treatment, high marginal tax rates can lead to inefficient reallocation of inputs, lowering the efficiency of production inputs, i.e. lowering TFP.[38]

Hours worked have also been shown in the literature to be modestly responsive to labour taxes while labour market participation is much more responsive (Heckman 1993, Blundell et al 1998).

Capital income taxes affect investment and entrepreneurship through savings and firms' financing. Taxes on personal capital income affect private savings by reducing their after tax return. As the income from savings are taxed as well as the income that generated those savings, they can discourage savings (and investments). They are therefore more harmful to savings that consumption taxes which are generally seen as neutral.

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[34] Blumkin, Tomer & Ruffle, Bradley J. & Ganun, Yosef, 2012. "Are income and consumption taxes ever really equivalent? Evidence from a real-effort experiment with real goods," European Economic Review, Elsevier, vol. 56(6), pages 1200-1219

[35] Controlling for human capital, the OECD's growth regressions point towards the sizeable adverse effects of progressive income tax schedules on GDP per capita. Results show that for an average OECD country if the marginal tax rate were to decrease by 5 percentage points in this situation, thus decreasing the progressivity of income taxes, the estimated increase in GDP per capita in the long run would be around 1 per cent

[36] Nickel (2004) found that a 10 percentage point increase in the tax wedge reduces employment by around 1% to 3% of the working age population, while OECD (2005b) found that a reduction of the tax wedge in an average OECD country would increase the employment rate by 3.7 percentage points

[37] See Box B.2 'Tax Policy Reform and Economic Growth', OECD, 2010

[38] Regression results presented in OECD (2010) show top marginal personal income tax rates have a more negative effect on TFP in sectors characterised by high firm entry rates. Employer and Employer and employee social security contributions (SSC) have a more negative influence on TFP in industries that are relatively more labour intensive.

Corporate Income Taxes

The OECD regards corporate income taxes as the most harmful for growth as they discourage the activities of firms that are most important for growth: investment in capital and productivity improvements. Corporate taxation affect the rate of capital accumulation, by reducing the after tax return on capital investment, and hence GDP per capita.[39]

As with labour taxes corporate income taxes can distort relative factor prices and result in misallocation of resources, or by reducing the after-tax return from innovative activities thus discouraging investment in R&D. Further by negatively affecting FDI and the presence of MNCs corporate taxes can hinder technology transfers.[40]

[39] OECD regressions found that increases in the tax-adjusted user cost of capital are found to reduce investment at the firm level and the effect on firm-level investment is stronger in more profitable industries – also confirmed in industry level regressions

[40] OECD regressions show link between corporate taxes, R&D incentives and TFP. While earlier OECD work shows adverse effect of corporate taxes on FDI – one percentage point increase in a country's corporation tax rate reduces FDI stocks by 1% to 2% (OECD, 2007c)

4. Growth orientated tax policy reforms

Arising from the theoretical and empirical literature on tax and growth, economists have proposed growth orientated changes in the structure of tax systems. Such reforms can be described as those that relate to reforms within one tax type, for instance widening a given base and lowering headline rates, or shifting the tax burden from more harmful taxes such as corporate and personal income towards consumption and property taxes (see OECD 2008 and 2010 and EC 2008, 2010 and 2012).

OECD (2010) presented empirical and theoretical evidence that there could be gains in terms of long-run GDP per capita from increasing the use of consumption and property taxes relative to income taxes without changing overall tax revenues.[41] This shift would have larger impacts on GDP per capita if it was in the form of cuts in marginal personal income tax rates rather than increases in thresholds (although the latter would be more effective at reducing inequality).

Shifts from Income to Consumption Taxes

Consumption taxes are beneficial in that they do not discourage savings and investment. In the long-run a revenue-neutral shift from personal income to VAT/consumption taxes may not have much effect on the average total taxes paid by a typical employee as the impact on their real net wages are equivalent, although recent research in the field of behavioural economics has challenged this view.

Since personal income taxes are generally more progressive than consumption taxes this reform would reduce the marginal tax rate of a typical worker and thereby increase their incentive to work additional hours through a positive substitution effect. Whilst this may promote economic growth it would do so at the expense of making the tax system less progressive. If transfer payments are not index-linked, there could be positive labour supply impacts,[42] although this would be at the expense of poverty and equality outcomes.

A shift towards consumption taxes does not imply an increase in the top rate of VAT as the shift could be achieved by raising or eliminating reduced VAT rates. Reduced rates on consumption taxes are an inefficient way of reducing income inequality and promoting progressivity.[43] Higher income households consume relatively more of lower taxed goods and thereby disproportionately benefit from reduced rate goods. The deadweight costs of using consumption taxes to achieve equality and redistributive objectives are therefore quite high.[44]

It is because of this deadweight cost that the income tax and benefits system is the appropriate place to target redistributive objectives. By broadening the VAT base through eliminating or reducing the level of reduced VAT rates, scope would

[41] See Annex B 'The OECD Tax and Growth Study', Tax Policy Reform and Economic Growth, OECD, 2010

[42] See Public Finances in EMU, European Commission, 2008

[43] See Mirrlees Report, OECD (Tax Policy Reform and Economic Growth), European Commission (2008, 2011)

[44] An exception to the argument in respect of reduced VAT rates can apply to goods that are complements and substitutes to labour. Differentiated consumption taxes can encourage work if goods and services that are complementary to work – e.g. transport and childcare – are taxed at a lower rate than those that are substitutes to work – e.g. leisure activities.

exit to better target expenditure measures to those who need them, whilst also allowing for a reduction in the headline rate. For example The Mirrless report estimated that the UK could eliminate most reduced and zero-rate VAT while compensating every household through the tax and benefits system to leave them as well off as they were before whilst raising an additional £3 billion for the exchequer.[45]

Shifts from Income to Property Taxes

A shift towards taxes on property appears to be even better for growth than a shift towards consumption taxes as it would not impact on labour supply decisions and would have the advantage of being highly efficient and, in the case of market value based property taxes, equitable (Norregaard, 2013).[46] The OECD (2010) cite an additional benefit of increasing taxation on immovable property as shifting some investment out of housing into higher return investments and so increase the rate of growth.

Despite the relative gains of a property tax based shift, OECD (2010) note that the scope for switching revenue to recurrent taxes on immovable property is limited because these taxes are particularly unpopular. This latter point is acknowledged by Norregaard (2013) who attributes their unpopularity to their transparency and the relatively limited scope for tax avoidance and evasion.

[45] See 'Broadening the VAT Base', Tax by Design, Mirrlees Report, Institute of Fiscal Studies, 2011, UK

[46] OECD (2010) note that scope for switching revenue to recurrent taxes on immovable property is limited because these taxes are particularly unpopular. This latter point is picked up on by Norregaard who attributes their unpopularity to their transparency and relatively limited scope for tax avoidance and evasion.

5. Options for Ireland

As described in Chapter the burden of labour taxation is only low when GDP is used as the tax base and when social security contributions are included in the comparison. Excluding social security contributions or using an alternative base to account for the economic structure of Ireland shows the burden on labour to be relatively high. The burden on consumption is however low in a European context and the burden on immovable property is low relative to English speaking OECD countries.

Within labour taxation the entry point to core tax, or even the USC, is relatively high. Effective rates of tax are also low relative to the OECD at income levels below the average wage. While the marginal rate may not be an outlier in an OECD context, the entry point to the top marginal rate is the lowest for progressive income tax systems. Ireland is also an outlier in terms of the progressivity of its income tax system. Estimates included in OECD (2010) point to adverse effects of highly progressive income tax schedules on GDP per capita through both lower labour utilisation and lower productivity partly reflecting lesser incentives to invest in higher education.

The theory and structure would therefore suggest that there may be gains for Ireland by reducing the burden of taxation on labour, and the strongest impacts would be from changes in marginal rates through positive substitution effects. Such a reform may involve moving the entry point to the top marginal rate away from the average wage, thereby incentivising greater labour supply through positive substitution effects, or from reducing the top marginal tax rate. The options for reform could be achieved on a revenue neutral basis by base broadening within income tax, or by a revenue neutral shift towards consumption or property tax.

Reforms within Income Tax

A series of base broadening reforms within income taxation were proposed by Abbas (2012) which involved broadening the base at the low end of the income distribution to facilitate an increase of the entry point for the top marginal tax rate, while ensuring that the tax burden did not rise for those earning below 67% of the average wage.[47] The proposals were as follows;

- Phase out the annual PAYE tax credit of €1650 between the minimum wage (€17,508) and the average wage (€32,600). This would increase the average and marginal income tax rates for persons earning between the minimum and average wage; raise the average tax for those earning above the average wage;

- The savings – which Abbas viewed as potential being substantial – may be partly used to lower the income tax rate in the first bracket, or split it into two (e.g. 15 and 25 percent) so as to ensure that tax burdens do not rise for those earning below 67 percent of the average wage; and

[47] This relates to a wage of €21,859 based on an average wage of €32,626 estimate by the OECD for Ireland in 2012 (see OECD, Taxing Wages, 2013).

- The income ceiling at which the top marginal rate kicks in could be increased somewhat to partly compensate those earning around the average wage.

Using the framework of the income and substitution effect the reforms would have the effect of increasing the average tax rate but not changing the marginal rate for individuals above the average wage, thereby increasing their incentive to work through the income effect, whilst lowering the marginal tax rate for individuals near the average wage, thereby increasing their incentive to work through the substitution effect. The phase out of the PAYE tax credit in combination with a lower rate would have positive income and substitution effects below the average wage, both of which would lead to greater labour supply. Whilst higher average rates at the lower end of the income distribution may bring Ireland closer to the OECD average, it would be at the expense of equality outcomes.

The aggregate effect of Abbas' reform proposal on economic growth and employment was not quantified and to do so would require the use of a macrosimulation model.

Simulating Tax Shifts

Reforms in the structure of the taxation system through revenue neutral shifts from labour to consumption or property have been simulated in the literature to raise the rate of growth in an economy. Myles (2009) concludes from a review of the literature of tax reforms on growth that "*almost all the results support the claim that a move from income taxation to consumption taxation will raise the rate of growth*". The results of recent simulations of tax shifts for Ireland are now discussed.

The effects of taxes on GDP have been simulated using the European Commission's Quest III model.[48] QUEST III is a New-Keynesian Dynamic Stochastic General Equilibrium (DSGE) model used by the Commission's staff in policy analysis.[49] It has previously been used by the Department of Finance in the context of an analysis of the impacts of structural reforms.[50]

The Commission's simulations use three baseline scenarios, a coordinated tax shift from labour to consumption for the whole euro area, a unilateral tax shift by a large Member State (Germany) and, a tax shift by a small Member State (Ireland). Each of the models confirm that the tax shift would have a positive impact on GDP and employment. In the short run the gains are larger for a unilateral shift due to competitiveness effects. The simulations are designed to be revenue neutral.

[48] See Public Finances in EMU, European Commission, 2008

[49] The key features of the model are: a fraction of households are liquidity constrained; prices and wages adjust with lags; monetary policy is determined using a Taylor Rule; and, debt is stabilised by means of a gradual adjustment in labour taxes. The model uses region specific estimated parameters for the euro area and the US, as well as calibrated parameters for the rest of the world. Individual countries are distinguished from the rest of the euro area only by using country-specific information on their size, their degree of openness, their bilateral trade linkages as well as their employment, tradable sector and government shares. There are no country specific behavioural estimates for individual countries, but the estimates obtained for the euro area are imposed. For a detailed description see Ratto, M. W. Roeger, Veld, Jan. 2008. QUEST III: An Estimated Open-Economy DSGE Model of the Euro Area with Fiscal and Monetary Policy. Economic Papers 335

[50] See 2011 SPU

The results for Ireland which are described in detail in European Commission (2008) are summarised below. The model assumes that benefits and transfers are index linked. The shift results in an increase in GDP and employment of 0.2% and 0.25% five years after the reform.

Years after reform	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 20
GDP	0.12	0.17	0.19	0.2	0.2	0.2	0.19
Employment	0.14	0.22	0.24	0.25	0.25	0.23	0.21

Table 5: Results from QUEST III Model of a 1% of GDP shift from income tax to consumption tax
Source: European Commission

As a check against the outputs from the QUEST III simulations, which may not be perfectly calibrated for the Irish economy, we use the results of an existing structural model of the Irish economy - the ESRI's HERMES model.[51] The HERMES model was first estimated in the 1980s (Bradley, Fitzgerald, Hurley, O'Sullivan and Storey (1993)) and the most recent specification of the model is outlined in Conefrey and Fitzgerald (2009).[52]

The results from the HERMES simulations again focus on a revenue neutral shift and are based on a more detailed, richer specification of the Irish economy QUEST III. Transfer payments are not index-linked in HERMES.

The first set of results presented below simulate a €1 billion increase in revenue from property taxes offset by a cut in income tax sufficient to keep the general government deficit unchanged each year. The results from HERMES are symmetric and linear and as such the results can be scaled up or down to reflect a greater or lesser shift than that modelled. Because property tax has a much more limited impact on the labour market than personal taxation the net effect of the change is to raise the growth rate and reduce the unemployment rate. The results indicate 0.32% increase in the GDP, a 0.43% increase in employment and a 0.14% reduction in unemployment after 5 years.

Years after reform	Year 1	Year 2	Year 3	Year 4	Year 5
GDP (%)	0.00	0.16	0.26	0.32	0.32
Employment (%)	0.00	0.11	0.26	0.41	0.43
Unemployment rate (change)	0.00	-0.07	-0.08	-0.12	-0.14

Table 6: Results from HERMES Model of a €1 billion shift from income tax to property tax
Source: ESRI

The table below reports the results of a simulated shift to VAT from income taxes using the HERMES model. It simulated an increase in VAT offset by a reduction in income tax, both scaled to roughly bring in ex ante €1 billion. Because personal taxation primarily affects those working and VAT affects a wider population, the switch results in lower wage rates, higher employment and higher output in the medium term. The results indicate that real GDP would be 0.38% higher than the

[51] The author would like to thank John Fitz Gerald for undertaking the reported simulations.

[52] Conefrey, T. and Fitz Gerald, J. (2009). The macro-economic impact of changing the rate of corporation tax, ESRI working paper 273

no policy change baseline after five years, with employment a 0.43% higher and unemployment 0.21% lower.

Years after reform	Year 1	Year 2	Year 3	Year 4	Year 5
GDP	0.00	0.17	0.30	0.42	0.38
Employment	0.00	0.11	0.26	0.41	0.43
Unemployment rate	0.00	-0.09	-0.17	-0.24	-0.21

Table 7: Results from HERMES model of a €1 billion shift from income tax to VAT
Source: ESRI

The results of both shifts are consistent with the literature and also with the results of the QUEST III simulations and all show an increase in short and medium term GDP and employment and a reduction in the unemployment rate arising from the shift.

The simulations do not give any guidance on how to implement the shift and a few considerations are required.

Firstly, in terms of a shift towards property taxes, a shift of €1 billion would suggest a two fold increase on the forecast for a full year yield of €500m for the local property tax. If a lower shift were considered the results would need to be scaled back proportionately.

Second, an increase in consumption tax does not necessarily imply an increase in the headline rate of VAT. Efforts could be made to increase the 'efficiency' of VAT by increasing some of the lower rates. Some of the revenue generated could be used as direct expenditure through means tested benefits to compensate low income groups as per the simulations in the Mirrlees Review (2011)[53] and described in Section 4 above. Direct cash payments are generally more efficient at relative poverty reduction given that the deadweight costs of reduced VAT rates are high.

[53] See Chapter 9 'Broadening the Tax Base', pp. 218, Mirrlees Report

6. Final Thoughts

The objective of this paper was to contribute towards the discussion of tax policy in the context of economic growth. Of course economic growth is not the only consideration when it comes to tax policy. The achievement of redistributive outcomes is also of interest to policy makers. Whilst this paper focuses mostly on changes to the structure of the tax system motivated by economic growth objectives, it does acknowledge the role the income tax (and benefits) system has played in achieving progressivity and redistribution in the Irish system already. However it also acknowledges that a trade-off exists between progressivity and economic growth.

The paper identified aspects of the Irish taxation system that may be harmful to growth and identified possible scope for growth enhancing reform. The reforms involve reductions in the burden of labour taxation either through base broadening within labour taxation or through a shift to consumption to property taxation. Given the constraints faced base the exchequer the reforms are presented in a revenue neutral basis. Results from macrosimulation models show positive GDP and employment gains for Ireland.