

POLICY PAPER

Free State to Tax State: A Century of Taxation in Ireland

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Abstract: Over the last century, there has been a dramatic change in both the composition and the structure of the Irish tax system. In this paper, we construct a new dataset of tax rates and tax bands for the main tax headings in Ireland, from 1920-2019. We document these changes and trends in tax policy in the aggregate and using the main tax headings. One striking regularity, however, is that Irish tax policy has been persistently procyclical. While tax revenues are naturally expected to vary with the cycle, we show that changes in tax rates have been conducted procyclically. Most notably, we find strong evidence that governments have tended to adjust the rates of income tax in a procyclical manner over the past century. Using an additional tax policy changes dataset, we show that discretionary tax measures – which incorporate all tax policy instruments (rates, bands, credits, exemptions, etc.) – have been largely procyclical over the period 1987-2019. These findings are in contrast with other developed countries, where tax policy has tended to be acyclical.

I INTRODUCTION

The Irish economy has changed dramatically since the Irish Free State was first established almost a century ago in 1922. Throughout this period, Ireland has experienced large swings in economic activity. As a small open economy, Ireland is exposed to global shocks. As such, it is important that domestic macroeconomic

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policy is conducted with a view to stabilising the economy. Given that Ireland is now a member of a monetary union, and does not have control over monetary policy, the use of fiscal policy in stabilising the business cycle is especially important. The impact that fiscal policy has had in terms of mitigating/exacerbating these fluctuations warrants close scrutiny and lessons can be drawn from it to better inform future policy decisions.

In this paper, we construct a new dataset to document how tax policy in Ireland has evolved from 1920 to 2019. We focus on the changes in composition and the trends in taxation over the past century. In addition, we show that tax policy has been persistently procyclical over the past century. A major contribution of this paper is that we isolate the discretionary changes to tax policy (changes to tax rates and tax bands) in our analysis. This sets our work apart from previous studies that have focused primarily on tax revenues. The distinction is critical as tax revenue is endogenous to the business cycle. That is, changes in tax revenues may not always reflect changes in policy, but instead, may reflect changes in the business cycle or other non-policy factors.

Using a new dataset on tax rates and tax bands, we show that income tax rates have been changed procyclically over the period 1920-2019. In addition, we construct a “tax rate index” as a measure of the overall tax system, which is a weighted average of changes in the rates of a number of key tax headings, and show that this too has exhibited signs of procyclicality over the period 1975-2019.

We use an additional dataset on the estimated yield/cost of all budgetary tax measures introduced from 1987-2019 to investigate how tax policy – as a whole – was conducted over this period. We find that changes to income taxes and the tax system as a whole have been taken procyclically over this period. Changes to VAT have been broadly acyclical over this period. There is evidence that changes to other tax heads were either acyclical or procyclical over this period. We do not find evidence of countercyclical changes.

In the past century Ireland has transitioned from a protectionist economy to a small open economy. The size of the State in the economy has increased significantly over this period, with the share of Exchequer taxation in the economy (GNI*) almost doubling from 1960 to the mid-1980s. While this partly reflects a more centralised form of taxation, i.e., a shift from local government taxes and charges to central government, it also reflects a more prominent role of government in the economy. In the early part of the foundation of the State, the main sources of tax revenue were from Customs taxes, excise taxes and income tax. A century later, the State is now mostly reliant on income tax, value added tax (VAT), and corporation tax.

Perhaps the most significant changes to the taxation system in Ireland occurred in the 1970s. Joining the EEC in 1973 fundamentally changed the composition of Ireland’s tax revenue. First, the share of Customs tax in Exchequer revenue fell by 19 percentage points following the accession to the EEC. Secondly, wholesale and

turnover tax were replaced by VAT. Another significant change that happened in the 1970s was the Corporation Tax Act (1976), which introduced an entirely new taxation system for companies. Under the old corporation profits tax, the precursor to the current system, taxes on companies were levied on both income and profits.¹ Finally, in the 1970s, there were also major reforms in how capital and wealth was taxed.

Broadly speaking, the Keynesian view of fiscal policy suggests that the optimal fiscal policy should be countercyclical, with taxes being cut and government spending being raised in recessionary periods in order to stimulate growth and increase aggregate demand, while the converse should happen during boom periods. Were policymakers to follow the Keynesian view of fiscal policy, tax rates and expenditure should be countercyclical, with a positive correlation between tax rates and the economic cycle and a negative correlation between expenditure and the cycle.

On the other hand, the “tax smoothing” theory of Barro (1979) suggests that tax rates, and fiscal policy more generally, should be kept constant over the cycle and only respond to unanticipated changes to fiscal sustainability. If policymakers followed Barro (1979), tax rates would be acyclical and there would be no correlation between tax rates and the economic cycle.

Numerous studies have empirically estimated the relationship between the cycle and fiscal policy, both in a domestic setting and an international setting. International evidence from Lane (2003) suggests that total government expenditure is acyclical, with current government expenditure being mildly countercyclical in 22 OECD countries. Other studies have found that, broadly speaking, fiscal policy has been countercyclical in developed countries and procyclical in developing countries (Kaminsky *et al.*, 2004; Talvi and Végh, 2005; Woo, 2009).

On the domestic side, Lane (1998) rejects the notion that fiscal policy was conducted countercyclically in Ireland over the 1980s and 1990s. Government spending has not been conducted on a countercyclical basis and, depending on how the cycle is measured, government tax revenue is either acyclical or countercyclical (Lane, 1998). Kearney *et al.* (2000) use three methods of estimating the fiscal stance and find that the fiscal stance was in general procyclical in Ireland over the 25 years from 1976-2000. Hunt (2005) finds that “feasible discretionary government investment” was procyclical over the period 1969-2003. Bénétrix and Lane (2012) find similar results when looking at a period from 1970-2007. Over this period, the headline government balance, the underlying government balance, government revenues, and the discretionary element of government expenditure moved procyclically. Consistent with these findings, Cronin and McQuinn (2018) have found that Irish fiscal policy in terms of government consumption was

¹ The bases for these two taxes were not the same. Corporation profits tax applied to the profits of a company before income tax was applied. The amount due in corporation profits tax was then a deductible from the income tax bill.

procyclical both ex-ante (plans laid out in budgetary documents, i.e., the intended fiscal stance) and ex-post (execution of these plans, including overruns and underruns, i.e., the actual fiscal stance) from 1989-2013. These findings all point to the conduct of fiscal policy in Ireland as being largely procyclical. It suggests that, in terms of its budgetary stance, Ireland is closer to developing economies than it is to developed economies.

While these papers contribute to the literature on how Irish fiscal policy – as a whole, and in terms of revenue and expenditure components – has been conducted over the business cycle in Ireland, they say relatively little on the cyclical conduct of tax policy, as opposed to tax revenue. The distinction between tax revenue and tax policy is crucial. In contrast to most items of government expenditure, tax revenue is not directly controllable by a policymaker. Tax revenue reflects a policy outcome and not a policy instrument. Tax revenue is endogenous to the business cycle and changes in tax revenues may not reflect changes in tax policy but instead reflect changes in the business cycle or other non-policy factors. As argued by Végh and Vuletin (2015), focusing on the cyclical behaviour of tax revenue may lead one to draw incorrect conclusions as to the cyclical behaviour of tax policy. For instance, tax revenues may fall in a recession even if tax rates increase. This arises if the higher taxes are dominated by the effect from a reduction in the size of the tax base i.e., the lower consumption/income. If one were to use tax revenues as the appropriate measure of tax policy in this instance, one would quite possibly conclude that tax policy has been countercyclical when the exact opposite has been the case. A perfect illustration of this is what transpired in 2009 and 2010 in Ireland. In the midst of the banking crisis, Ireland introduced the income levy at the beginning of 2009 (the rate of the levy was subsequently increased mid-way through the year), and yet income tax revenue fell in 2009, and continued to fall in 2010, even as the rate was increased further. Focusing on tax revenue in this instance – as opposed to the appropriate policy variable – would lead one to incorrectly conclude that tax policy in 2009 and 2010 was countercyclical.

This paper fills a gap in the literature of Irish fiscal policy by examining the cyclicity of tax policy as opposed to tax revenues. We take two approaches to investigate the cyclicity of taxation.

First, we take the approach of Végh and Vuletin (2015), who use tax rates as the appropriate policy instrument on the revenue side and examine how these rates change across the business cycle. To do so, we compile a new dataset of tax rates and tax bands for key tax headings in Ireland, from 1920-2019. We cover the main tax headings in Ireland, including income tax, the Universal Social Charge (USC), corporation tax and value added tax (VAT). Using this dataset, we show that income tax rates have been changed procyclically over the period 1920-2019. In addition, we construct a “tax rate index” as a measure of the overall tax system, which is a weighted average of changes in the rates of a number of key tax headings, and show that this too has exhibited signs of procyclicality over the period 1975-2019. This

stands in contrast to Végh and Vuletin (2015), who find that tax policy is acyclical in developed countries and places Ireland among developing countries, who tend to run procyclical tax policy.²

However, there is an important caveat to bear in mind when considering the cyclicity of tax policy solely based on tax rate changes. Tax rates are only one policy instrument available in the conduct of tax policy. A more holistic assessment would need to account for changes in other tax policy instruments, like tax credits or tax bands. For instance, it is possible that the impact, in terms of revenue, of a change in the tax rates may be wholly or partially offset by parallel changes in tax bands.

Our second approach to investigate the cyclicity of taxation addresses this shortcoming. We use estimates of the costs/yields in revenue from all discretionary changes to the tax system – changes in bands, rates, credits, exemptions, etc. – to see how tax policy, as a whole, is conducted over the business cycle. This is the approach taken by Barrios and Fagnoli (2010), who find that, for eight EU countries over the period 2001-2007, discretionary tax changes were taken in a procyclical manner.³ We carry out the same exercise for Ireland using a dataset on the expected yields/costs from discretionary tax policy changes included in each budget from 1987-2019 to investigate how the tax system has been changed over the business cycle.⁴ Our findings suggest that the overall tax system and income tax have been changed procyclically, while evidence suggests that other parts of the tax system were changed either procyclically or acyclically. We do not find evidence of countercyclical tax changes.

The paper proceeds as follows: Section II outlines how the tax rate and tax band data were collected, as well as the sources of other data used in the paper. Section III outlines the historical trends, and changes in taxation over the past century both on an aggregate level, and with a focus on certain individual tax headings (income tax, VAT, corporation tax, etc.). Section IV investigates the cyclicity of tax policy over the last century using both the tax rate data and the data on discretionary tax measures. Finally, Section V concludes.

II DATA DESCRIPTION

This paper draws on several different sources of data relevant to the Irish tax system and the macroeconomy. A summary of the data used in this paper is outlined in Table 1.

In terms of tax revenue, long-run Exchequer revenue data (and interest expenditure data) are available from the Irish Fiscal Advisory Council (Fiscal

² Their analysis was based on more than 60 countries. However, Ireland was not included in their analysis.

³ Ireland was not one of the eight countries included in this analysis.

⁴ Since 1987, the budgetary documents have included the expected yield/cost, in nominal terms, of a tax policy change.

Table 1: Description of Data

<i>Data</i>	<i>Description</i>	<i>Source</i>	<i>Coverage</i>	<i>Frequency</i>
Exchequer tax revenue	Data cover the Exchequer tax revenue receipts for all the main tax headings included in the Finance Accounts. Data relate to the government financial year, which from 1922-1973 ran from 1 April to 31 March. In 1974 the financial year ran from 1 April to 31 December. Thereafter, the financial year coincided with the calendar year.	Irish Fiscal Advisory Council, and Finance Accounts.	1922-2019	Annual
Total Exchequer revenue	Includes all Exchequer tax revenue, with the addition of Post office revenue and miscellaneous receipts. Miscellaneous receipts include items like the central bank surplus payments, fees for licences etc. Data relate to the financial year.	Irish Fiscal Advisory Council, and Finance Accounts.	1922-2019	Annual
Exchequer interest	Exchequer interest expenditure is taken from the Finance Accounts. Data relate to a financial year.	Irish Fiscal Advisory Council, and Finance Accounts.	1922-2019	Annual
Tax rates and tax bands	Data on tax rates, tax bands and the implementation dates are obtained from primary legislation. Data cover the main tax headings. Income tax bands are those for a single person. If more than one tax rate applied in a calendar year, the tax rate that was in place for the majority of the calendar year is used in this paper.	Finance Acts, Income tax acts, Tax consolidation acts, Corporation tax acts, Wealth tax acts, Social Welfare Acts, Capital Gains tax acts, Capital Acquisition tax acts, Stamp Duty Acts and Health	1920-2019	Annual

Table 1: Description of Data (Contd.)

<i>Data</i>	<i>Description</i>	<i>Source</i>	<i>Coverage</i>	<i>Frequency</i>
National debt	Data on the national debt are taken from the NTMA for years 1996-2019. Data prior to 1996 are taken from FitzGerald and Kenny (2018), which was compiled from the Finance Accounts.	Contribution Acts as well as data from the Revenue Commissioners and the European Commission.	1922-2019	Annual
Consumer Price Index	The Consumer Price Index with December 2016 as the base month is used. Data with December 2016 as the base month are available back until 1976. This is then extended back until 1922 using the Consumer Price Index with base month of July 1914.	NTMA and FitzGerald and Kenny (2018). Central Statistics Office.	1922-2019	Annual
Employment cycle	Estimates of the length of economic contractions are obtained using the Bry and Boschan dating algorithm. For further details see Box A of Fiscal Council (2018) for details.	Irish Fiscal Advisory Council.	1960-2019	Annual
Discretionary tax measures	Discretionary tax measures include the estimates revenue yield/cost of all tax policy changes included in the budget documents. Only implemented tax changes are included. Data are at a quarterly frequency. If a tax measure is implemented after the middle of the current quarter, it is assigned an implementation date of the following quarter. Measures that merely alter the timing of payments, but not the ultimate tax liability, are not included. Full year estimates of the tax revenue yield/cost have been used. As the full year estimate is used, these are scaled by an annual estimate of nominal GNI*.	Financial Statements/ Budget documents from the Department of Finance	1987-2019	Quarterly

Table 1: Description of Data (Contd.)

<i>Data</i>	<i>Description</i>	<i>Source</i>	<i>Coverage</i>	<i>Frequency</i>
Output gap	The output gap is estimated using a “suite of models” approach based on domestic GVA.	Casey (2019).	1975–2019	Annual and quarterly
Nominal and real GNI*	Nominal and Real modified gross national income (GNI*) are obtained from the CSO for the years 1995–2019. Data are then extended back to 1922 using the nominal and real GDP growth rates from Gerlach and Stuart (2015).	Central Statistics Office, and Gerlach and Stuart (2015).	1922–2019	Annual
Real domestic GVA	Data on real domestic GVA are taken from the CSO for Q1 1995–Q4 2019. These data exclude sectors that are dominated by foreign-owned multi-national enterprises. Data from Q1 1989 to Q4 1994 are from the Irish Fiscal Advisory Council. The data are extended back to Q1 1987 using the historical relationship between domestic demand and domestic GVA. A local quadratic interpolation is used to convert the series into a quarterly series over this period.	Central Statistics Office, and Irish Fiscal Advisory Council.	1987–2019	Quarterly

Council) from 1938-2018.⁵ This was supplemented with additional data from the Finance Accounts to extend the dataset back to 1922. The revenue data in this dataset only relate to Exchequer revenue (central government revenue). The dataset includes Exchequer tax revenue for all the main tax heads, as well as other Exchequer revenue (post office revenue and miscellaneous receipts). Exchequer data are available on a financial year basis. From 1922-1973, the financial year ran from 1 April to 31 March. In 1974 there was a nine-month financial year running from 1 April to 31 December. Thereafter the financial year coincided with the calendar year. For the most part, the revenue data presented here are on a financial year basis, with data for 1974 presented as a linear interpolation between 1973 and 1975. It is important to note that significant revenue is generated from taxes and charges outside of the Exchequer and is not included in this dataset. For instance, significant revenue is raised by way of social security contributions, Pay Related Social Insurance (PRSI), which are not paid into the Exchequer.

For tax rate and tax band data, a new dataset was compiled. These data draw on several different sources. The main sources of data for the tax rates and tax bands, as well as the implementation dates of these tax changes, are the various Finance Acts from 1920-2019.^{6, 7} Data from the Finance Acts are supplemented with data in Income tax acts, Tax consolidation acts, Corporation tax acts, Wealth tax acts, Social Welfare Acts, Capital Gains tax acts, Capital Acquisition tax acts, Stamp Duty Acts and Health Contribution Acts as well as data from the Revenue Commissioners. For VAT, data are available from the European Commission.⁸

A second new tax policy changes dataset is also used here. This dataset consists of the expected full year yield or cost of discretionary revenue measures taken in each budget.⁹ The data are constructed on a quarterly basis covering Q1 1987 to Q4 2019 and contain all implemented tax changes for the main tax headings.^{10, 11} If a tax measure is implemented in the first half of a quarter, it is assigned to that quarter. If a tax measure is implemented in the second half of a quarter, it is assigned an implementation date of the following quarter.

⁵ Exchequer revenue data are available here: <https://www.fiscalcouncil.ie/datasets/>

⁶ The income levy, which was a precursor to the Universal Social Charge (USC) and was introduced in 2009, has been included in the category labelled “USC” here. USC was introduced in 2011 as a replacement for the income levy and the health levy. Its introduction was estimated to be revenue neutral in 2011.

⁷ In the event that two different tax rates applied in the one year, as was the case for the income levy in 2009 with a lower rate for the first four months and a higher rate for the final eight months, the rate that is shown in figures and used in the empirical analysis is that which applies for the majority of the calendar year.

⁸ VAT rate data are available from the European Commission here: https://ec.europa.eu/taxation_customs/sites/taxation/files/resources/documents/taxation/vat/how_vat_works/rates/vat_rates_en.pdf.

⁹ This dataset is similar to the dataset used in Conroy (2019). Both datasets capture discretionary tax measures. However, the dataset in Conroy (2019) is at an annual frequency.

¹⁰ There was no systematic recording of the yield from discretionary revenue measures in budget documentation prior to 1987.

¹¹ Tax measures that merely change the timing of payments, but not the ultimate tax liability are not included.

Data on Ireland's historical national debt are taken from the NTMA for 1996-2018, and from FitzGerald and Kenny (2018) for 1922-1995.¹²

Turning to the macroeconomic variables used: Consumer Price Index (CPI) data from the Central Statistics Office (CSO) are used. For the years 1976-2019 the CPI with December 2016 as the base is used. This is then backcasted to 1922 using the Consumer Price Index with July 1914 as the base. For our measures of nominal and real output, nominal GNI* and real GNI* from the CSO is used from 1995-2019.¹³ These data are then backcasted to 1922 using the nominal and real GDP growth rates of Gerlach and Stuart (2015).¹⁴ As data for real GNI* are only available at an annual frequency, data on quarterly real domestic GVA from the CSO are also used here.¹⁵ These data are available from the CSO from Q1 1995 to Q4 2019. This is extended back to Q1 1987 using the historical relationship between domestic demand and domestic GVA.¹⁶

Data on the "Employment cycle", which show periods of contraction in the Irish economy, are taken from Fiscal Council (2018).¹⁷ These data are available for the period from 1960-2018.

Irish output gap estimates from 1975-2019 are taken from the Irish Fiscal Advisory Council, as estimated in Casey (2019). These are available on both an annual and a quarterly frequency. This is supplemented with output gap estimates that are derived using a Hodrick-Prescott (HP) filter and a Hamilton filter on the real GNI* series.¹⁸

III TRENDS IN TAXATION OVER THE PAST CENTURY

The structure of the Irish economy has changed significantly over the past century and with it, so too has the composition of tax revenue. Table 2 highlights some of the key tax changes to the main tax headings over the past century.¹⁹

¹² Historical national debt data are available here: <https://www.ntma.ie/business-areas/funding-and-debt-management/statistics/debt-projections>.

¹³ Ireland's National Account data are distorted due to the globalisation activities of a few large multinational corporations in Ireland. As a result, the Irish statistics office, the Central Statistics Office (CSO), produces a measure of domestic income called Modified Gross National Income (GNI*), which adjusts for the disproportional affect that these multinationals have on Ireland's National Accounts. This estimate is a more relevant measure of the underlying Irish economy—particularly in a fiscal capacity context—than GDP or GNP.

¹⁴ Data for historical nominal and real GDP for Ireland are located here: https://rebcecastuart.net/historical_macroeconomic_data/.

¹⁵ Domestic GVA excludes GVA from sectors that are dominated by foreign-owned multinational enterprises.

¹⁶ A local quadratic interpolation is used to convert these data to a quarterly frequency over this period.

¹⁷ Estimates of the lengths of contractions are obtained using the Bry and Boschan (1971) dating algorithm, which is commonly used in business cycle dating.

¹⁸ For the HP filter a value of $\lambda = 6.25$ is used, as in Ravn and Uhlig (2002), and for the Hamilton filter, $h = 2$, and $p = 2$. Due to the filtering techniques involved, the output gap series using the HP filter begins in 1922, and the output gap series using the Hamilton filter begins in 1925.

¹⁹ This is by no means an exhaustive list.

Figure 1 shows the composition of Exchequer tax revenue from 1922-2019. In the last century Ireland has transitioned from a protectionist economy to a small open economy. This is reflected in the changing composition of tax revenue over the same period. While excise taxes and income taxes have remained key pillars of the tax system in Ireland over the past century, Customs tax, which from 1924-1967 (with the sole exception of 1944) was the largest tax heading, has significantly declined in importance as a revenue source. Customs tax averaged 35 per cent of total tax revenue in each year up to 1972 and peaked at 46 per cent of tax revenue in 1958. As Ireland gradually liberalised its trade policies, the importance of Customs tax as a tax source declined persistently from 1959-1975.

Table 2: Selected Key Changes to the Main Tax Headings

<i>Year</i>	<i>Tax</i>	<i>Description</i>
1956/1957	Corporation profits tax	An exports profits relief of 50% was introduced in 1956. This was then broadened and increased to 100% in 1957. ²⁰
1960	Income tax	PAYE was introduced. Prior to this income tax was paid a year in arrears.
1972/1973	Value added tax	Ireland joined the EEC in 1973. This resulted in Ireland introducing a value added tax which replaced wholesale and turnover taxes. Joining the EEC resulted in significant falls in Customs tax revenue.
1975	Corporation tax	In 1975 Corporation profits tax was replaced with Corporation tax. Prior to 1974, businesses paid income tax and corporation profits tax.
1981	Corporation tax	A reduced rate of corporation tax of 10 per cent was introduced for manufacturing companies. (A less broad scheme for manufacturing companies was introduced in 1977).
2000	Income tax	Introduction of a tax credit system for income tax to replace the older system of allowances.
1998-2003	Corporation tax	The Finance Act, 1999 included a schedule of incremental annual reductions of the standard rate of corporation tax from 32 per cent in 1998 to 12.5 per cent by 2003.

²⁰ This scheme ceased on 5 April 1990.

Significant structural changes in the composition of the tax system occurred in the 1970s. The foremost reason for the structural change in the tax system was Ireland's accession to the European Economic Community (EEC), now the European Union (EU). In 1972, Ireland adopted a value added tax (VAT) in preparation for joining the EEC. This replaced the wholesale and turnover taxes which were abolished in 1972. As a result of joining the EEC, the declining trend in the importance of Customs tax as a revenue source was accelerated.²¹ Customs tax made up 21 per cent of tax revenue in 1972, the year prior to accession. This share of tax revenue fell to 2 per cent by 1975. This was offset by an increase in the share of excise duty in tax revenue from 18 per cent in 1972 to 33 per cent in 1975. VAT made up a further 19 per cent of tax revenue in 1975.

Since its introduction, VAT has played a significant role as a revenue source, contributing more than 18 per cent of tax revenue in each year. It reached a historical maximum share of tax revenue in 2008 (33 per cent), partly as a result of the construction boom at the time, with windfall estimates of VAT attributed to the construction boom of €3.5 billion over 2006-2008 (Addison-Smyth and McQuinn, 2010).

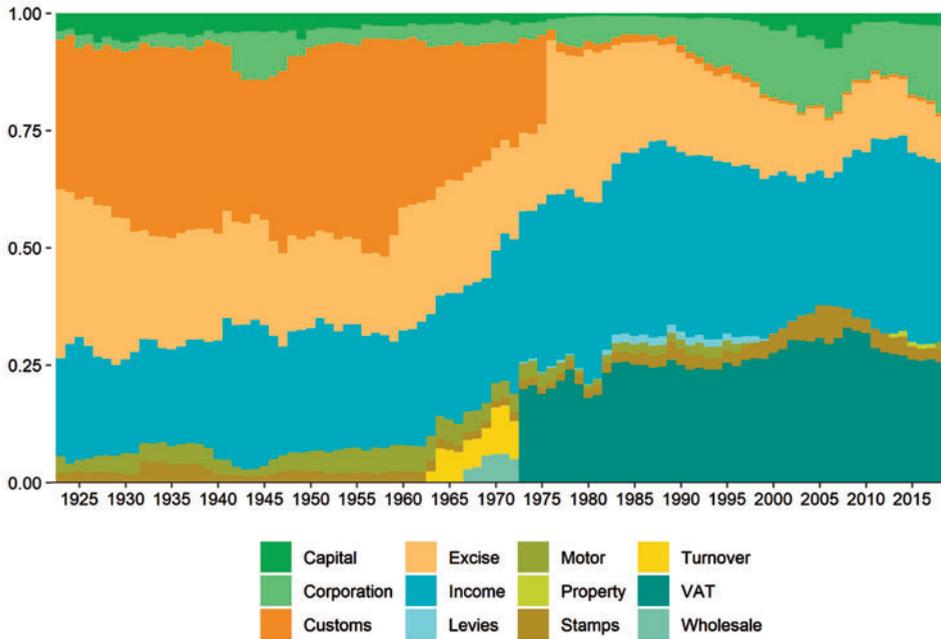
The reliance on income tax as the main source of revenue is evident in recent years. This reflects the fact that Ireland's income tax base has been significantly broadened in the last 60 years (Hardiman, 2004). However, despite its considerable significance, income tax has not reached the levels of importance that Customs tax once played in the Irish tax system. At its peak, income tax accounted for only 42 per cent of tax revenue in 1987. The contrast between the levels of dependency on income tax and Customs tax over the past century shows to some extent the significant changes that have taken place in the past century. Ireland transitioned from a protectionist economy to a much more open economy.

For a brief period in the 1940s revenue from corporation tax made up over 10 per cent of tax revenues. This was partly due to an excess profits tax of 50 per cent being levied during World War II from 1941-1946. It was not until 1994 that the corporation tax share was more than 10 per cent again. Since then, the corporation tax share has grown further and reached 19 per cent of Exchequer tax revenue in 2018.

Excise duty has historically played an important role as a source of tax revenue, with an average share of tax revenue of 22 per cent since 1922.²² However, in recent

²¹ Imports from the EEC in 1969 accounted for 15.5 per cent of Irish imports, while Imports from the UK (which joined the EEC at the same time as Ireland) accounted for 47.7 per cent of Irish imports in the five-year period prior to 30 April 1970 (Dáil Éireann debate, Wednesday 8 July 1970, Vol. 248, No.5). As well as that, joining the EEC Customs area would have lowered tariffs on non-member countries with which the EEC had trade agreements. Naturally, the lowering of tariffs on the majority of Irish imports led to a reduction in Customs revenue.

²² Excise duty made up 64 per cent of all tax revenue in 1922, before declining in share to 36 per cent in 1932.

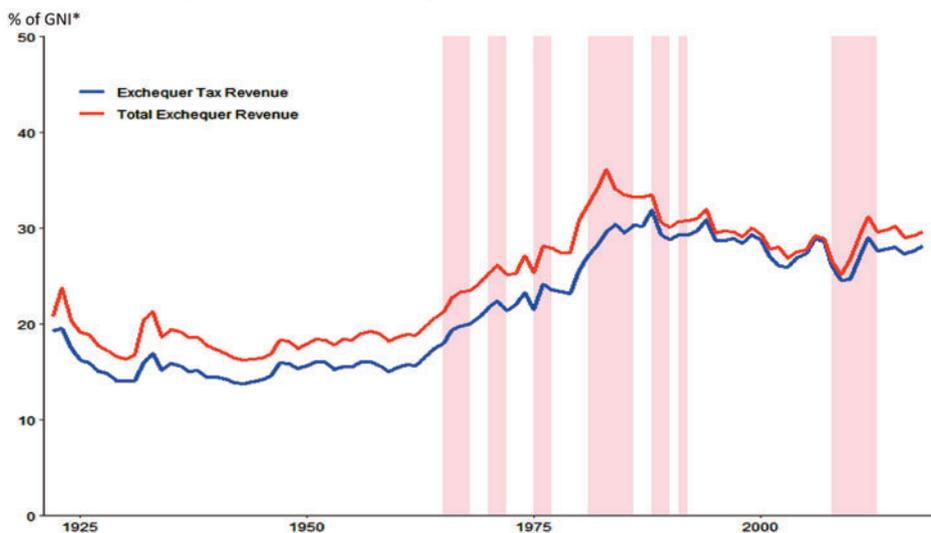
Figure 1: Composition of Exchequer Tax Revenue 1922-2019

Sources: Fiscal Council and author's calculations.

years the share of excise duty in tax revenue has declined and reached a historical low of 10 per cent of tax revenue in 2018. Capital taxes have historically played a limited role in tax revenue in Ireland, with an average share of 3 per cent over the last 98 years. However, partly as a result of the property boom capital taxes reached a peak share of 8 per cent of tax revenue in 2006.

The share of Exchequer tax revenue in GNI* remained relatively constant, and below 20 per cent of GNI* up until the late 1960s (Figure 2). Thereafter it increased steadily and reached a peak of 31 per cent of GNI* in 1988. This reflects the fact that in the 1980s, Ireland had the fastest growing tax-to-GNP ratio in the OECD (Barry, 2008) and a greater degree of centralisation of revenue sources (the relative size of local government has shrunk). Since then, the share of Exchequer tax revenue in GNI* has declined somewhat, particularly during the Celtic Tiger era, but its share has largely fluctuated around the high 20s.

Figure 3 shows the growth in both real Exchequer revenue and real Exchequer tax revenue from 1922-2019. Tax revenue fluctuated significantly in the first ten years of the State with real tax revenue falling by 11 per cent in 1924 and rising by 12 per cent in 1932. Tax revenue was falling during the start of the Second World War, with real revenue growth negative for each year from 1939-1943. Tax revenue grew marginally (1 per cent) in 1944, but then grew dramatically over 1945-1947, with annual growth averaging 11.4 per cent. The 1950s was an unstable period in

Figure 2: Irish Exchequer Revenue from 1922-2019

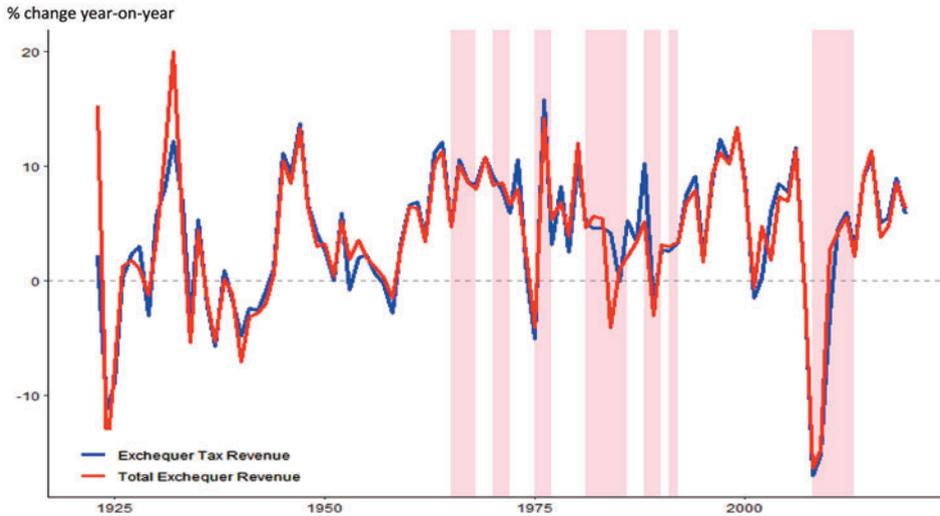
Sources: Fiscal Council; Gerlach and Stuart (2015) and author's calculations.

Notes: Pink shaded regions are periods of contractions, as estimated using the “employment cycle” from Fiscal Council (2018) for the period 1960-2009. For 1974, the revenue data, in levels, are a linear interpolation between 1973 and 1975. This is because 1974 was a short financial year, running from 01/04/1974 to 31/12/1974. Thereafter the financial year was in line with the calendar year, which was not the case prior to 1974.

terms of tax revenue, with tax revenue growth negative in four years. It was not until 1975 before real tax revenue growth turned negative again, falling by 5.1 per cent. The growth in revenue in the run up to the most recent crisis was partially because of buoyant revenues from the property boom. Approximately €5.5 billion of the revenue over 2006-2008 has been estimated to be windfall receipts in the form of VAT and stamp duty from the construction sector (Addison-Smyth and McQuinn, 2010). The unwinding of these windfalls led to the dramatic fall in revenue when the property bubble crashed, with nominal tax revenue falling by 19 per cent in 2009 (or 15.2 per cent in real terms).

Figure 4 shows the evolution of Irish national debt since 1922-2019. The State began with a very small debt burden at its foundation.²³ Since then, Irish national debt had four significant peaks, when expressed as a percentage of tax revenues: 1939, 1962, 1987 and 2013. In contrast when measured against GNI*, there were only two significant peaks: 1987 and 2013. This reflects the low share of tax revenue in GNI* up until the late 1960s. In 2013, national debt as a share of Exchequer tax revenue exceeded 500 per cent. This came just seven years after the series was at its lowest since 1925, at 87 per cent of tax revenue in 2006. This

²³ See FitzGerald and Kenny (2018) for further details on national debt since the foundation of the State.

Figure 3: Real Growth in Revenue 1922-2019

Sources: Fiscal Council and author's calculations.

Notes: Revenue is CPI deflated. Pink shaded regions are periods of contractions, as estimated using the "employment cycle" from Fiscal Council (2018) for the period 1960-2009. For 1974, the revenue data, in levels, are a linear interpolation between 1973 and 1975. This is because 1974 was a short financial year, running from 01/04/1974 to 31/12/1974. Thereafter the financial year was in line with the calendar year, which was not the case prior to 1974.

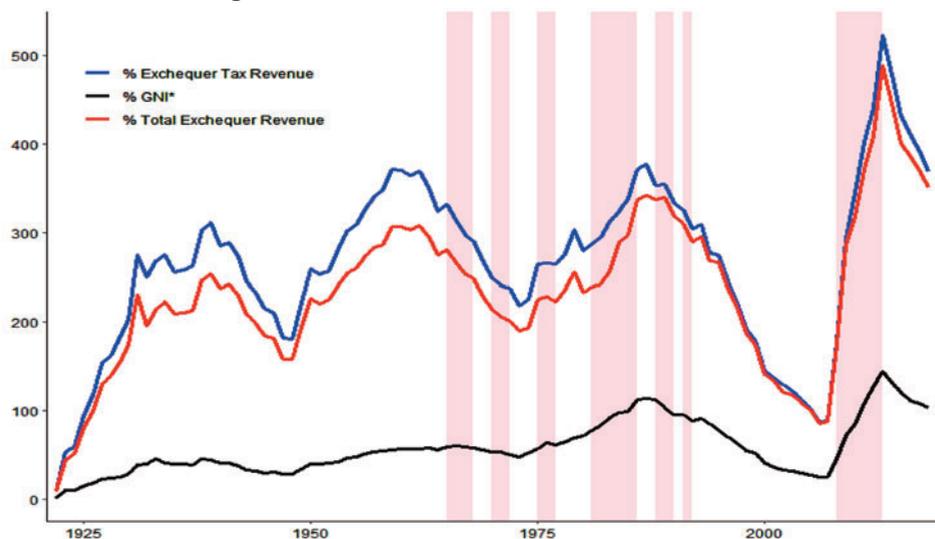
reflects both the fall in Exchequer tax revenue and the increase in the level of debt between 2006 and 2013.

The cost of this debt to the Exchequer is shown in Figure 5. Interest payments on the national debt were, for the most part, above 20 per cent of Exchequer tax revenue from 1960-1996. What is noticeable when you compare Figure 4 with Figure 5 is that, despite there being a larger debt burden during the most recent financial crisis than in the 1980s, the costs in terms of interest payments peaked in 1985 at 35 per cent of Exchequer tax revenue but only reached 19 per cent of Exchequer tax revenue in the recent financial crisis. This partly reflects the higher bond yields at the time, with the average annual yield peaking at 17 per cent in the 1980s whereas the average annual yield peaked just below 10 per cent in the recent crisis (FitzGerald and Kenny, 2018). This rapid increase in the cost of debt to the Exchequer is remarkable given that in 2007, interest as a share of tax revenue was 3 per cent, its lowest point since 1924.

3.1 Income Tax

For the majority of the 19th century, Ireland was exempt from the income taxation system that was in place in Britain at the time. This changed when the exemption

Figure 4: Irish National Debt from 1922-2019



Sources: Fiscal Council; NTMA; FitzGerald and Kenny (2018); CSO; Gerlach and Stuart (2015) and author's calculations.

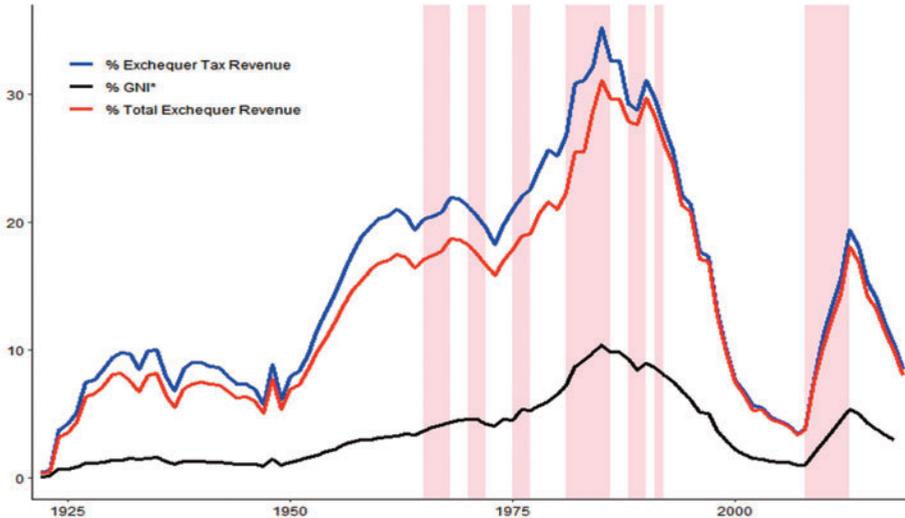
Notes: Pink shaded regions are periods of contractions, as estimated using the "employment cycle" from Fiscal Council (2018) for the period 1960-2009. For 1974, the revenue data, in levels, are a linear interpolation between 1973 and 1975. This is because 1974 was a short financial year, running from 01/04/1974 to 31/12/1974. Thereafter the financial year was in line with the calendar year, which was not the case prior to 1974.

for Ireland was removed in the *Income Tax Act, 1853*. In 1909, graduation (i.e., progressivity) was introduced to the income tax system, with an additional tax, a "supertax" (also known as a "sur-tax"), being paid on incomes above a certain threshold. This was the system that was adopted by the Irish Free State in 1922. Up until the end of the 1950s Ireland's income tax was payable twice yearly, a year in arrears (Clarke, 2017). In 1960, the current Pay As You Earn (PAYE) system of income taxation was introduced (Hardiman, 2002).

Shown in Panel A of Figure 6 is the standard rate of income tax and the top marginal rate of income tax from 1920-2019.^{24, 25} From 1927-1931 the standard rate of income tax was at its lowest at 15 per cent. By contrast, the standard rate of

²⁴ This does not include the rates for social security contributions.

²⁶ From 1920-1974 all income tax (above a reduced rate threshold) was paid at the standard rate. An additional tax, a sur-tax/super-tax, applied on income above a certain threshold. For instance, in 1920, the standard rate of income tax was 30 per cent. Above an income of €38,100, an additional sur-tax of 30 per cent applied. Taken together, this meant that the marginal income tax above €38,100 was 60 per cent. This was essentially equivalent to today's system, where the standard rate applies up to a certain threshold, with a higher rate above this threshold but formulated by means of an additional tax as opposed to a higher rate. For 1920-1974, the top rate of income tax shown in Figure 6 is the combination of the income tax rate and the top rate of sur-tax, and the top rate of income tax is shown from 1975-2019.

Figure 5: Irish Interest Expenditure from 1922-2019

Sources: Fiscal Council; CSO; Gerlach and Stuart (2015) and author's calculations.

Note: Pink shaded regions are periods of contractions, as estimated using the “employment cycle” from Fiscal Council (2018) for the period 1960-2009. For 1974, the data in levels is a linear interpolation between 1973 and 1975. This is because 1974 was a short financial year, running from 01/04/1974 to 31/12/1974. Thereafter the financial year was in line with the calendar year, which was not the case prior to 1974.

income tax was at its highest at 37.5 per cent during World War II in 1941-1945 and from 1952-1958. The top marginal rate of income tax peaked from 1967-1974 at 80 per cent.²⁶ Since 1976, the top marginal rate of income tax has been on a downward trajectory (with the exception of 1983-1984, when it was increased) and is now currently at 40 per cent. However, were USC included, the top marginal rate of income tax would be 48 per cent in 2019.

Looking at periods of economic contractions denoted by pink recession bands, it appears that income tax rates have, for the most part, been raised procyclically during these periods. Only the late 1980s/early 1990s are an exception, where rates were not raised procyclically. Income tax rates when raised in a contraction were typically cut not long after that contraction ended.

Panel B of Figure 6 shows, to some degree, the complexity of the income tax system. From the peak of 11 different tax bands in from 1920-1923, the complexity of the tax system, as measured by the number of tax bands, has been on a downward trend. However, this is only a partial picture of the complexity, as it says nothing about the number of “tax expenditures” related to income tax; items

²⁶ Based on CPI deflated income bands, this top rate of income tax would have applied to incomes above €150,000 and €88,900 (in today's terms) in 1967 and 1974, respectively.

like tax credits and other exemptions. It also excludes the number of USC rates, which, were they included, would bring the total of income tax rates up to six in 2019.

Panel C Figure 6 shows the standard and top nominal income tax bands.²⁷ In 1922, the standard rate of income tax of 25 per cent was broad based and applied on incomes of up to €2,540, which adjusted for inflation would have been equivalent to €132,500.²⁸ The top marginal rate of 55 per cent applied to incomes above €38,100 in 1922, which is equivalent to €1.988 million in today's terms. From 1932-1958, the income tax bands, in nominal terms remained unchanged. From 1920 up until 1966 (and again intermittently between 1970 and 1983), a reduced rate, below the standard rate, applied on low incomes. Between 1932-1966 this applied on incomes below €127.²⁹

What is important to note about the income tax system in Ireland over the majority of the 20th century is that it had a narrow base. Relatively few income earners paid income tax at a rate above the standard rate. In 1938, 72 per cent of incomes did not exceed €317 (€17,590 in today's terms), with 6.5 per cent having incomes above the standard band of €1,905 (€105,720 in today's terms), i.e., paid sur-tax (Department of Finance, 1946). By 1961, the standard rate of income tax of 31.7 per cent applied on incomes up to €3,174 (€63,600 in today's terms), while the top marginal rate, of 69.2 per cent, applied to incomes above €9,523 (€190,750 in today's terms). However, the number of people paying sur-tax on income remained low in 1970-1971, with only 4,735 people paying sur-tax.³⁰

From the early 1980s onwards, both the standard rate and the top marginal rate of income tax have been trending downwards. This follows a similar declining trend in income tax rates for other countries over the same period (Végh and Vuletin, 2015). By 2017, the income tax net was much broader. The standard rate of tax of 20 per cent applied on incomes up to €33,800, with 43 per cent of income earners paying income tax at this rate (Revenue Commissioners, 2019). Some 20 per cent of income earners paid income tax at the higher rate of 40 per cent.³¹

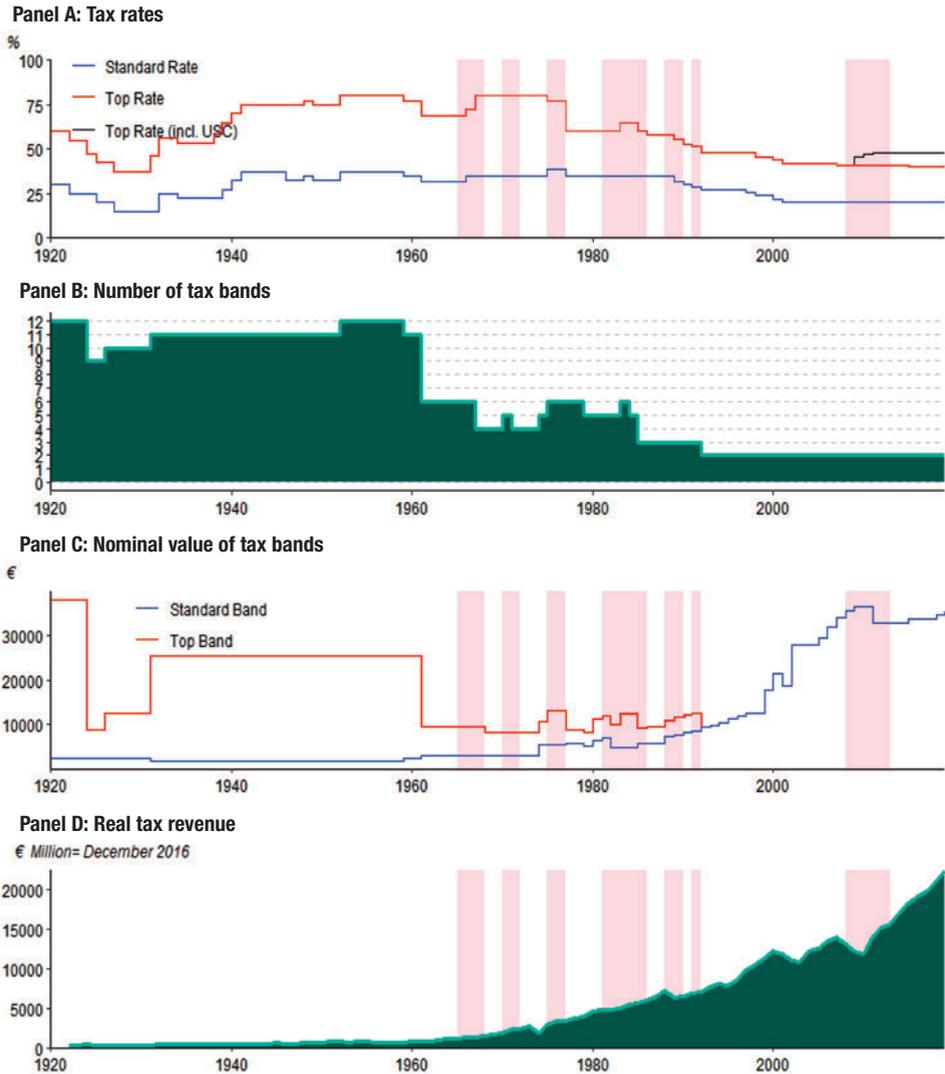
²⁷ For ease of presentation, tax bands in Figure 6 are shown in nominal terms instead of real terms.

²⁸ Deflated using the CPI with December 2016 as the base. A reduced rate of 15 per cent applied on incomes up to €286 (or €14,800 in real terms).

²⁹ €127 in 1932 would have been equivalent to €7,766 in today's terms, while €127 in 1966 would have been equivalent to €2,063 in today's terms.

³⁰ See response of Minister for Finance to questions on Income taxpayers (Dáil Éireann debate, Wednesday 17 May 1972, Vol. 260, No.13).

³¹ Top marginal rate reference here does not include USC. Were USC included the top marginal rate of 48 per cent would apply to incomes above €70,044.

Figure 6: Income Tax in Ireland 1920-2019

Sources: Fiscal Council; CSO and author's calculations.

Note: Pink shaded regions are periods of contractions, as estimated using the “employment cycle” from Fiscal Council (2018) for the period 1960-2009. Panel A shows the top marginal income tax rate (red) and the standard income tax rate (blue) from 1920-2019. Panel B shows the number of income tax bands from 1920-2019. The rates and bands shown are the rates and bands which correspond to a single person. The top rate of income tax represents income tax and the top rate of sur-tax from 1920-1973. Panel C shows the top nominal income tax band (red) and the standard nominal income tax band (blue) from 1920-2019 (USC not included). Panel D shows the real income tax revenue (CPI deflated; including USC) from 1922-2019.

3.2 Value Added Tax, Wholesale and Turnover Tax

In 1963, a turnover tax was introduced in order to reduce the dependency of tax revenue on excise and Customs receipts, which only related to a small number of goods (Clarke, 2017). A rate of 2.5 per cent applied on a monthly turnover of more than €127 (€2,063 in real terms).³² In 1966, a Wholesale tax was introduced at a rate of 5 per cent and was chargeable on the sale of goods such as foods, clothing, medicine, and fuel (Clarke, 2017). Both taxes were ultimately abolished and replaced by VAT when Ireland joined the EEC in 1973.

Panel A in Figure 7 shows both the standard rate of value added tax (VAT) and the top reduced rate of VAT from its introduction in 1972-2018.^{33, 34} Since its introduction there have been several reduced rates of VAT, including VAT exempt goods and services. In addition, from 1972-1978 there were increased rates of VAT (above the standard rate).³⁵ In all, there have been 13 changes to the standard rate of VAT, with eight changes to the top reduced rate of VAT. However, as shown in Panel B of Figure 7, there have been as many as seven, and no fewer than five rates of VAT, since its introduction.³⁶ The standard rate peaked in 1982 at 30 per cent and was as low as 16 per cent in 1972 when VAT was first introduced. While the standard rate of VAT has largely fluctuated around 23 per cent since 1983, over the same period, there has been a slow persistent upward trend in the standard rate of VAT for other countries of about 2 percentage points, albeit from a lower level of 15 per cent (Végh and Vuletin, 2015).

Looking at the periods of contraction (in pink shaded region), there does not appear to be a clear cyclical pattern. There is a mixture of both tax cuts and tax increases over these contractionary periods. Panel C of Figure 7 shows the real VAT revenue from 1972-2019. For the most part, there has been a clear upward increase in VAT revenue since its introduction, the main exception being the recent crisis period when real VAT revenues fell by €5 billion from 2007-2011. While the revenue from VAT has been trending upward since 2011, real VAT revenue has not yet surpassed its pre-crisis peak in 2007. However, this pre-crisis peak in VAT revenue was boosted considerably by revenues related to the construction boom.

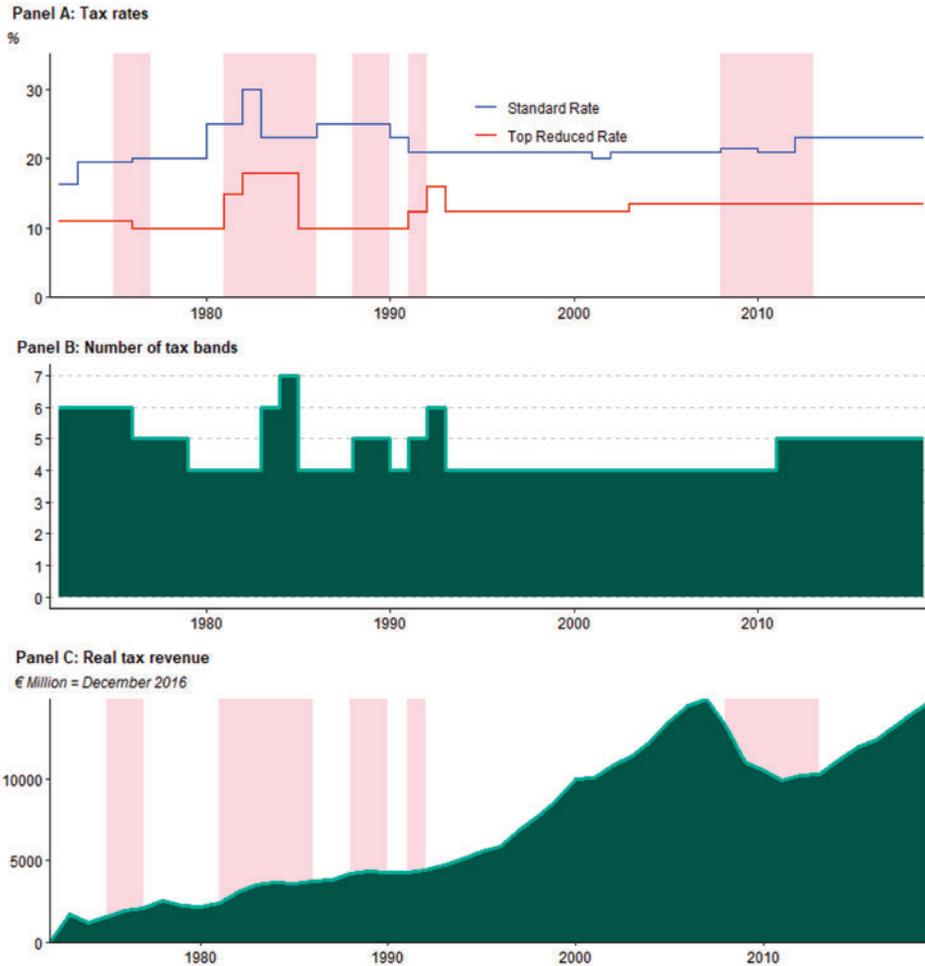
³² A flat rate of €0.32 applied on monthly turnover below €127.

³³ It is important to note that the top reduced rate of VAT is not a consistent series, and the tax base it has applied to has varied widely over this period. It is presented here as one series for reference purposes only.

³⁴ The standard rate of VAT applied to 53 per cent of activity and the top reduced rate applied to 34 per cent of activity in 2020 (Revenue Commissioners, 2020).

³⁵ From 1983-1984 there was an additional standard rate of VAT of 35 per cent. The lower rate of 23 per cent is presented in Figure 7.

³⁶ This includes the rate of zero i.e., goods and services for which a rate of zero VAT applies. There are further goods and services that are VAT exempt.

Figure 7: VAT in Ireland 1973-2019

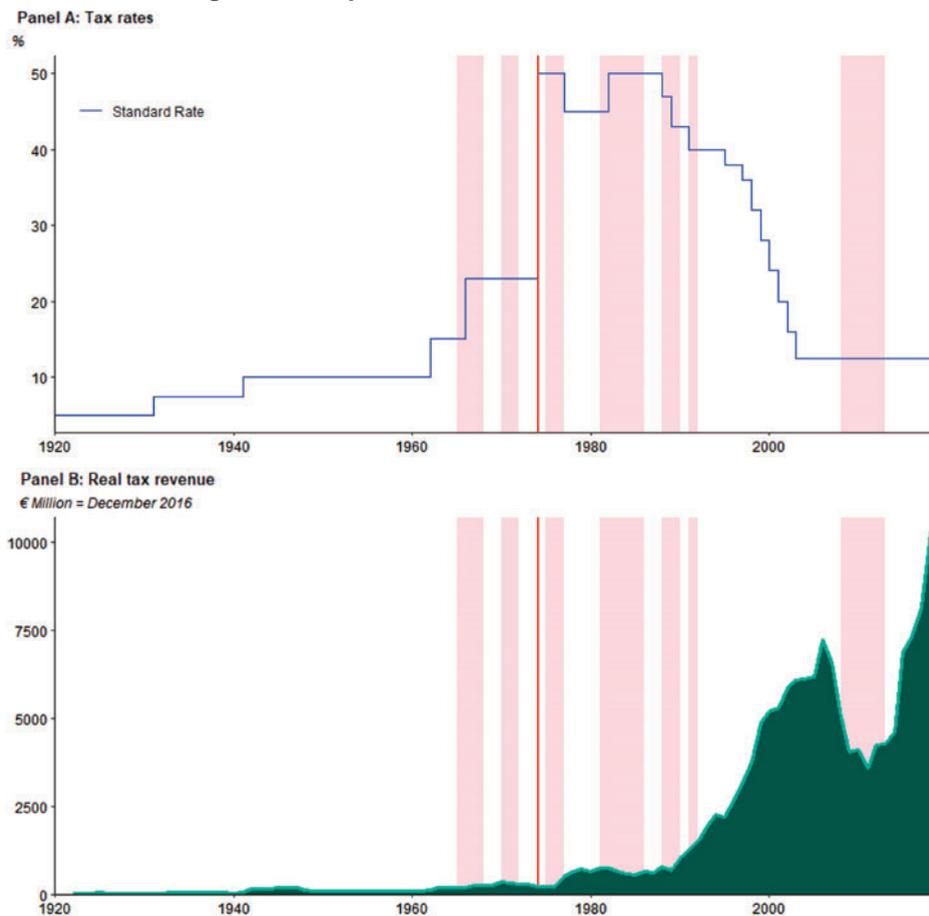
Sources: Fiscal Council, CSO and author's calculations.

Note: Pink shaded regions are periods of contractions, as estimated using the "employment cycle" from Fiscal Council (2018) for the period 1960-2009. Panel A shows the standard VAT rate (blue line) and the top reduced rate of VAT (red line). Panel B shows the number of VAT rates that applied to goods and services supplied in Ireland (incl. the rate of zero). Panel C shows the real revenue from VAT from 1973-2019 (CPI deflated in December 2016 prices).

3.3 Corporation Tax

Corporations in Ireland have been subject to taxes ever since the introduction of the income tax in 1853. While a progressive income tax system for individuals was introduced in 1909 by means of a sur-tax, this sur-tax did not apply to the income of corporations. In 1920, a corporation profits tax was introduced. It is important

Figure 8: Corporation Tax in Ireland 1920-2019



Sources: Fiscal Council and author's calculations.

Note: Pink shaded regions are periods of contractions, as estimated using the “employment cycle” from Fiscal Council (2018) for the period 1960-2009. Panel A shows the standard rate of corporation profits tax, which applied to Irish headquartered companies from 1920-1974, as well as the standard rate of corporation tax from 1975-2019. The red line indicates a structural break when the corporation tax system was reformed. Prior to 1974, companies paid both income tax and corporation profits tax. Panel B shows the real revenue from corporation tax from 1922-2019 (CPI deflated).

to note that this corporation profits tax is not comparable to the system of taxing corporate profits today. The old system meant that corporations paid tax on income, at the standard rate, and a tax on profits, corporation profits tax. This system remained in place until the *Corporation Tax Act, 1976*, which introduced the broad system we now have today.

Panel A in Figure 8 shows the standard rate of corporation tax in Ireland from 1920-2019.³⁷ The red line indicates a structural break in the series. Prior to 1974, the standard rate of corporation profits tax, which applied to Irish incorporated companies is shown.³⁸ After 1974, the standard rate of corporation tax is shown. The rate shown in Figure 8 for corporation profits tax is that which applied to Irish incorporated companies. The old corporation profits tax reached a peak of 23 per cent in 1966 and remained at this rate until it was replaced by the new corporation tax system.³⁹ When the new system was introduced, it set a standard rate of 50 per cent on profits for the years 1974-1976.⁴⁰ The standard rate of corporation tax fell from 50 per cent in 1987 to 12.5 per cent in 2003 and has remained at that rate since then.⁴¹ A declining trend in corporation tax was evident over the same period for other countries, with corporation tax rates falling from around 50 per cent in the early 1980s to 30 per cent by the late 2000s (Végh and Vuletin, 2015).

Corporation tax receipts expanded rapidly after the late 1990s. Panel B in Figure 8 shows the real revenue from corporation profits tax/corporation tax from 1938-2019. From the late 1990s to 2006 real revenue from corporation tax grew by 600 per cent. A dramatic fall in corporation tax revenue occurred as a result of the property crash, with corporation tax revenue falling by roughly half from 2006 to 2011, but since then revenue from corporation tax has increased by almost 200 per cent.

IV THE CYCLICALITY OF IRELAND'S TAX POLICY

We now address a gap in the literature by investigating the cyclical nature of tax policy over the past century. Rather than focusing on aggregate revenues as has been done elsewhere and for shorter time periods, we focus on how the tax instruments available to the policymaker have been changed over the past century. In particular, we examine how tax rates have been adjusted over the economic cycle. In addition, we use a separate tax policy changes dataset to investigate how discretionary tax measures – which incorporate all tax policy instruments (rates, bands, credits, exemptions, etc.) – have been taken over the cycle.

³⁷ Note, this refers to corporation profits tax from 1920-1974, which was a precursor to current corporation tax system that was introduced in the Corporation Tax Act 1976.

³⁸ A higher rate of corporation profits tax applied to companies incorporated in foreign countries.

³⁹ While the statutory rates may seem quite different at the point of the structural break in the figure, taking corporation profits tax and income tax together, the marginal rates of tax on corporations were around 40 and 50 per cent in the year prior to the abolition of corporation profits tax (Sandford and Morrissey, 1985).

⁴⁰ Other rates have applied since the new corporation tax system was introduced. For instance, a reduced rate for manufacturing companies of 10 per cent applied from 1981 to 2010. An Exports Sales relief of 100 per cent was also introduced in 1957 and lasted until 1990.

⁴¹ *The Finance Act, 1999* included a schedule of incremental annual reductions of the standard rate of corporation tax from 32 per cent in 1998 to 12.5 per cent by 2003.

We split our analysis into two overlapping time periods. First, we take a long-run perspective and look at the cyclicity of income tax from 1922-2019. Second, we deal with the cyclicity of tax policy for the more recent period of 1975-2019.

There are several reasons for separating the analysis into short and long-term samples. First, estimates of the economic cycle, the output gap, are more reliable for the more recent period and we use the estimates of Casey (2019), which is based on a multivariate suite of models' approach to estimating potential output. The estimates we derive for the output gap for the entire sample (1922-2019) are based on a single univariate model: either a HP filter or a Hamilton filter. These tend not to be as plausible as the suite of models approach, which involve multivariate and other approaches. Second, the system of taxation after 1975 is much more similar to the one we have today. For instance, the corporation tax system was changed significantly as a result of the Corporation Tax Act 1976.⁴² Prior to this Act, corporations paid tax on income and on profits. VAT was first introduced in 1972, and so was in effect for the entire period of 1975-2019. The system of taxing capital also changed significantly in the 1970s with the abolition of the estate duty, and the introduction of both capital acquisitions tax and capital gains tax. Finally, the government's financial year has only coincided with the calendar year since 1975. Taking the post-1975 era allows for the construction of a tax rate index by taking the weighted average of changes in tax rates among the main tax headings, as in Végh and Vuletin (2015). The tax rate index is constructed by using weights that are derived from the share of each tax heading in tax revenue in a given financial year. As the macroeconomic variables relate to a calendar year, it seems appropriate to isolate the period where these coincide.⁴³

4.1 The Cyclicity of Income Taxation from 1922-2019

In this section we take a long-run view and focus on the changes in the rates of tax on income since 1922. To investigate the cyclical nature of taxation we estimate a similar regression to that of Végh and Vuletin (2015):

$$\Delta \text{Tax rate}_t = \alpha + \beta \text{Cycle}_t + e_t \quad (1)$$

Where, $\Delta \text{Tax rate}$ is the percentage point change in the tax rate at time t , and Cycle_t is the estimate of the business cycle at time t .⁴⁴ From Equation 1, β is then the estimate of the stance of tax policy. A negative sign for the estimate of β would

⁴² This Act introduced corporation tax rates for the 1975 financial year and subsequent years.

⁴³ Although this is slightly mitigated by the fact that tax rates may be changed during the calendar year. This is often the case, as up until 2001, the tax year – as opposed to the financial year – began on 6 April, so changes in tax rates often occurred on this date. In such circumstances, the tax rates that applied for the majority of the calendar year are used in estimation.

⁴⁴ Végh and Vuletin (2015) use the percentage change in the tax rate as the dependent variable. We take a slightly different approach and use the percentage point change in the tax rate as the dependent variable as we believe this is both more easily interpretable and more economically meaningful.

indicate that the tax rates have been changed procyclically, while a positive sign would indicate that the tax rates have been changed countercyclically. We use three estimates of the cycle in our analysis in this section.⁴⁵ First, we use the growth rate of real modified gross national income (RGNI*).⁴⁶ We also use estimates of the output gap derived using a HP filter, and a Hamilton filter on the RGNI*. As the dependent variable is the percentage point change in the tax rate, we allow for the errors to exhibit heteroscedasticity and autocorrelation. As a result, we use heteroskedastic and auto-correlation consistent standard errors throughout.

To understand how taxation on income was conducted over the past century, we estimate Equation 1 for several different rates of income tax. In addition, we also combine these rates with social security contributions. PRSI was introduced in 1979, however prior to this a flat social security contribution was paid by employees. Therefore, the introduction of PRSI in 1979 was not necessarily an increase in the rate of tax on income for many taxpayers. For this reason, dummy variables are included in the equations that include PRSI, with the dummy taking the value of one in 1979, and zero otherwise.⁴⁷ The income levy (which we have merged with the USC series), was introduced in 2009 and represented an increase in the rate of tax on income. Therefore, we have not included a dummy for its introduction.

We find evidence that income tax rates have been changed procyclically over the past century in Ireland. Table 3 shows the results of Equation 1 for various rates of income tax from 1922-2019. The results are consistent across all tax rates. Using the growth rate of real GNI* as the cyclical indicator, there is strong evidence that income tax rates have been changed procyclically. A one percentage point increase in the real growth rate of GNI* is associated with a 0.21 percentage point decrease in the standard rate of income tax. If the output gap were used as the cyclical indicator the results are more mixed. The output gap, derived from a HP filter, points to tax rates being changed acyclically over the past century. However, it appears income tax policy is also conducted in a procyclical manner when the output gap is estimated using a Hamilton filter. A one percentage point increase in the output gap, as derived using the Hamilton filter, is associated with a 0.12 percentage point reduction in the standard rate of income tax.

The issue of endogeneity of economic growth and the tax rate is addressed in Section 4.4.

⁴⁵ Note, estimates of the cyclical variables are on a calendar year basis. In most years, tax rates were changed over the course of a calendar year. In circumstances where this arises, the income tax rates that were in place for the majority of the calendar year are used in estimation.

⁴⁶ Using growth rates as the indicator of cyclicity is a common approach in the literature due to the difficulty in accurately estimating the economic cycle. For instance, in their analysis, Végh and Vuletin (2015) use the growth rates of real GDP as the measure of the cycle, not the output gap.

⁴⁷ As a robustness check, we dropped the dummy variables from the equations that include PRSI. This did not materially alter the results.

4.2 The Cyclicity of Taxation from 1975-2019

In this section, we focus on the more recent period and investigate cyclicity of taxation from 1975-2019 given that the tax system is more comparable to the current tax system and that estimates of the cycle are likely to be more meaningful.

4.2.1 Tax Rate Index

The cyclicity of tax policy since 1975 can be examined on an individual tax head basis as shown above for income taxes, and by means of an overall tax rate index.

Following Végh and Vuletin (2015), we construct the overall tax rate index as a weighted average of the changes in tax rates for various taxes. As Végh and Vuletin (2015) argue, while it can be difficult to obtain an appropriate single indicator to measure the cyclicity of overall tax policy, a tax rate index can provide suggestive evidence of the cyclicity of overall tax policy. The index is made up of tax rates for income tax, VAT, corporation tax, capital gains tax, capital acquisitions tax, and stamp duty with a weight attached to each tax corresponding to its share in tax revenue.⁴⁸ By weighting each tax rate by their corresponding share of tax revenue, the corresponding importance of each tax rate change in the overall tax system is taken into account. Formally, that is:

$$\begin{aligned} \Delta \text{tax rate index}_t = & w_t^{IT} \times \Delta \text{income tax}_t + w_t^{VAT} \times \Delta \text{VAT}_t + w_t^{CT} \\ & \times \Delta \text{corporation tax}_t + w_t^{CTG} \times \Delta \text{capital gains tax}_t + w_t^{CAT} \\ & \times \Delta \text{capital acquisitions tax}_t + w_t^{SD} \times \Delta \text{stamp duty}_t \end{aligned} \quad (2)$$

Where $\Delta \text{income tax}_t$, ΔVAT_t , $\Delta \text{corporation tax}_t$, $\Delta \text{capital gains tax}_t$, $\Delta \text{capital acquisitions tax}_t$ and $\Delta \text{stamp duty}_t$ are the percentage change in the top rate of income tax including USC (or alternatively, the standard rate of income tax), the standard rate of VAT, and the standard rate of corporation tax, the top rate of capital gains tax, the top rate of capital acquisitions tax and the top rate of stamp duty for residential properties and w_t^{IT} , w_t^{VAT} , w_t^{CT} , w_t^{CTG} , w_t^{CAT} and w_t^{SD} are the shares of income tax, VAT and corporation tax, capital gains tax, capital acquisitions tax and stamp duty in Exchequer revenue, at time t .⁴⁹ That is, for the equations using individual taxes, we use the percentage point change in each of the individual taxes as the dependent variable, but for constructing the tax rate index we use the percentage change in the tax rates. This is to allow for a more appropriate weight for aggregation to be attached to the changes in the individual taxes.⁵⁰

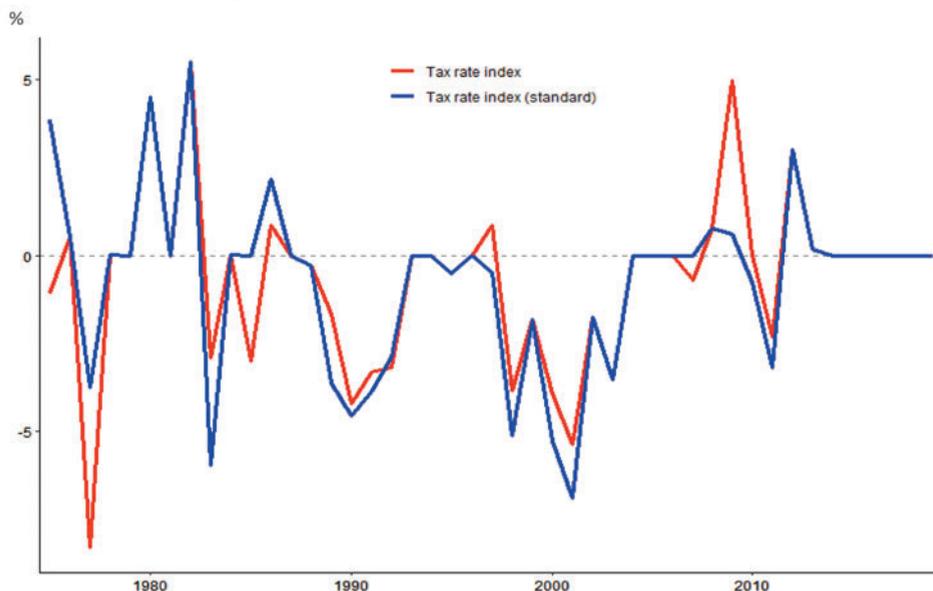
⁴⁸ This tax rate index is a broader index than that used by Végh and Vuletin (2015), who construct the tax rate index using only rates of income tax, VAT, and corporation tax.

⁴⁹ In the results that follow, we update the weight attached to each tax in the tax rate index in each year. This may incorporate short-term fluctuations in the share of each tax due to non-policy changes. However, we have also carried out estimation based on a tax rate index which uses weights based on the 1975-2019 average share of each tax head. The results using this tax rate index are similar.

⁵⁰ As a robustness check we also construct the tax rate index using percentage point changes in the tax rates instead of percentage changes, and the results in terms of estimates of the stance of tax policy are the same.

Figure 9 shows the two tax rate indices from 1975-2019. Both indices display qualitative evidence of procyclicality. There were large cuts to tax rates when there was strong growth and positive output gaps in 1977, further cuts to tax rates during the Celtic Tiger and property bubble period, followed by increases in the tax rates during the Great Recession.

Figure 9: Tax Rate Indices from 1975-2019



Sources: Author's calculations.

Note: Data are constructed based on Equation 2.

4.2.2 Cyclicity of tax rates

In Table 4 we examine how income tax rates are changed across the business cycle; first, using the output gap measure of the cycle and, second, using real GNI* growth as the measure of the cycle. Using the output gap estimates of Casey (2019) suggests that, while the sign on the cyclical indicator is negative in all cases, the income tax rate changes were acyclical (see Section 4.4 for some evidence to the contrary using an instrumental variable approach).⁵¹ However, using the real GNI* growth rate, a one percentage point increase in the growth rate is found to be associated with a 0.23 percentage point reduction in the top rate of income tax (incl. USC). The latter suggests a procyclical pattern to income tax rate changes.

⁵¹ As a further check, the less reliable estimates of the output gap using the HP filter and the Hamilton filter were also used as cyclical indicators. The estimates using the HP filter pointed to income tax rates being changed acyclically, while the estimates using the Hamilton filter pointed to the rates being changed procyclically. Once endogeneity was addressed the HP filter estimates also pointed to procyclical changes in the tax rates.

The cyclical nature of changes to the rates of other taxes is also investigated and the results are shown in Table 5. However, as some of these tax rates were not altered frequently, there is limited variation in their rates, with some tax rates being altered less than ten times over the period (stamp duty, capital gains tax and capital acquisitions tax). The number of tax rate changes are outlined at the bottom of Table 5. As a result of the limited variation in these rates, these results are largely illustrative and should be interpreted alongside the tax indices in the last two columns of Table 5.

The evidence points to changes in VAT, capital acquisitions tax and stamp duty being made acyclically, with both cyclical indicators having a coefficient that is not statistically different than zero for any of these taxes. For corporation tax and capital gains tax, using the growth rate of real GNI* as a cyclical indicator, points to both taxes being changed procyclically. A one percentage point increase in the real growth rate of GNI* is associated with a 0.37 reduction in the top rate of capital gains tax and a 0.13 reduction in the standard rate of corporation tax. However, if the output gap is used as the cyclical indicator, the evidence points to these tax rates being altered acyclically.

Table 5 also shows the results of estimating the cyclical nature of the tax rate index constructed using Equation 2, as measured using the standard rate of income tax, or, separately, the top rate of income tax (including USC).⁵² The tax indices show signs of procyclicality if one uses the growth rate of real GNI* as the cyclical indicator. However, using the output gap estimate as the cyclical indicator points to the tax system being changed acyclically.

For comparison purposes, the results using cyclical component of real tax revenue (obtained using a HP filter) is shown in the last two columns of Table 5. The results using both the output gap and the real growth rate of GNI* indicate that real tax revenue was positively related over the period 1975-2019. However, as argued by Végh and Vuletin (2015), there is little insight to be gained on the cyclical nature of tax policy by observing a positive relationship between tax revenues and the business cycle. The positive relationship between the two variables is perfectly consistent with a higher tax rate, an unchanged tax rate or a lower tax rate.

⁵² Aggregating the data into a tax rate index gives rise to 28 observations in this sample with non-zero entries in the case of the tax rate index using the standard rate of income tax and 31 observations with non-zero observations when the top rate of income tax (including USC) is used.

Table 4: Cyclicalities of the Income Tax Rates (1975-2019)

	Standard rate of income tax (incl. PRSI)	Standard rate of income tax (incl. PRSI)	Top rate of income tax (incl. USC)	Top rate of income tax (incl. USC)	Top rate of income tax (incl. USC and PRSI)
Output Gap	-0.02 [0.05]	-0.02 [0.06]	-0.03 [0.13]	-0.10 [0.11]	-0.11 [0.12]
RGNJ* growth	-0.07*** [0.03]	-0.08*** [0.04]	-0.22*** [0.10]	-0.23*** [0.10]	-0.25*** [0.10]
R ²	0.00	0.19	0.00	0.01	0.05
No. of tax rate changes	10	13	14	17	20
Observations	45	45	45	45	45

Note: The dependent variable is the percentage point change for each individual tax rate. The output gap used is that of Casey (2019). PRSI refers to the standard rate of employees PRSI. In the equations with PRSI included, a dummy variable is included for the introduction of PRSI in 1979. Coefficients for dummy variables and intercept term are not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

Table 5: Cyclicity of the Tax Rates (1975-2019)

	VAT	Corporation Tax	Capital Gains tax	Capital acquisitions tax	Stamp duty	Tax rate index (standard)	Tax rate index (top rate) revenue	Cyclical component of real tax
Output Gap	0.06 [0.07]	-0.09 [0.12]	0.03 [0.18]	-0.27 [0.22]	0.11 [0.10]	-0.05 [0.17]	-0.08 [0.13]	0.006*** [0.003]
RGNI* growth	-0.01 [0.05]	-0.13** [0.06]	-0.38** [0.16]	-0.25 [0.17]	0.10 [0.08]	-0.12* [0.07]	-0.20** [0.10]	0.003* [0.002]
R ²	0.01	0.02	0.08	0.03	0.06	0.00	0.03	0.01
No. of tax rate changes	12	13	8	6	3	28	31	N/A
Observations	45	45	45	45	45	45	45	45

Note: The dependent variable is the percentage point change for each individual tax rate. The tax rate index is as constructed in Equation 2 using either the standard rate of income tax or the top rate of income tax (incl. USC). The cyclical component of real tax revenue is the cyclical component of real Exchequer tax revenue (CPI deflated), obtained using a HP filter. The output gap used is that of Casey (2019). Intercept term not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

4.3 The Cyclicality of Discretionary Tax Measures

This section widens the analysis in the previous section from the focus on tax rates to include the role of changes in tax bands, tax credits and exemptions. Tax bands, tax credits and exemptions are also tax policy instruments which play a vital role in the conduct of fiscal policy. Decisions to change (or not) the tax bands and tax credits can impact the net cyclical stance of tax policy.

To investigate the cyclical nature of tax policy – as a whole – we use the approach of Barrios and Fargnoli (2010), who use the estimated yield (or cost) from all discretionary tax changes in each year to investigate the cyclical nature of tax policy. To do so, we construct a new tax policy changes dataset.⁵³ This dataset provides the revenue yield (or cost) of all discretionary tax measure changes (tax bands, tax rates, tax credits, etc.), for each tax heading, introduced in the budgets from 1987-2019.

Two important caveats should be noted with this dataset. First, estimates of the yield/cost of individual tax policy measure are made on an *ex-ante* basis and these are not updated *ex-post*. *Ex-ante* estimates of tax yields will inevitably have some degree of error.⁵⁴ Second, estimates of yields are based on a “no policy change” scenario. Therefore, any increases in tax bands or tax credits are recorded as revenue reducing measures. There is no systematic recording of estimates of the yield from keeping tax bands and tax credits constant. Keeping tax bands and tax credits constant in a booming economy will expand the tax base and yield additional revenue (i.e., be countercyclical) as wages rise and people drift into higher tax bands. As a result, to the extent that we find that income tax policy (or, by extension, overall tax policy) is conducted procyclically using these estimates of discretionary tax measures, the size of the association will be an upper bound on the actual magnitude of the association.⁵⁵

Figure 10 shows the share of discretionary tax measure changes, for the three main tax headings, expressed as a percentage of GNI* from Q1 1987 to Q4 2019. In most years, changes to the income tax system have been the most significant tax policy change. Total discretionary tax measures were revenue reducing in all but three years from 1989-2008, which from a qualitative perspective appears to be evidence of procyclicality as this is the period generally considered as the

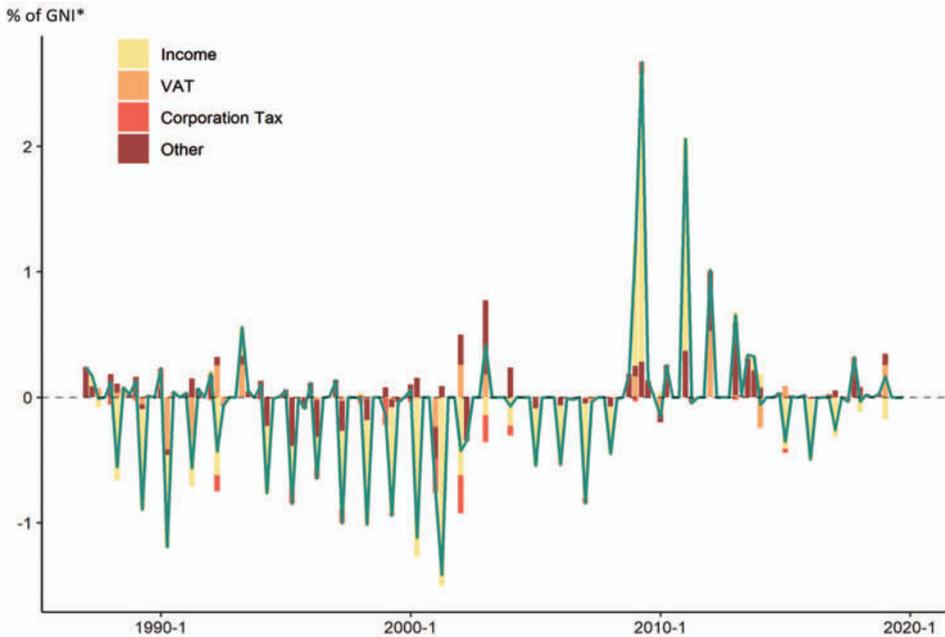
⁵³ A tax policy changes dataset is available for Ireland from Conroy (2019) over the period 1987-2018. However, this dataset is only available on an annual frequency. As a result, a new dataset was constructed here at a quarterly frequency.

⁵⁴ These estimates rely on early official estimates of the predicted impact of prospective tax changes. They therefore rely on modelling work and judgments which may prove inaccurate.

⁵⁵ For reference, income tax bands were changed in 24 of the 34 years included in the sample. In only two years of this sample the tax bands were lowered. Estimates of the yield from keeping tax rates constant are available in recent years, but only for a limited number of years. For consistency, these estimates have not been included. However, for context, the estimate of the yield from keeping tax bands constant was €455 million in 2017, and €536 million in 2018.

“Celtic Tiger” era. Net revenue raising measures were then taken during the most recent financial crisis in order to close the sizeable government budget deficit that had emerged. For instance, in Q2 2009 net revenue raising measures totalling 2.7 per cent of GNI* were implemented.

Figure 10: Discretionary Tax Measures Q1 1987 to Q4 2019



Sources: CSO; Gerlach and Stuart (2015), and author's calculations.

Note: The green line shows the net effect of discretionary tax measure changes on total revenue.

To estimate the cyclical nature of discretionary tax measures we estimate the following regression:

$$DTM_t = \alpha + \beta Cycle_t + e_t \quad (3)$$

Where, DTM_t is the full year estimate of discretionary tax measure as a share of annual GNI*, introduced at time t , $Cycle_t$ is the estimate of the business cycle at time t and the coefficient β is the estimate of the cyclical stance of tax policy. Here we use the year-on-year growth rate of domestic GVA, and the output gap estimates of Casey (2019) as the cyclical indicators. Table 6 shows the results of the estimation of Equation 3 for eight individual tax headings and total tax revenue.⁵⁶

⁵⁶ The measure of total revenue here includes income tax, corporation tax, VAT, capital taxes, property tax, stamps, excise, PRSI, and the health levy.

Table 6: Cyclicity of Discretionary Tax Measures (Q1 1987 - Q4 2019)

	Income Tax	VAT	Corporation Tax	Excise	Stamps	Capital	PRSI	Total Revenue
Output Gap	-0.033*** [0.013]	-0.003 [0.004]	-0.003 [0.002]	-0.003 [0.003]	-0.002 [0.002]	-0.003 [0.002]	-0.003 [0.003]	-0.050*** [0.017]
Real domestic GVA growth	-0.042** [0.017]	-0.004 [0.002]	-0.001 [0.001]	-0.004** [0.002]	0.000 [0.000]	-0.002*** [0.001]	-0.003** [0.001]	-0.056*** [0.019]
R ²	0.02	0.13	0.00	0.00	0.03	0.01	0.00	0.01
Observations	132	132	132	132	132	132	132	132

Note: The dependent variable is the percentage share of discretionary revenue measures in annual GNI*. The output gap used is that of Casey (2019). Intercept term not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

Again, we find clear evidence of tax policy being conducted in a procyclical manner. In particular, there is evidence that income tax and overall tax policy as a whole have been altered procyclically. There is some evidence that excise duty, capital taxes and PRSI have been altered procyclically. All other tax headings do not exhibit any clear cyclical pattern in how they have been altered.

We find that a one percentage point increase in the output gap estimate for a quarter – an improvement in cyclical conditions – is associated with procyclical revenue-reducing measures of 0.05 per cent of GNI*. If we take nominal GNI* as approximately €200 billion in 2018, a one percentage point increase in the year-on-year growth rate of real domestic GVA would be associated with discretionary revenue reducing measures of €100 million in that quarter.

4.4 Endogeneity and Procyclicality

Up to now, the assumption in the estimation of the empirical results is that Equation 1 and Equation 3 are correctly identified. However, it can be argued that changes in the tax rate in a given year may affect the rate of growth in the same year. For example, economic activity in a given year might be dampened by the potential distortions/behavioural changes that an increase in a tax rate may cause. If that is the case, then Equations 1 and 3 would fall foul of reverse causality. To address this potential issue, as the change in the tax rate in year t cannot affect the growth rate in year $t - 1$, we instrument both cyclical indicators, the output gap and the real growth rate of GNI*, with the lag of the growth rate in real GNI* or the 4-quarter lag of domestic GVA growth, where relevant.⁵⁷ Results show that, in all cases, we can reject the null hypothesis that the lag of the growth rate is a weak instrument for both the growth rate and the output gap.

The reason the lag of the output gap is not used as an instrument for the output gap is due to the way the output gap is estimated. Output gap estimates are usually obtained using filtering techniques, as is the case here. That is, the output gap in year t is also dependent on the level of output in year $t + 1$ and $t + 2$ etc. due to the filtering that is required to estimate a potential output level. To the extent that a change in the tax rate in year t affects output in year t or $t + 1$, this will also affect the estimate of the output gap in year t and $t - 1$, and so endogeneity problems, if any, may still remain. As a result, it was decided to use the lag of the growth rate to instrument for the output gap, instead of the lag of the output gap.

Table 7 shows the results of an investigation into the cyclicity of income tax policy using two-stage least squares estimation. The instrumental variable (IV) approach provides broadly similar results with a negative sign on the cyclical indicator across all equations. The Wu-Hausman test suggests that endogeneity is an issue when the output gap, as estimated using a HP filter, is used as the measure of the cycle in the equations that include the top rate of income tax. Using the

⁵⁷ As an additional robustness check, the lag of real GNI* growth or the 4-quarter lag of domestic GVA growth were used directly as the cyclical indicator. The results are similar.

Table 7: Instrumental Variable Estimation – Cyclicity of Income Tax Rates (1922-2019)

	Standard rate of income tax	Standard rate of income tax (incl. PRSI)	Top rate of income tax	Top rate of income tax (incl. USC)	Top rate of income tax (incl. USC and PRSI)
Output Gap (HP)	-0.33 [0.22]	-0.36 [0.24]	-0.39 [0.30]	-0.54* [0.32]	-0.58* [0.33]
Output Gap (Hamilton)	-0.08 [0.05]	-0.09 [0.06]	-0.12* [0.06]	-0.16*** [0.05]	-0.17*** [0.05]
RGNI* growth	-0.21* [0.12]	-0.23* [0.13]	-0.25 [0.17]	-0.34** [0.17]	-0.37** [0.17]
Weak instru- ments	23.21 ***	135.99 ***	23.21 ***	137.91 ***	23.21 ***
Wu- Hausman	1.67	2.02	2.7	4.38**	4.94**
No. of tax rate changes	24	27	32	35	38
Observations	96	96	96	96	96
	95	95	95	95	95
	96	96	96	96	96

Note: The dependent variable is the percentage point change in the tax rate. The output gaps used are based on a HP filter of real GNI* with $\lambda = 6.25$ and a Hamilton filter, with $h = 2, p = 2$. Both the output gaps and the Real GNI* growth rate are instrumented using the lag of the Real GNI* growth rate. PRSI refers to the standard rate of employees PRSI. In the equations with PRSI included, a dummy variable is included for the introduction of PRSI in 1979. Intercept term and dummy not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

two-stage least squares instrumental variable approach for these equations points to the top rate of income tax, with USC and PRSI included, being changed procyclically. On the other hand, the top rate of income tax, excluding USC or PRSI, does not show signs of being changed procyclically when the HP filter estimate of the output gap is used. For the equations where endogeneity does not appear to be a concern, as measured by the Wu-Hausman test, the original OLS estimates are preferred. Where the Wu-Hausman test suggests endogeneity is an issue, the IV estimates are preferred.

Turning to the more recent period, Table 8 shows the cyclicity of income tax rates from 1975-2019 using the IV approach and with the more plausible output gap estimates of Casey (2019). Again, all coefficients have a negative sign. In three cases where the output gap is used as the cyclical indicator and the Wu-Hausman test suggests that endogeneity is a concern, for the standard rate of income tax, the standard rate of income tax (incl. PRSI) and the top rate of income tax (incl. USC and PRSI), the IV estimates point to some evidence that these rates have been changed procyclically.

Table 9 shows the results of the IV estimates for other taxes over this more recent period. Again, for the most part, the signs on the coefficients of the cyclical indicators are similar to those of the corresponding OLS estimates. In several cases where the output gap is used as the cyclical indicator, the Wu-Hausman test suggests that endogeneity is a problem in the OLS estimates. Using the IV estimates for these equations with the output gap as the cyclical indicator, points to corporation tax and capital gains tax being changed acyclically from 1975-2019, whereas capital acquisitions tax and both the tax indices show evidence that these have been changed procyclically.

The results of an instrumental variable estimation using discretionary tax measures are shown in Table 10. In general, the signs on the coefficients are similar to those from the OLS estimation, that is all coefficients have a negative sign. The Wu-Hausman test suggests that endogeneity is an issue in the equations for income tax, excise duty, PRSI, and total revenues, for equations using the output gap as the cyclical indicator. The IV estimates for income tax, stamp duty and total revenue suggest that changes to these taxes were conducted procyclically, with some evidence that PRSI and corporation tax were changed procyclically. The results indicate that a one percentage point increase in the year-on-year growth rate of domestic GVA is associated with a 0.06 per cent of annual GNI* cut in income taxes in the quarter, and a 0.095 per cent cut in total tax revenue in the quarter. To put this in context, 0.095 per cent of GNI* in 2018 is approximately equal to a €190 million. A sustained one percentage point increase in the year-on-year growth rate of domestic GVA over four quarters, would result in a tax cut of €760 million in that year. However, as highlighted in Section 4.3 the size of this association is likely to be an upper bound on the true size of the association.

Table 8: Instrumental Variable Estimation – Cyclicalities of the Income Tax Rates (1975-2019)

	Standard rate of income tax	Standard rate of income tax (incl. PRSI)	Top rate Income tax	Top rate Income tax (incl. USC)	Top rate of income tax (incl. USC and PRSI)
Output Gap	-0.21* [0.12]	-0.28* [0.17]	-0.19 [0.14]	-0.47 [0.29]	-0.56* [0.31]
RGNI* growth	-0.12* [0.06]	-0.15* [0.08]	-0.11 [0.08]	-0.26** [0.10]	-0.30*** [0.10]
Weak instruments	20.07***	16.85***	20.07***	20.07***	16.85***
Wu-Hausman	4.33**	4.69**	0.96	2.42	3.20* 0.24
No. of tax rate changes	10	13	14	17	20
Observations	45	45	45	45	45

Note: The dependent variable is the percentage point change for each individual tax rate. The output gap used is that of Casey (2019). Both the output gap and the Real GNI* growth rate are instrumented using the lag of the Real GNI* growth rate. PRSI refers to the standard rate of employees PRSI. In the equations with PRSI included, a dummy variable is included for the introduction of PRSI in 1979. Coefficients for dummy variables and intercept term are not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

Table 9: Instrumental Variable Estimation – Cyclical of the Tax Rates (1975-2019)

	VAT	Corporation Tax	Capital Gains Tax	Capital Acquisitions Tax	Stamp Duty	Tax rate index (standard)	Tax rate index (top rate)	Cyclical component of real tax revenue
Output Gap	-0.11 [0.15]	-0.47 [0.29]	-1.20 [0.76]	-1.40** [0.65]	0.20* [0.12]	-0.59* [0.34]	-0.69** [0.31]	0.015** [0.007]
RGNI* growth	-0.06 [0.09]	-0.26* [0.14]	-0.67* [0.38]	-0.78** [0.37]	0.11 [0.08]	-0.33 [0.22]	-0.38** [0.15]	0.008** [0.003]
Weak instruments	20.07 ***	16.99 ***	20.07 ***	20.07 ***	16.99 ***	20.07 ***	20.07 ***	16.99 ***
Wu- Hausman*	1.40	4.11**	1.85	3.27*	1.26	4.04**	3.14*	1.00
No. of tax rate changes	12	12	13	8	8	8	6	6
Observations	45	45	45	45	45	45	45	45

Note: The dependent variable is the percentage point change for each individual tax rate. The tax rate index is as constructed in Equation 2 using either the standard rate of income tax or the top rate of income tax (incl. USC). The cyclical component of real tax revenue is the cyclical component of real Exchequer tax revenue (CPI deflated), obtained using a HP filter. The output gap used is that of Casey (2019). Both the output gap and the Real GNI* growth rate are instrumented using the lag of the Real GNI* growth rate. Intercept term not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

Table 10: Instrumental Variable Estimation – Cyclicity of Discretionary Tax Measures (Q1 1987 to Q4 2019)

	Income Tax	VAT	Corporation Tax	Excise	Stamps	Capital	PRSI	Total Revenue
Output Gap	-0.09** [0.038]	-0.004 [0.007]	-0.007* [0.004]	-0.012** [0.006]	-0.007** [0.04]	-0.010 [0.006]	-0.012* [0.006]	-0.149*** [0.047]
Real domestic GVA growth	-0.060** [0.025]	-0.003 [0.005]	-0.005* [0.003]	-0.008 [0.005]	-0.005* [0.003]	-0.006 [0.004]	-0.008* [0.004]	-0.095** [0.038]
Weak instruments	21.51 ***	21.51 ***	21.51 ***	21.51 ***	21.51 ***	21.51 ***	21.51 ***	53.97 ***
Wu-Hausman	3.63* 132	0.08 132	1.43 132	3.10* 132	2.74 132	2.03 132	2.96* 132	4.77** 132
Observations	132	132	132	132	132	132	132	132

Note: The dependent variable is the percentage share of discretionary revenue measures in annual GNI*. The output gap used is that of Casey (2019). Both the output gap and the Real GNI* growth rate are instrumented using the lag of the Real GNI* growth rate. Intercept term not reported. HAC standard errors in parentheses. * Indicates significance at 10 per cent level. ** indicates significance at the 5 per cent level. *** indicates significance at the 1 per cent level.

4.5 Discussion of Results

Overall, the evidence points to income tax rates being changed procyclically over the past century. This reflects both our OLS-based estimates and our IV estimates.⁵⁸

When we focus on the more recent period of 1975-2019, the evidence of procyclicality in the changes to income tax rates remains. By using a tax rate index, constructed as a weighted average of the changes in the main tax heads, we show that the overall association between tax rate changes and the cycle from 1975-2019 was negative, indicating that tax policy was conducted procyclically.

However, tax rates are only one policy instrument available in the conduct of tax policy. A more holistic assessment would need to account for changes in other tax policy instruments, like tax credits or tax bands that could potentially offset the fiscal impact of changing the tax rates.

Focusing on the tax system as a whole, by using estimates of discretionary tax measures, we find further evidence that the overall tax policy in Ireland has been conducted procyclically since 1987. In particular, we find that the changes to the income tax system and to overall tax policy have been made procyclically. Changes to VAT have been made acyclically. Other tax heads have been changed either procyclically or acyclically. No evidence was found to suggest that any tax heading was altered countercyclically.

Overall, the evidence suggests that tax policy in Ireland over the past century has not been conducted in an optimal fashion, either from a Keynesian perspective or from a “tax smoothing” perspective of Barro (1979). Instead, the evidence suggests that tax policy in Ireland has been conducted procyclically, with taxes being cut in good times and being raised in bad times. This places Ireland in the company of developing nations and in stark contrast with the tax policy of other developed economies, where tax policy is conducted acyclically (Végh and Vuletin, 2015).

V CONCLUSIONS

The Irish tax system has undergone significant changes over the past century. We document how the share of taxation in the economy approximately doubled over the period 1960-1980. Perhaps the most significant change to the Irish tax system occurred in the 1970s. Prior to joining the EEC, more than a fifth of tax revenue was from Customs tax. The elimination of tariffs on some of our largest trading partners saw this share fall dramatically. VAT was also introduced as part of Ireland’s accession to the EEC and replaced the wholesale and turnover taxes. In addition, significant reform to Ireland’s system of taxing capital took place in the 1970s.

⁵⁸ As well as lagged estimates.

We fill a gap in the literature on Irish fiscal policy by investigating how tax policy – as opposed to tax revenues, which are endogenous to the cycle – are changed over the business cycle. We create a new dataset on tax rates and tax bands for the main tax headings in Ireland, from 1920-2019.

We find that Irish tax policy has been routinely procyclical since the foundation of the State. First, we show evidence of this procyclicality in terms of how changes in Ireland’s income tax rates have been made.

Second, we consider the wider tax system beyond just rates. We use an additional tax policy changes dataset to show that total discretionary tax measures – which incorporate all tax policy instruments (rates, bands, credits, exemptions, etc.) – have been taken in a procyclical manner over the period 1987-2019. In addition, discretionary changes to income tax and to overall tax policy have been made procyclically. There is no evidence to suggest that any tax head has been changed countercyclically.

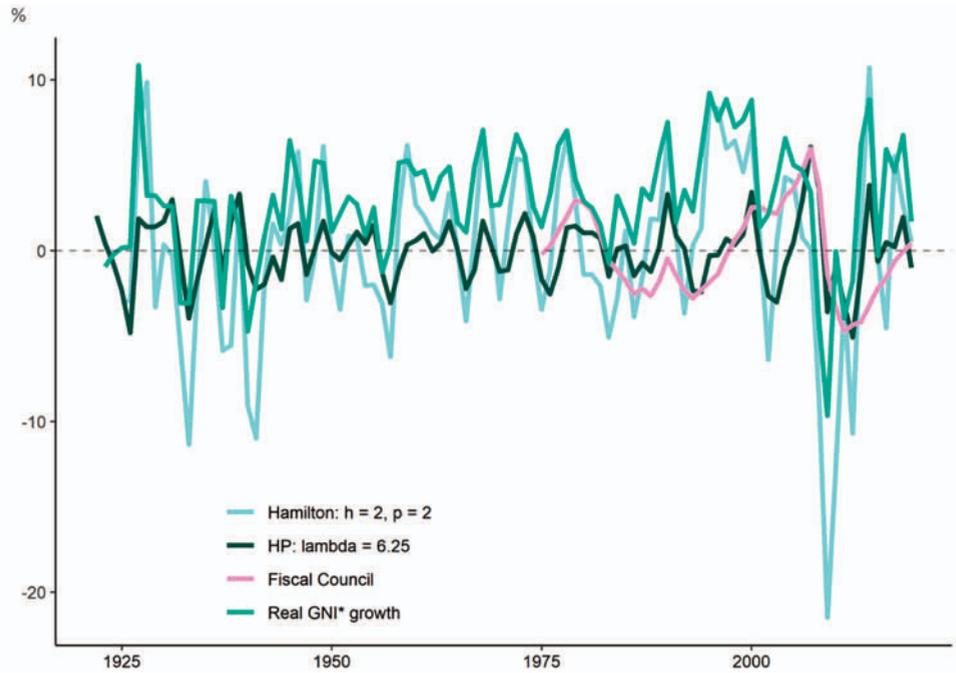
These results indicate that tax policy has not acted to stabilise the macroeconomy in Ireland over the past century. Instead of acting to mitigate the fluctuations in the Irish economy, tax policy has exacerbated them. This contrasts with empirical evidence for other developed countries where tax policy has been acyclical and puts Ireland among developing countries whose tax policy has been procyclical. It is also in contrast to the Keynesian view of optimal fiscal policy, with tax rates positively correlated with the cycle, and the theory of “tax smoothing” of Barro (1979), with no correlation between tax rates and the cycle.

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APPENDIX 1: ADDITIONAL CHART**Figure A.1: Measures of the Economic Cycle from 1922-2019**

Sources: CSO, Casey (2019), Gerlach and Stuart (2015) and author's calculations.

Note: Hamilton, HP and Fiscal Council are all measures of the output gap. Fiscal Council is the estimate of the output gap from Casey (2019).

