Joint Research Programme on The Macroeconomy, Taxation and Banking

Annual Report for 2017

The joint research programme between the Department of Finance, the Revenue Commissioners and the ESRI on *The Macroeconomy and Taxation* began in January 2015 with the objective of undertaking research on a range of macroeconomic and taxation issues in Ireland and was renewed for work to continue through 2017. In the course of 2017, an additional strand was added to the programme to undertake research on issues related to banking and financial stability in Ireland. Work on banking research began during the second half of the year.

This report has been prepared on behalf of the Steering Committee for submission to the Secretary General of the Department of Finance and the Director of the ESRI to describe the work undertaken in the third year of the programme on macroeconomic and taxation topics and on the topics relating to banking and financial stability added to the programme. It includes an overview of the completed projects and presentations along with associated costs. It also includes a brief overview of the proposed research for the programme's extension into 2018.

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Research Topic 1: Tax Elasticities

Two papers have been prepared in 2017 investigating VAT revenues at a detailed level and comparing broad tax elasticities across a panel of OECD countries.

The first paper investigates the sensitivity of VAT revenues to economic activity. Similar to the previous work published as part of the programme on income tax sensitivities, it makes use of highly disaggregated data on households and their expenditure patterns and applies the Creedy-Gemmell analytical technique which allows for different responses across different types of households. To do so, individuals' net incomes are computed using data on the relevant budget shares, income and consumption tax parameters, after distinguishing between goods with different indirect tax rates. The elasticity is computed first for the several different groups of consumer goods subject to different levels of indirect tax and then are weighted and aggregated in one value of the elasticity for each year.

The Steering Committee agreed to delay publication of this paper until the 2015/2016 Household Budget Survey microdata became available to ensure that the research was as timely as possible. These data were received in October and the analysis updated. A revised paper incorporating the new results is being finalised with publication intended for early in 2018.

The second paper under the tax sensitivity stream compares the elasticities of all the broad tax headings using data on Ireland and a range of other OECD countries. Similar to the work on income tax, this includes an examination of the sensitivity of the estimates to the use of different measures of economic activity. The paper distinguishes between long-run and short-run elasticities and uses a range of panel and country-by-country estimators. The results indicate that long-run total tax revenue elasticities are not significantly different from one for the whole panel, a result that also holds for 15 out of 25 countries in the sample. The same holds for the short-run elasticity estimate (also statistically equal to unity) implying that tax revenues are a neutral automatic stabilizer.

As regards the main tax categories, long-run income tax elasticity estimates are slightly lower than one for the whole period, as well as in the two sub-samples, pointing to a regressive income tax system for the whole panel. Long-run corporate tax estimates exceed unity, while short-run estimates are the highest among the sample, indicating that corporate tax operates as an automatic stabilizer. For Ireland, the elasticity estimates for total taxes and income taxes are somewhat lower than the median and statistically not different from one (both for the short- and the long-run).

However, corporate tax elasticities are higher relative to the median value. The estimates are robust to the inclusion of policy controls, a result that can be attributed to the long-run stability of the tax system. Finally, it appears that the use of GNP as a measure of economic activity in Ireland leads to changes in the estimates for tax revenue elasticities, which should be taken into account from a policy perspective (although, qualitatively, the results remain unchanged). The initial results of this paper were presented to the Steering Committee in September and the paper was published as an ESRI working paper in March 2018.

Research Topic 2: The Excess Burden of Taxation

The aim of this project is to provide an analysis and estimate of the additional cost on society due to the impact of taxation on relative prices which results in a deadweight loss (also referred to as the excess burden of taxation). Given the fact that the excess burden of taxation can be large, which implies significant distortions due to taxation, and the fact that the only estimates for Ireland are now quite dated, this topic carries out a new analysis of the excess burden of taxation in Ireland.[1]

Work was undertaken in the first quarter of 2017 to review the state of the art in calculating the excess burden of taxation and to collect the necessary data for estimation. Since then, economists in the Revenue Commissioners have performed econometric analysis to estimate the elasticity of taxable income (how taxable income responds to the net-of-tax rate).[2] The results are quite sensitive to specification so a wide range of robustness checks were then carried out on the estimates, using the international literature as a guideline.

This work was presented at the Department of Finance's Annual Tax Policy in March 2018 and a draft paper circulated to the Steering Committee for final comments before publication.

Research Topic 3: Brexit and Customs Implications

Under all but the most benign outcomes to Brexit negotiations, it is likely that some degree of increased customs checks will be necessary. Although some analysis had been done on the potential impact on trade values of the implementation of tariffs on Irish trade with the UK, in terms of the resource implications for customs infrastructure, the volumes of trade in terms of weight and number of containers shipped are as relevant as the monetary value of the goods and this aspect of the impact of Brexit has not yet been considered.

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[1] The last paper on this topic was Honohan, P., and I. Irvine (1987) "The Marginal Social Cost of Taxation in Ireland", *Economic and Social Review*, Vol. 19(1), pp. 15-41.

[2] Since the mid-1990s, this has become the key parameter in determining the excess burden of taxation.

The paper highlights that the share of trade accounted for by the UK is substantially larger if measured in volume terms, which is of potentially greater significance when considering how trade patterns affect transport costs and decisions on transport modes. Relating data on transport modes to potential increases in tariffs and non-tariff barriers in the absence of a free trade agreement between the UK and EU, we estimate significant overall reductions in trade volumes, particularly in the use of refrigerated transport whereas unitised containers and bulk shipping, which are more associated with manufactured products, show much more modest reductions.

The topic also examined how widely used the UK land-bridge is as a route for Irish international trade with the rest of the world markets. This involves combining a number of different sources of trade and transport data, along with some assumptions on average load sizes. The results suggest that possibly as much as half of Irish exports to the rest of the world travels via this route.

Following comments from the Steering Committee and others, this research was released as an ESRI working paper in October.

Research Topic 4: Productivity Spillovers from Multinational Activity in Ireland

As well as their direct effects on output and employment, the attraction of foreign direct investment is sometimes argued to provide further economic benefits through spillover effects that potentially increase the productivity performance of domestic firms. Empirical evidence on this has however tended to be mixed. This research examines whether, and to what extent, the productivity performance of indigenous firms is linked to spillovers from foreign affiliates operating in Ireland, using firm-level data from the Census of Industrial Production (CIP) and the Annual Services Inquiry (ASI). The research is being carried out in co-operation with the Economic Research Unit of the Department of Finance and the OECD team preparing the *Economic Survey on Ireland* (published in March 2018).

This paper updates previous work on intra-industry spillovers and then extends the research by examining if spillovers are more likely to occur through supply chain linkages in line with more recent developments in this literature. It further tests for the sensitivity of these vertical spillover effects to alternative supply chain measures. Overall, limited evidence of a link between the presence of foreign-owned firms is found although important variation across sectors is identified. Examining linkages through supply chains indicates some negative impacts from obtaining supplies from foreign-owned firms although this is mitigated for domestic firms in manufacturing which invest in R&D, which appears to increase the absorptive capacity of the firms to internalise spillovers.

Preliminary results were presented to the OECD country mission in November, following which some further tests of absorptive capacity were undertaken. A draft version of a Technical Paper was circulated for review by the Steering Committee and OECD and published together with the OECD Economic Survey on Ireland in March 2018.

Research Topic 5: Corporate Taxation and Location Decisions of Multinationals

The attraction of Multinational Firms (MNCs) has been a cornerstone of Irish industrial and economic policy for almost six decades. Understanding the factors that affect investment decisions of MNCs and how such companies interact with the broader economy is therefore of fundamental concern to Irish policy makers. This is particularly the case in an environment where the taxation of international activities of companies is facing scrutiny.

This research stream examines the role and effects of corporate tax policy on the attractiveness of Ireland and other European countries to foreign direct investment. Finalising the work that was carried out in 2016, the remaining paper on new evidence on factors determining the location choice of multinational firms across groups of EU countries with similar attractiveness characteristics was completed and published as an ESRI working paper in March 2018.

Research Topic 6: Role of Inheritance in Wealth and Implications for Taxation

Information on the frequency, value and composition of household wealth transfers has been fairly limited in Ireland and this research aims to fill this gap by drawing on the detailed data now available on the pattern of gifts and inheritances from the CSO's Household Finance and Consumption Survey.

We find that a considerably larger number of older and wealthier households report having received a gift or inheritance compared to their younger, less wealthy counterparts. The household main residence and businesses/farms are identified as the most important asset type in wealth transfers. Overall slightly over 13% of home-owning households were gifted or inherited their household main residence. We also show some association between inheritance and position in the wealth distribution, controlling for other factors. We find that that having received an inheritance or gift moves a household up the wealth distribution by 15.4 percentiles on average relative to households of the same income level that did not receive an inheritance. This effect is particularly large when the inheritance takes the form of a business or a property (not the main residence).

Linking the results from the analysis to the structure of taxation on wealth transfers shows that the channels where capital acquisitions tax (CAT) is relaxed from a full accessions tax are the same channels that account for the bulk of wealth transfers. In particular, parents are the primary source of gifts and inheritances for most households and gifts and inheritances of businesses/farms and dwellings (HMR & other) as the most important asset type in wealth transfers. The stylised facts therefore bear out the trade-off between encouraging the greater diffusion of wealth and reflecting the structures of familial responsibility that underpin the Capital Acquisitions Tax.

This paper was presented at an internal seminar in the Department of Finance and, following comments received from the participants and from the Steering Committee, the paper was published as an ESRI working paper in December.

2. Description and Progress of Research Topics on Banking

- Research Topic 1: Measuring the investment gap and its financing requirements for Irish SMEs
- Research Topic 2: Stress testing the Irish mortgage market: A financial stability assessment of the triggers of mortgage default
- Research Topic 3: Understanding SME Investment Patterns

Research Topic 1: Measuring the Investment Gap and its Financing Requirements for Irish SMEs

Despite the general economic recovery and pickup in overall aggregate investment, concerns have been raised that investment rates in Irish small and medium enterprises (SMEs) have not kept pace with these broader indicators. Having considerably lowered investment levels for a prolonged crisis period, firms could face the risk of experiencing a capital gap in the absence of a catch-up period of increased investment. This generates two questions that are addressed in this paper: first, is there evidence of under-investment by Irish SMEs and, second, if this is found to be the case, how much (if any) of the under-investment can be attributed to difficulties in accessing finance? The observation of low levels of investment is not sufficient to judge if there is under-investment and a critical ingredient in determining under-investment is to estimate a "fundamental" level of expected investment.

This paper uses firm-level data for Irish SMEs from the Department to investigate the existence of an investment gap by modelling fundamental investment based on firm performance characteristics and measures of local demand developments. We find evidence that actual investment is below what would be expected given how companies are currently performing. The magnitude of this "investment gap" is economically meaningful and is estimated to be just over 30 per cent in 2016.

Having established that an investment gap exists, we further examine the extent to which there is role for frictions in the availability of financing to firms that affects investment decisions. To ensure robustness, we use three methods to ascertain the contribution of financial market failures to the investment gap. First, we use a model-based approach which appends proxy variables for credit access to the investment specification. Second, we follow the EIF guidelines for the ex-ante assessment of financial market instruments and third, we use a simple empirical estimate based on external financing usage in other EU countries. Across the three different methodologies, we estimate that financial factors explain between 12 per cent and 18 per cent of the investment gap.

This work was presented at the Department of Finance's Annual Tax Policy and published as an ESRI working paper in March 2018.

Research Topic 2: Stress testing the Irish mortgage market: A financial stability assessment of the triggers of mortgage default

The second topic being examined is an analysis of the Irish mortgage market and implications for financial stability. The contribution of the mortgage market to the scale and severity of the recent economic and financial crisis in Ireland was considerable. Mortgage loans outstanding remain the largest asset class held by Irish banks and thus credit risk vulnerabilities that arise through economic shocks propagate quickly thorough into loan delinquencies problems for the banking sector. Within this context, it is pertinent to understand the main drivers of mortgage default and to be able to disentangle the factors which lead to households missing loan payments.

Internationally, standard models of mortgage default would stress the sensitivity of households to two main factors: equity shocks (changes in house prices relative to debt outstanding) and affordability shocks (through household income or interest rate changes). While a number of papers have documented the relative importance of equity versus affordability shocks on mortgage default, further work is required to disentangle income shocks from affordability through the interest rate channel.

Within the context of modelling the drivers of arrears in the Irish mortgage market, this research topic aims to build a microeconometric stress-testing model which will link mortgage arrears at the household level to the equity and affordability channels which drive arrears. The research aims to build a model which separately identifies the interest rate, income and house price (equity) channels which affect mortgage arrears. This will allow us to understand how shocks to income (through changes in net after tax income from unemployment or fiscal policies), interest rates (through changes in the ECB policy rate), and house prices impact arrears. These factors can then be linked to macro models to look at scenarios for arrears. We will also explore the differences across households to see whether pockets of vulnerabilities are evident.

The data to be used for the analysis are from the survey on income and living conditions (SILC) undertaken by the CSO which provides a comprehensive micro-level dataset surveying income and living conditions across different types of households. It also provides an indicator of whether or not households have missed mortgage loan repayments in the last 12 months.

The ESRI team is currently working on the data preparation and analysis phase of this paper. It is being jointly prepared by Mike Fahey, Department of Finance who is co-authoring the work with the ESRI. It is planned that a draft of initial results will be available for review in late Q1 of 2018. This will focus on the triggers of default and in particular assessing the impacts of interest rates on mortgage delinquencies.

Research Topic 3: Understanding SME Investment Patterns

As identified in the first topic, investment rates by SMEs remain relatively low despite improvements in reported turnover and profits. Building on the first topic, this research project aims to provide a profile of SME investment patterns in Ireland and provide a detailed overview of its financing. Providing insight into these questions will ensure a better understanding of the investment activity of Irish SMEs as well as provide evidence to support the development of targeted policy initiatives around investment and investment financing. The data for this analysis will be collected using the Department of Finance Credit Demand survey supplemented by an additional investment module designed with the input of the ESRI researchers.

Since August 2017, the ESRI team has been working with the Department of Finance to include a full new module on the Credit Demand Survey which would better capture investment activities of SMEs. The questionnaire for the new survey has been completed and it is currently in the field. The new data was received in early February 2018 and preliminary results presented to the Steering Committee and the Banking Division of the Department of Finance in March 2018. It is envisaged that a full draft of the SME investment profile will be completed in Q2 2018.

3. Outputs in 2017 (including forthcoming publications)

Research Papers and Publications published in 2017 and early 2018

- "Ireland's Trade and Transport Connections" by Martina Lawless and Edgar Morgenroth, ESRI Working Paper No.573, October 2017

- "Assessing the Level of Cross-Border Fuel Tourism" by Seán Kennedy, Seán Lyons, Edgar Morgenroth and Keith Walsh, published in the *Irish Journal of Social, Economic and Environmental Sustainability,* December 2017

- "Gifts and Inheritances in Ireland" by Martina Lawless and Donal Lynch, ESRI Working Paper No.579, December 2017

- "Modelling the Medium- to Long-Term Potential Macroeconomic Impact of Brexit on Ireland" by Adele Bergin, Abian Garcia-Rodriguez, Edgar Morgenroth and Donal Smith published in the *Economic and Social Review*, Autumn 2017

- "How Sensitive is Irish Income Tax Revenue to Underlying Economic Activity?" By Yota Deli, Derek Lambert, Martina Lawless, Kieran McQuinn and Edgar Morgenroth published in the *Economic and Social Review*, Autumn 2017

- "Dynamic tax revenue buoyancy estimates for a panel of OECD countries" by Yota Deli, Abian Garcia Rodriguez, Ilias Kostarakos and Petros Varthalitis, ESRI Working Paper No.592, March 2018

- "Productivity spillovers from multinational activity to indigenous firms in Ireland" by Mattia Di Ubaldo, Martina Lawless and Iulia Siedschlag, ESRI Working Paper No.587, March 2018

- "Corporate taxation and the location choice of foreign direct investment in EU countries" by Ronald B. Davies, Iulia Siedschlag and Zuzanna Studnicka, ESRI Working Paper No.591, March 2018

- "Estimating an SME investment gap and the contribution of financing frictions" by Martina Lawless, Conor O'Toole and Rachel Slaymaker, ESRI Working Paper No.589, March 2018

Research Papers and Publications to be finalised in 2018

- "Expenditure Tax Revenue Elasticities in Ireland: An Analytical Approach" by Jean Acheson, Yota Deli, Martin Murphy and Edgar Morgenroth

- "Excess Burden of Taxation in Ireland" by Jean Acheson, Sean Kennedy, Brian Stanley and Edgar Morgenroth

Other

The research project on income tax and USC elasticities contributed to a re-evaluation of the parameters used in the Department's revenue forecasting methodology. Following an internal back casting exercise, the Department decided to change the previously used revenue elasticities to reflect the estimates produced by the research project. The elasticities were updated in early 2017 and fed into Budget 2018 forecasts.

The Department of Finance produced a Tax Strategy Group paper on the research programme for the first time in 2017. The paper highlighted the work of the research programme and contained a synopsis of all tax-related published outputs to date. [3]

A paper completed as part of the programme in 2016, "Scenarios and Distributional Implications of a Household Wealth Tax in Ireland" by Martina Lawless and Donal Lynch was short-listed for the Miriam Hederman-O'Brien prize by the Foundation for Fiscal Studies.

[3] Available at: http://www.finance.gov.ie/wp-content/uploads/2017/07/TSG-17-10-Research-Programme-JA.pdf

4. Proposed Research Topics for 2018

A range of new topics have been proposed for the 2018 work plan, to include:

Topic 1: Tax modelling and fiscal policy

A systematic evaluation of alternative fiscal policy mixes requires a clear specification and quantification of fiscal goals and objectives. To evaluate and rank alternative fiscal policy options research economists should take into account an explicit analysis of private expectations and dynamic adjustments. To this end, we propose using a suite of macro models currently employed and maintained at the ESRI, namely small scale macro-econometric, COSMO and DSGE models for the Irish economy. This research will seek to augment these models with a rich set of spending-tax instruments which will allow us to perform counterfactual analysis. This will enable us to explore a variety of topics (subject to prioritisation by the steering committee):

- Compute fiscal multipliers
- Compute theoretical Laffer curves for the main tax instruments
- Compute constrained-optimal fiscal policies under alternative scenarios
- Develop a toolkit for fiscal policy analysis
- Provide more extensive robustness analysis of results (for example fiscal multipliers) by comparing and combining outputs across different models
- Using a suite of models to challenge the outputs will reduce uncertainty stemming from model-specific assumptions or/and the use of a specific methodology.

Topic 2: Carbon Tax – Impact and Pricing

As future policy developments in the area of carbon tax is of primary concern to the Department, it is proposed that the joint research programme examines the effectiveness of the introduction of carbon tax in Ireland and its impact on emissions, fuel poverty and the overall economy. The research should also help to project the impact of future increases in carbon tax on fossil fuels in terms of providing an incentive to move away from the use of carbon intensive processes.

Detailed terms of reference will be prepared for these and any new proposed topic for discussion and approval by the Steering Committee throughout the year.

5. Budget 2017

Project	Cost
Brexit customs	€43,595
Tax elasticities	€58,874
Deadweight loss	€20,740
Productivity spillovers	€58,418
Tax modelling	€22,020
FDI & Corporate tax	€6,855
Inheritance and wealth	€13,995
Investment gap	€33,201
Stress-testing	€20,522
SMEs	€14,916
Total	€293,135