Joint Research Programme on The Macroeconomy, Taxation and Banking

Annual Report for 2021

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. The programme was later expanded to also undertake research on issues related to banking and financial stability in Ireland.

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 2021. This report provides an overview of the projects completed along with associated costs. It also includes a brief overview of the proposed research for the programme's extension into 2022, subject to the approval of the steering committee.

The joint research programme aims to deepen the evidence-base underlying the Department of Finance's policymaking. The collaboration between the Department and the ESRI researchers is targeted towards encouraging knowledge-spillovers across the economics, tax and banking divisions. The steering committee notes that outputs from the programme have had tangible applications within the Department's own work. Joint research on post-pandemic recovery scenarios has contributed to the Department's macroeconomic forecasting processes and complemented the central forecast scenario. Similarly, findings from research analysing Irish trade flows were used in understanding of the initial response to Brexit. Ongoing research into SME investment practices at a firm level continues in its aim of providing important insights into SME financing trends and related issues.

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1. Description and Progress of Research Topics

Using macro-model scenarios to explore a range of potential recovery paths for the Irish Economy: An Update

This project provided an update previous work assessing the impact of COVID-19 on the Irish economy and potential scenarios for its future path. This update incorporates more recent data related on the epidemiological and economic developments since the previous work in 2020. The new analysis explores the impact of the most recent lockdown with the use of advanced indicators and proprietary data.

A range of potential recovery paths are developed. These include an Upside scenario with public health restrictions gradually relaxed and effective rollout of vaccines, a Downside scenario where recovery in the domestic economy is slower (e.g. if there are new variants of the virus or there are scarring effects where some of the losses in domestic sectors are assumed to be permanent) and a Repeated lockdowns scenario where continued lockdowns are needed at intervals for disease suppression. The Upside scenario sees economic activity return to its pre-pandemic trend by the end of 2022, whereas in the Downside scenario a return to this level is delayed until late 2024. The Repeated lockdowns scenario generates a result where the trajectory of the economy is between the other two scenarios.

This research was published as an ESRI Working Paper in August (Working Paper 706).

Anticipation and Response of Irish Trade Flows to Brexit

Although a tariff and quota free agreement was agreed between the EU and UK in December 2020, it was anticipated that additional trading costs would still be attached to UK-EU trade although at a less severe level than the hard Brexit previously modelled in the absence of such an agreement. A range of previous research has made clear that Ireland is likely to have the greatest exposure to any such changes in trading costs given the extent and composition of its trade links with the UK.

The output of the research has been prepared as two papers. The first examines aggregate EU-UK trade. The results show sharp declines in trade from the UK to the EU, the majority of which can be attributed to a Brexit impact. We also document considerable variation across member states and sectors. The effect of Brexit is highly asymmetric, however, with reduction in trade from the EU to the UK approximately half the size of the fall from the UK to EU. This is likely explained by the more gradual implementation of customs checks by the UK. Reductions in trade are identified from the date of the referendum and no evidence of stockpiling in the months prior to Brexit is found on either side.

The second paper examines in greater depth the effect of Brexit on Ireland's trade with the UK, with a decomposition of the impacts for Great Britain and Northern Ireland. This shows that all of the decline in trade is driven by Great Britain with the majority of the reduction attributable to Brexit. In contrast, trade between Ireland and Northern Ireland trade has increased considerably.

The research was presented to the European Trade Study Group conference on September 11th and both papers were published as ESRI working papers in December.

SME survival and recovery following COVID-19

This project used information collected through the Department's Credit Demand Survey to investigate the impact of the pandemic on SMEs, by examining the extent of potential threats to firm survival. To address this issue, the research has developed a microsimulation mode which uses the CDS as a baseline and then applies a range of recovery and policy scenarios to the firms. The recovery scenarios are benchmarked to the COSMO macro scenarios generated separately as part of the programme with some adjustments made to allocate these across sectors taking into account variation in public health restrictions on particular sectors.

The key metrics of SME financial distress examined are the shares of firms making losses, those with negative cash reserves and those with accumulated debts higher than assets. Policy interventions such as the EWSS, tax warehousing and others are modelled across firms up to and including announcements made in Budget 2022.

Our baseline scenario shows that indicators of financial difficulties remain persistently high with the share of highly distressed firms reaching twenty-one per cent in 2024 in scenarios without firm exit. With exit of the most financially distressed firms, the patterns of financial characteristics return to 2019 levels by 2023. We also model the impact of the policy supports available to firms. In the absence of government supports, distress rate would have been seventy-two per cent higher during the pandemic. We find that supports have a persistent impact even after they expire. In 2024, the distressed rate without the supports would be twenty per cent higher than in the baseline scenario with supports. This paper was published as an ESRI working paper in January 2022.

Impact of COVID-19 on SME investment and financing

Following on from previous years, the team have produced a detailed SME investment report which reviews trends and developments in SME investment in Ireland. This report looks in depth at how SME investment activity has fared throughout 2020. While the immediate pressure of adjusting to the dramatic change in economic circumstances arising from the pandemic might have reduced incentives and resources available for investment for many SMEs across a range of asset types, adjustments to business models to provide goods and services in new ways to continue trading through periods of health restrictions may have resulted in increased need for some types of investment. This uses the Department's Credit Demand Survey, which this year added new questions on digitalisation, which is a critical issue in relation to the productivity challenges for SMEs.

The key finding of the analysis is that the number of firms and the level of investment both dropped in 2020 relative to 2019, indicating the Covid-19 pandemic is having a marked effect on capital formation for smaller firms. For example, the proportion of investing SMES was relatively constant

between 2017 and 2019 at approximately 64 per cent and this dropped to 55 percent in 2020. Larger SMEs cut their level of investment by more than smaller SMEs. While the share of investing firms dropped across all asset classes, the steepest drops were in machinery, equipment and other fixed assets. The share of SMEs investing in digital activities declined by 5 percentage points. However, the mean expenditure was up 22 per cent and the median expenditure was up 7 per cent.

The level of investment declined sharply in sectors hit particularly hard by the public health restrictions such as hotels and restaurants, wholesale and retail and construction. While many firms continued to invest in these sectors, the typical value of each investment was markedly down in 2020 on 2019 levels.

Approximately 57 per cent of firms indicated that uncertainty was a major barrier to business investment. There was a clear drop in the borrowing appetite with the share of firms willing to borrow to expand falling from 45 per cent in 2019 to 38 per cent in 2021. The share of firms who indicate they would not borrow to expand has increased by an even larger margin, from 39 per cent in 2019 to 48 per cent in 2021. Firms in Ireland continue to largely self-finance their investments with bank loans the second most prevalent financing type. External equity and other types are used by fewer than 3 per cent of firms.

This report will be finalised and published in 2022.

Transition to a Low Carbon Economy

To ensure a smooth and least-cost transition to a low-carbon economy, it is imperative that appropriate energy policies, including a carbon tax pathway, are designed. Under the 2019 Joint Research Programme (JRP), an increase in the carbon tax reaching €80 by 2030 was examined.

The impacts for the macro economy, households and emissions were investigated. However, this work did not include other climate policy elements in the Climate Action Plan (CAP), most importantly the electric vehicle (EV) and retrofitting targets. Furthermore, recent international events including the COVID-19 crisis and the drop in energy prices are likely to have large impacts on the effectiveness of climate policies. This project uses the ESRI's I3E model to investigate the impacts of the latest proposed climate policies: a carbon tax trajectory reaching €100 by 2030, the CAP EV target and the CAP retrofitting target.

- The results show that an increase in the carbon tax has substantial impacts on emission reduction, and EV adoption and HP installations can further reduce emissions but to a lesser degree than the carbon tax increase. Compared to a carbon tax alone, the wide-scale adoption of EVs and HPs boost the economy and employment. This boost leads to a rebound effect, where emissions increase slightly in other sectors of the economy. The results prove the importance of simultaneous use of carbon taxation and electrification of transport and home heating, where carbon taxation increases the benefits of adopting

low carbon technologies and adoption reduces the costs of carbon taxation. This work was published in December 2021.

COSMO Banking sector and impacts of bank capital changes

This research project proposes to develop the COSMO banking sector model and enable an assessment of macroprudential capital buffers on the Irish economy. The research will allow the Department and ESRI to explore how changes to capital buffers (such as the countercyclical capital buffer) would impact Irish GDP, employment, fiscal policy and the broader mortgage market.

A COSMO banking satellite has been developed which models macro-financial linkages, financial distress and bank credit in the Irish economy. This modelling included a complete re-specification and revisitation of equations around mortgage arrears, corporate insolvencies, bank capital, credit markets and housing supply and demand. The credit market equations were adapted to allow separate supply and demand equations for credit levels while banking competition channels were added to the cost and access to credit equations. A draft paper was prepared and will be finalised in 2022.

Corporation Tax Elasticities

Completing work from the work programme of 2020, the objective of the project is to complete the suite of micro-founded revenue elasticities papers by using microdata from the Revenue Commissioners panel of Corporation Tax paying firms to examine the responsiveness of corporation tax receipts to taxable income.

Using an analytical approach, the baseline estimates for the annual aggregate revenue elasticities suggest that the tax elasticity has gradually trended up over time, reaching 1.34 for the latest year available (2018). The average elasticity across the baseline annual estimates is 1.3. This work was published as an ESRI working paper towards the end of 2022.

Modelling the MNE sector

This project aims at performing an analysis of the impact of intangible capital in the growth performance of the Irish economy, taking into account the well documented distortions of the investment series in the national accounts. A focal point of this project is the calculation of new, undistorted series of investment that will allow for the assessment of the underlying performance of the Irish economy. In addition, we incorporate into the analysis a broader set of intangible assets such as organizational capital, advertising, branding etc. These assets are currently not included in the fixed assets reported in the National Accounts and have been shown to be significant determinants of the growth performance of advanced economies (see, among others, Corrado et al. (2009, 2016), Niebel et al. (2017)).

Our results indicate that even when the distortionary transactions are removed, Irish labour productivity growth is larger compared to the EU average over the 2000-2016 period. The growth accounting calculations indicate that the main driver of labour productivity is tangible capital

deepening, while the various intangible assets have a negligible contribution. This paper was published as an ESRI working paper in January 2022.

Assessing the Potential Impact of Population Ageing on the Public Finances

This project will use long-term demographic projections generated using the ESRI's demographic model. Projections of net migration are determined in the ESRIs macroeconomic model (COSMO) and are driven by the relative attractiveness of alternative labour markets. Using COSMO (and the fiscal satellite) and the demographic model, it would be possible to generate alternative macro scenarios from which the implications of ageing for the evolution of the public finances could be analysed. Work on this project was slightly deferred to facilitate the focus on the COVID modelling work and will be carried forward into 2022.

The role of firm dynamism in aggregate productivity growth

The establishment and growth of new businesses are key ingredients for economic growth and job creation. This project had been delayed due to data access restrictions arising from COVID-19 and will be carried forward into 2022.

2. Outputs in 2021

Research papers and other publications in 2021

- "Exploring the Impact of COVID-19 and Recovery Paths for the Economy" by Abian Garcia-Rodriguez, Adele Bergin, Luke Rehill and Éamonn Sweeney. ESRI Working Paper No.706 (August 2021).

- *"*Responsiveness of corporate taxes to profits and taxable income*"* by Jean Acheson, Martina Lawless, Donough Lawlor, Oisín Tarrant and Laura Weymes. ESRI Working Paper No.715 (December 2021).

- "Early Reactions of EU-UK Trade Flows to Brexit" by Eimear Flynn, Janez Kren and Martina Lawless. ESRI Working Paper No.713 (December 2021).

- "Initial impact of Brexit on Ireland-UK trade flows" by Eimear Flynn, Janez Kren and Martina Lawless. ESRI Working Paper No.714 (December 2021).

- "SME Financial Distress and the Macroeconomic Recovery: A Microsimulation Approach" by Janez Kren, Martina Lawless, Gerard McGuinness and Conor O'Toole. ESRI Working Paper No.718 (January 2022).

- "Is Ireland the most Intangible Intensive Economy in Europe? A Growth Accounting Perspective" by Ilias Kostarakos, Kieran McQuinn and Petros Varthalitis. ESRI Working Paper No.719 (January 2022).

- "The Impacts of Electric Vehicles Uptake and Heat Pump Installation on the Irish Economy" by Kelly de Bruin and Aykut Mert Yakut ESRI Working Paper No.717 (December 2020).

- "Market power, productivity and sectoral labour shares in Europe" by Martina Lawless and Luke Rehill, *Open Economies Review,* December 2021

Research papers and publications forthcoming

- "Recent Trends in SME Investment in Ireland: Exploring the Pandemic and the Barriers to Growth" by Leona Cantillon, Eric Gargan, Janez Kren, Martina Lawless and Conor O'Toole.

- "Modelling the Irish Banking sector and impacts of bank capital changes" by Conor O'Toole, Abian Garcia-Rodriguez, Paul Egan, Kieran McQuinn and Ilias Kostarakos.

3. Proposed Research Topics for 2022

A range of proposals for new topics are being drawn up for the 2022 work plan. 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.

Topic 1: Assessing the Potential Impact of Population Ageing on the Public Finances

Population ageing and long-run demographic changes are widely considered to have important implications for future economic growth and fiscal sustainability. In this project, long-term demographic projections will be generated using the ESRI's demographic model. Using COSMO (and the fiscal satellite) and the demographic model, alternative macro scenarios will be generated from which the implications of ageing for the evolution of the public finances can be analysed. The fiscal satellite recently built under this research programme allows for a richer interaction between COSMO and the demographic model than previously possible, with a more comprehensive view of public spending and how ageing could affect its different components.

Topic 2: The role of firm dynamism in aggregate productivity growth

The establishment and growth of new businesses are key ingredients for economic growth and job creation. Across the OECD, however, the share of start-ups had been steadily decreasing and evidence from the US that finds a significant decline in business dynamism in the US over the last 30 years. For Ireland, the OECD has expressed concern that the rate of business entry-exit dynamism is particularly low. Extensive work on estimating firm productivity distributions using CSO micro-data has been undertaken by the Department and used in a previous project on productivity spillovers for this programme. This project proposes to utilise this data further with a focus on the link between firm dynamics and contributions to overall productivity levels.

Topic 3: Sector-level costs of the transition to low carbon economy

This project proposes to use the recently published SEAI national heat study, which gives a detailed description of substitution potential in delivering heating across industries, to examine the economic implications for production sectors of the transition to low carbon. The current version of the I3E model has substitution possibilities which are represented through elasticities taken from the literature and the characteristics of each production sector. This project would calibrate these substitution elasticities to reflect the sector level switching behaviour modelled in HEAT. Several HEAT scenarios could then be run to examine the impacts on sectors due to the increase in business heating costs across the scenarios. This would give unique insights into the costs of production sectors to transition to low carbon.

Topic 4: Drivers of entrepreneurship entry and exit

The establishment and growth of new businesses are key ingredients for economic growth and job creation. The link between business dynamism and productivity is one element of this that the joint research programme plans to investigate in 2022. A related set of questions are what characteristics determine the entry and exit of new entrepreneurs and how does this vary across the business cycle? This project will use employment status information from the Labour Force Survey (LFS) to examine the characteristics of the self-employed and the extent to which the determinants of becoming self-employed changed against the background of dramatic changes in economic conditions. The LFS

follows each individual for up to five consecutive quarters, thereby allowing us to examine transitions into and out of self-employment, taking into account prior occupational and sectoral experience as well as other characteristics.

Topic 5: Interest Rate Normalisation and the Impact on Macro-Financial Linkages

Following the global financial crisis, Central Banks globally lowered interest rates and followed a policy of extremely accommodative monetary expansion. However, the Covid-19 pandemic has led to a rebound in inflation, driven mainly by international energy prices and supply chain bottlenecks. While at present these effects are predicted to be temporary, if wage price expectations rise, this could lead to a more permanent increase in inflation. This may lead to earlier than expected increases in the ECBs base policy rate which could pose rises to the Irish economy in terms of credit demand, financial distress and household and firm expenditure. Given this context, this study proposes to use the newly upgraded COSMO banking model to consider the impact of interest rate rises on credit demand, financial distress and the real economy (investment and consumption channels). The paper will pass through a series of interest rate scenarios and attempt to explore the likely response of the Irish macro-economy and financial sector to the increase in interest rate.

Topic 6: Productivity, Structural Change and the Capital-Labour Ratio: SME Evidence

An emerging observation in Western economies like Ireland has been an increase in economic growth without a commensurate increase in credit levels. Indeed, investment in physical capital has also decoupled from investment activity and the composition of investment has changed from tangible to intangible capital as the economy becomes more service oriented. These changes have implications for our understanding of productivity and the link between capital deepening and productivity growth. This research proposes to use survey micro data to explore relationship between capital and labour, their marginal returns and productivity for Irish SMEs. A focus on exploring differences across sectors will be important given the likely differences in production technologies by sector.

Topic 7: Impact of wage subsidies on the labour market during COVID-19

In response to the onset of the COVID-19 health pandemic in February 2020, the Irish government introduced substantial labour market support measures to subsidise wages and to enhance unemployment benefits. This research will undertake an examination of employment outcomes over the pandemic and the role played by the wage subsidy programmes in these outcomes, both at firm-level and employee-level. Along with the unemployment polices, the wage subsidy programmes accounted for the largest share of state support to the economy during the COVID-19 health pandemic. As such, an examination of their use and impact would make an important contribution to assessing the effectiveness of policy intervention in the crisis period. This project proposes to use the extensive individual-level data from the real-time PAYE system of the Office of the Revenue Commissioners to track the coverage of the wage subsidy schemes and the impact on firms and employees.

4. Budget 2021

Allocation of 2021 costs by project

Scenarios on economic recovery from COVID-19	€38,203
Banking sector modelling	€50,711
Transition to a low carbon economy	€20,256
Fiscal cost of aging	€14,291
Firm dynamics and productivity	€4,896
SME survival and recovery following COVID-19	€37,776
SME investment and financing	€32,344
Initial impacts of Brexit on Irish trade	€34,809
Total	**€233,285**