This is the seventh edition of the Research Bulletin of the Central Bank of Ireland. Its aim is to highlight economic research and associated activities conducted by bank staff. In terms of research technical papers, eight were produced in 2013 and to date thirteen have been released this year. The non-technical summaries for each of these papers are included in this bulletin and the full papers are available for download from the Central Bank website. Some of the recent themes examined in bank research include the determinants of mortgage arrears; recall biases of owners assessment of the price they bought their homes; money demand; the interaction between repo market and central bank auctions; the determinants of corporate liquidations in Ireland; a core DSGE model of the Irish economy and an examination of the size of fiscal multipliers in Ireland and Slovenia within a DSGE framework.

A listing of our Economics Letters series for 2013 and up to September 2014 is included while the actual Letters are available for download. Some of the recent topics covered in this series include the distribution of debt among SMEs and how much of it is due to property investments; assessing developments in wages of recent graduates before and during the financial crisis; the impact of mortgage modification on mortgage repayments; some stylised facts regarding the distribution of interest rate only mortgages and its implications for policy. We also publish a number of less technical articles in the Quarterly Bulletin which can be downloaded. Many of these articles cover statistical issues reflecting an increase in the range of data released recently.

Also included in this Research Bulletin are recent and forthcoming publications by bank staff in peer reviewed academic journals and books as well as visiting speakers who presented over the period at the bank. Bank staff have also presented extensively outside the Bank at a range of domestic and international conferences and institutions including the American Economic Association; Computational Economics, Infiniti Conference; European Economic Association; Money, Macro and Finance meetings; Dept of Finance; UCD; NUIG to mention but a few. The Bank has hosted three conferences so far this year. These include a conference on Forward Guidance, an economic history conference and a statistical conference entitled Macro to Micro: A new era in financial statistics. There are also plans for Labour Market conference in December and a Balance Sheet Recovery conference in January.
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Leverage can be defined as the ratio of a bank’s total assets to its equity capital. A number of papers in recent years have presented two related features of leverage: leverage growth and asset growth move in the same direction; and consequently changes in leverage tend to move in the same direction as changes in the wider economy, i.e. it is pro-cyclical. When the economy is growing, bank equity capital tends to increase due to higher profits. In response banks tend to issue more liabilities to maintain a target leverage ratio, which also allows them to fund more assets and increase their overall balance sheet further. When the economy slows down the process reverses, with falling equity and banks seeking to reduce liabilities and thus cut back on lending which can then restrict funding to promote economic recovery. It has been argued that this pro-cyclicality property of leverage ratios in the US financial system had the effect of deepening and prolonging the 2008-2009 recession, with the key role being given to banks choosing to react to the negative changes in bank’s equity at the onset of the crisis.

In this paper we exploit the positive correlation between leverage growth and asset growth evident in the data to explore the mechanisms through which banks respond to changes in their equity. We make two contributions, one theoretical and one empirical. Our theoretical framework allows us to understand the implications of changes in equity growth for changes in asset growth, while allowing for other important features such as the need to move toward a target leverage ratio and the potential for changes in liabilities not related to equity growth to determine asset growth. The model shows that these changes in liabilities not related to equity growth are important in determining how fast banks respond to changes in their equity and leverage ratios, as well as the strength of the correlation between leverage growth and asset growth. This implies that changes in equity in and of themselves are not sufficient enough to understand bank balance sheet dynamics and the consequences of these for the pro-cyclicality of leverage.

In our empirical contribution, we show how our approach explains the pattern of correlations between leverage growth and asset growth observed for various types of commercial banks in the United States. In particular we provide evidence that large banks engage in more active balance sheet management in response to shocks. However, contrary to the logic that follows from equity changes dominating banks reasons to move towards their target leverage ratio, we show that larger banks that manage balance sheets more actively have a less positive correlation between asset growth and leverage growth. It is important to understand wider bank characteristics to explain the positive correlation between asset growth and leverage growth, and consequently the extent of the pro-cyclicality of leverage.
02/RT/14: Dis-entangling the mortgage arrears crisis: The role of the labour market, income volatility and housing equity

Yvonne McCarthy

About one in five residential mortgages in Ireland are currently in a delinquent state. This high rate of arrears has prompted much debate and a number of policy interventions to deal with the crisis. To date, much of the discussion has centred on the role of negative equity and unemployment. Given the extent of the deterioration in these factors over such a short period of time, and the accepted role that these factors have played in mortgage distress in other countries, this is not surprising. However, other factors are also likely to be important to the Irish mortgage arrears story.

A sizeable portion of the stock of mortgages in Ireland was taken out at a time when the Irish economy was growing strongly and experiencing significant improvements in incomes and living standards. However, the sharp deterioration in the Irish economy since the onset of the current crisis has had a depressing effect on household incomes which goes beyond the impact of unemployment alone. In this context, additional labour market issues such as deteriorating employment terms and income volatility are also likely to be important considerations.

Previous research has not been able to examine the impact of such factors since the existing datasets on mortgage arrears did not contain such information.

In this paper, we use two new and unique datasets to assess the main drivers of Irish mortgage arrears. Unlike previous datasets, these new sources include both detailed information on mortgage arrears and housing equity as well as up-to-date borrower specific information on affordability factors (such as income and labour market data) that are likely to be relevant to the Irish mortgage arrears story. The results provide new and important insights on mortgage arrears in Ireland. We find that unemployment and housing equity are key drivers of mortgage arrears in Ireland, as shown by previous research. However, the results also show that many borrowers experiencing arrears are currently employed. The data show that many of these borrowers have experienced a significant drop in their income or a change in employment conditions.

Furthermore, some of these borrowers are in fragile employment, i.e. they are on a temporary contract, have been with their employer for a short time or have a history of unemployment. This shows that the current mortgage crisis, and efforts to prevent a further deterioration, requires more than simply targeting negative equity and unemployment. Rather, such efforts should also aim to strengthen overall labour market conditions and job security.

03/RT/14: Does bank market power affect SME financing constraints?

Robert Ryan, Conor O’Toole and Fergal McCann

The relationship between bank market power and SME financing constraints has been the subject of significant debate. On the one hand, the bank market power (BMP) hypothesis suggests that, as a traditional Industrial Organization model would predict, higher market power in bank lending leads to lower quantities and higher prices for borrowers. The information hypothesis (IH), on the other hand predicts that when banks have greater market power, they will make greater investments in their relationships with SME borrowers, which will lead to greater credit availability.

This study uses firm and bank balance sheet data from across Europe between 2005 and 2008 to provide cross-country tests of the above hypotheses for the first time in a developed country setting. The findings suggest strongly that bank market power is associated with lower firm investment, and that this effect
is driven by the adverse effect of bank market power on SME financing constraints. In studying the potentially heterogeneous effect of bank market power on financing constraints, we find evidence that the effect is strongest among micro enterprises. This finding ties in with a long literature that finds that the smallest firms are generally found to have the most difficulty in accessing external finance, due to their lack of published financial reports (opacity) and their heightened vulnerability to idiosyncratic shocks. In a final extension of the paper, the impact of a country’s financial market structure on the above relationship is tested. It is found that in countries in which the private sector is more reliant on banks for funding, the effect of bank market power on SME financing constraints and investment is exacerbated.

The findings of this study are of great relevance to the current policy debate in Ireland and across Europe. In the aftermath of the global financial crisis, the harmful effect of SME financing constraints on firm investment, hiring, innovation and growth has led governments to adopt a wide range of policies aimed at stimulating SME funding. The finding of a harmful impact of bank market power on SME financing constraints provides a motivation for policy measures which aim to stimulate the entry of new lenders into domestic credit markets. Increased competition in the banking sector can be achieved through the introduction of a state SME bank, public-private partnerships whereby the state provides matched funding for new entrants to the SME lending market, as well as through the attraction of foreign banks and the reduction of barriers to entry in the banking industry. The finding that bank-reliant countries experience an even larger adverse effect on SME financing constraints also motivates policies which aim to diversify the mix of funding options available to SMEs. Ireland has been shown to have among the most bank-reliant SME populations in Europe in recent studies, suggesting this is a particular concern for Irish policy makers.

04/RT/14: The distribution of debt across Euro Area countries: The role of individual characteristics, institutions and credit conditions

Olympia Bover, Jose Maria Casado, Sonia Costa, Philip Du Caju, Yvonne McCarthy, Eva Sierminska, Panagiota Tzamourani, Ernesto Villanueva and Tibor Zavadil

In this paper we present an up-to-date assessment of the differences across euro area countries in the distributions of various features of household debt conditional on household characteristics. We consider three different features: the probability of holding debt, the amount of debt held and, in the case of mortgage debt, the interest rate paid on the main mortgage. The analysis relies on the new Household Finance and Consumption Survey (HFCS), a harmonized survey that contains information on household demographics, debt, wealth and income across euro area countries.

The data reveal striking differences in the incidence, amount and cost of debt held by comparable households across countries in the Euro area. For example, nearly half of all Dutch households hold mortgage debt while only one in ten Italian households do. Furthermore, debt-to-income ratios of Austrian debt holders are three times smaller than those of Dutch households. In terms of explaining debt holdings within countries, we find the age, income and education level of household members to be important demographic considerations. In this context, we find evidence of a hump-shaped profile of mortgage debt holding over age cohort groups. Specifically, the propensity to borrow tends to peak for cohorts aged 35-44 at the time of the survey, before the (cross-sectional) income profile peaks, possibly suggesting a role for mortgage debt in smoothing household consumption. Nevertheless, cross-country differences in the age, income and education profiles of borrowers are substantial. There is also substantial heterogeneity in how mortgage interest rates are related to income or borrower age across countries.

As a next step, we examine the role of legal and economic institutions in accounting for the different impacts of household characteristics
on debt patterns across countries. In particular, we analyze the role of the legal enforcement of contracts measured by the time needed to repossess a house, the tax treatment of mortgage repayments, regulatory loan-to-value ratios, the depth of information available about borrowers and credit conditions. Theoretical and quantitative models have stressed the role of each of these institutional factors in shaping the distribution of debt outcomes among age or income groups. Our findings suggest that among all the institutions we consider, the length of repossession best explains the features of the distribution of debt we analyze.

In countries with 15 months longer repossession periods, we find that the proportion of comparable households with mortgage debt is 12 per cent smaller, the amount borrowed by the youngest set of households (conditional on borrowing) is 8 per cent less than that of the 35-44 age group, and the interest rates paid by households in the bottom decile of the income distribution are 0.3 percentage points higher. These results are robust to the inclusion of other institutional factors. Regulatory loan-to-value ratios, the taxation of mortgages and the prevalence of interest-only or fixed-rate mortgages deliver less robust results.

One interpretation of our results is that the supply of mortgage credit is affected by legal processes that influence the speed of recovery of collateral in the case of non-repayment. Banks react to expected losses due to longer repossession periods not only by rationing quantities or rejecting applications but also by pricing secured debt differently across income groups and charging relatively higher interest rates to low income households.

Finally, we have documented substantial heterogeneity in the distribution of household debt across countries. Such diversity has implications for a wide array of outcomes including macroeconomic policy the consequences of an interest rate increase, for example, depend on the fraction and the characteristics of indebted households and financial stability loan arrears depend on the income, age and household structure of indebted households. Those outcomes merit further research.

05/RT/14: Deleveraging in a highly indebted property market: Who does it and are there implications for household consumption?

Kieran McQuinn and Yvonne McCarthy

In this paper we use two unique sources of data to examine the extent to which Irish mortgaged households are deleveraging. In particular, we focus on whether households are making overpayments to clear their debt more quickly or using savings to supplement their payments. We also examine if the decision to deleverage has implications for household consumption. The Irish market is of specific interest in this regard owing to the rapid increase in household indebtedness prior to 2007 vis-à-vis other western economies. A significant element of this increase in indebtedness is attributable to the Irish property boom of 1995 to 2007, when the growth in both Irish house prices and activity levels was amongst the largest across the OECD.

Our results suggest that it is older, more affluent Irish households, which are deleveraging. In particular, the probability of deleveraging is highest among those households with higher levels of income, with older or retired / inactive heads of household, and among those households where the head is relatively well educated. Furthermore, in a result that reinforces the importance of affordability in any deleveraging decision, we find that households are likely to reduce their deleveraging if they expect a deterioration in future financial conditions. Finally, we find that the decision to deleverage has negative implications for consumption patterns.
06/RT/14: Attenuation bias, recall error and the housing wealth effect

Kieran McQuinn and Yvonne McCarthy

In this paper using two unique sources of data, we assess the accuracy with which Irish mortgaged households can remember the price they paid for their main residential property. We then assess the implications for estimates of the housing wealth effect when recall as opposed to actual house prices are used as an indicator of housing wealth. Prudential data gathered for the main Irish financial institutions reveals the actual house price paid by most Irish mortgagees. In 2012, the Irish central bank conducted an income survey of mortgaged Irish households. In the survey, households were asked how much they had paid for their main residential dwelling (recall price). Thus, the accuracy of the recall price can be evaluated.

Significant error in the recall price has major implications for estimates of the housing wealth effect. An increasing number of micro based estimates of the housing wealth effect use the recall house price as an indicator of housing wealth. Where households are unable to accurately remember their house price on a systematic basis, the corresponding wealth effect estimates are likely to suffer from classical attenuation bias.

Our results suggest that Irish households have some difficulty in accurately remembering their house price with error measures indicating that most households are inclined to understate the true purchase price of their property. Accordingly, if the recall price was to be used as the indicator of Irish housing wealth, then the resulting wealth effect would be over 70 per cent less than that estimated with the actual price due to attenuation bias. The error itself would appear to be both a function of market conditions and individual household characteristics with the scale of house price movements being a particularly important factor. Therefore, survey data in housing markets which have experienced significant house price appreciation would appear to be most susceptible to this bias.

07/RT/14: Money, interest and prices in Ireland

Stefan Gerlach and Rebecca Stuart

In this paper we assemble an annual data set on broad and narrow money, prices, real economic activity and interest rates in Ireland from a variety of sources for the period 1933-2012. We then study the relationship between these variables since 1933. A central part of this paper consists of the compilation of a long historical macroeconomic data set for Ireland, using data from a number of different published sources. The combination of data in this way is not without problems. For instance, estimates of macroeconomic aggregates are likely to have improved over time in response to the use of improved statistical techniques and better data. Furthermore, economies evolve, leading to a strong presumption that macroeconomic relationships may change over time.

However, modern data are also subject to measurement errors and contemporary economies also experience structural change. There is therefore no reason to disregard historical data out of hand. Nevertheless, we emphasize that our data set should be seen as preliminary and that we hope to find more and better data in the future. The Irish monetary system has undergone large changes since the Irish Free State was established in 1922. At the time of independence in 1922, the monetary and financial system of Ireland was completely integrated with that of the United Kingdom, and monetary arrangements evolved gradually over time. Following the establishment of the Central Bank of Ireland in 1943, the link to the UK monetary system remained extremely close with the Irish pound pegged at unity to Sterling until Ireland joined the European Monetary System (EMS) in 1979. The Central Bank of Ireland then conducted monetary policy with
an adjustable exchange rate peg until Ireland joined the Economic and Monetary Union in 1999.

Given these changes in the monetary system, it is interesting to explore how the relationships between narrow and broad money (as measured by M1 and M2), real GDP, prices and short and long interest rates have evolved over time in Ireland. We perform a Vector Autoregression (VAR) analysis to provide some simple empirical evidence on the behaviour of these time series. The results suggest that aggregate supply and inflation shocks play a dominant role in Irish business cycles.

08/RT/14: Money Demand in Ireland: 1933-2012

Stefan Gerlach and Rebecca Stuart

Using annual data from several sources, we study the evolution of narrow money (M1), broad money (M2), income, prices and long and short interest rates in Ireland over the period 1933-2012. The purpose of the analysis is to see whether the behavior of these time series in this eighty-year period can be explained by standard money demand theory.

Ireland experienced a number of monetary and economic regimes in this period. Economic growth in Ireland was weak in the 1930s, largely as a consequence of the Great Depression and the Economic War with the UK that started in 1932 and during which a policy of economic self-sufficiency was instituted. This policy ended in the 1950s with a shift towards outward-looking economic policies that heralded a period of relatively strong economic growth in the 1960s and 1970s. In the early 1980s, however, growth fell sharply, partly reflecting disinflation policies in a number of countries.

Our sample includes the Celtic Tiger boom that started in the early 1990s which evolved into the construction boom of the early-2000s. Finally, the sample also covers the financial crisis which began in 2008. This long sample also spans several monetary regimes. At the time of independence in 1922, the monetary and financial system of Ireland was completely integrated with that of the United Kingdom, and monetary arrangements evolved gradually over time. Following the establishment of the Central Bank of Ireland in 1943, the link to the UK monetary system remained extremely close with the Irish pound pegged at unity to Sterling until Ireland joined the European Monetary System (EMS) in 1979. The Central Bank of Ireland then conducted monetary policy with an adjustable exchange rate peg until Ireland joined the Economic and Monetary Union in 1999. We estimate money demand functions for Ireland for the period 1933-2012.

Our estimates for long-run money demand using M2 are stable and close to our prior expectations. Specifically, the estimates indicate a unit price elasticity, a real income elasticity of 1.7 and a negative interest rate elasticity as suggested by standard money demand analysis. However, for M1 we obtain low price elasticities, and a relatively high income elasticity, and detect parameter instability. We therefore drop M1 from the analysis and estimate a short-run money demand function for M2. While it passes a number of diagnostic tests, the standard error of the regression in large, suggesting that the relationship between money growth and its determinants in Ireland was not very close in the 80 years of data we studied.

09/RT/14: ECB Monetary Operations and the Interbank Repo Market

Peter Dunne, Michael Fleming & Andrey Zholos
An important element of monetary policy is the imposition of reserve requirements on banks (i.e., requirements to hold a daily average amount of reserves within each reserve maintenance period). In the Euro Area reserve requirements are set equal to a proportion of banks’ liquid liabilities (mainly demand deposit accounts). This requirement creates a demand for reserves (they can be considered working capital) and the ECB conducts auctions at regular intervals within reserve maintenance periods to supply these. Official reserves facilitate the real-time settlement of transactions between customers of different banks. Such transactions are unpredictable and they can push a bank’s reserves away from what is likely to result in adherence to the average requirements. In normal conditions reserve surprises are mostly symmetric (causing one bank to have a positive shock while another has a negative one) and these shocks can usually be counteracted by interbank transactions where the surplus bank lends to the deficit bank. Interbank transactions can be unsecured or secured against collateral (i.e., repurchase agreements).

Our analysis focuses on the relationship between the interbank trading of reserves secured against sovereign bonds as collateral and the behavior of banks at official auctions.

The requirement to hold short term reserves reduces the amount that banks can more profitably lend for longer maturity. An increase in the efficiency of the interbank market can therefore release capital for lending. The deepening of the integration of European financial markets from 1999 to 2007 and the increasingly widespread participation of banks in interbank electronic trading venues, most likely contributed to increased efficiency in the sharing of reserves before the crisis. This may have led to less cautious management of reserves and a greater reliance on the interbank market. These developments, in combination with movements towards non-deposit based funding, a more leveraged banking sector and an accommodative monetary policy stance, may have been responsible for the significant increase in long term lending that was observed during the pre-crisis period. We begin our study by analysing how interbank activity was related to behaviour at auctions during this period and we assess the effects of a tightening of monetary policy just before the crisis.

It is known that some banks in the pre-crisis period had small reserve requirements but large amounts of low-quality lending (sourcing funding from corporate bond investors rather than customer deposits). They also managed these small amounts of reserves aggressively with high dependence on the interbank market. Such banks were the source of severe increases in counterparty risk during the financial crisis. This led to a widespread reluctance to trade reserves (particularly in unsecured transactions) and it reduced the value and acceptability of some types of collateral. This also led to increased demand for official funding and a change in behaviour of banks, at official auctions (with much more aggressive bidding by some banks).

Auction policy initially responded to crisis-related pressures by relaxing the amounts allotted in auctions. After the Lehman crisis there was another change in policy (a move to fixed-rate full-allotment auctions). We examine the effects of these changes through a structural analysis of the relationship between amounts sought at auctions and amounts traded in the interbank market. We control for collateral quality effects and interbank market conditions. Our results indicate that the fixed-rate full-allotment policy discourages re-intermediation and we suggest that a move to variable rate auctions with flexible allotment quantity would be beneficial in encouraging banks to restore normal interbank trading relationships. It would also incentivise banks to conduct balance sheet repairs, and eventually, to engage in re-capitalisations through new equity issuances.

Paper 10/RT/14: A long-run survival analysis of corporate liquidations in Ireland

Robert Kelly, Eoin O’Brien & Rebecca Stewart
The Irish economy has undergone a significant change since the onset of the financial crisis in 2008. By its nature, a systemic crisis impacts not just the financial sector, but also the broader real economy. The financial crisis in Ireland has impacted the corporate sector severely, resulting in an unprecedented increase in insolvencies. Understanding the drivers of such an increase in SME insolvencies ensures a better assessment of the risk of financial distress throughout the economic and financial cycle. The role that credit access and indebtedness play in determining the condition of SMEs is well known in the academic literature. While credit can take many forms, small firms are generally reliant on banks for external financing. However, SME access to bank credit is procyclical with alternative sources of financing becoming increasingly important during stressed periods. We therefore use a measure of corporate sector distress - insolvent liquidations - which captures both bank and non-bank forms of credit.

We disaggregate insolvent liquidations by sector of activity and geographical location, to determine the relative impact of the crisis compared to historical norms. To determine what drives the probability of SME failure during a protracted period of stress we conduct a survival analysis. We find that, after taking account of firm location and economic sector, both macroeconomic conditions and bank credit conditions are determinants of firm survival. In terms of macroeconomic factors, we find that macroeconomic variables which capture the build-up in distress, such as the unemployment rate, explain the behaviour of insolvent liquidations better than variables which only capture short-term fluctuations in economic activity. We also find that insolvencies are affected by the pro-cyclicality of bank credit standards and availability throughout the cycle.

First, we find that firms that are born during boom periods when credit standards are loose, are more likely to become insolvent than those born when credit standards are tighter. Second, a reduction in bank credit availability at any point in time also decreases the probability of firm survival.

11/RT/14: EIRE Mod: A DSGE Model for Ireland

Daragh Clancy & Rosanna Merola

This paper describes the development of a core DSGE model for Ireland, EIRE Mod (Elementary Irish Real Economy Model). The model’s theoretical foundation is the New Open Macroeconomics synthesis, with additional features added to account for Ireland’s membership of European Monetary Union (EMU). The framework is a small open economy with two sectors, tradable and non-tradable. Agents in the economy are households, firms and retailers who import goods from abroad for sale on the domestic market. Monetary policy is exogenous and is determined at the euro area. New Keynesian features, such as sticky prices and wages, are included. This means the model dynamics can replicate the sluggish reaction of prices, wages and other economic variables found in the empirical literature. The model is calibrated in order to match key observed ratios in the Irish data.

To highlight the usefulness of the model for policy analysis, we examine the impact that various structural reforms could have on the Irish economy. The simulation of these shocks highlight the transmission channels through which such reforms would affect the economy. Structural reforms have been on the Irish policy agenda since the beginning of the decade, as the financial crisis exposed the loss of competitiveness suffered during the excesses of the housing boom. Successive policy documents, from Europe 2020 to the Financial Assistance Programme, the Programme for Government and the Medium-Term Economic Strategy (MTES) all call for the introduction of structural reforms to boost the sustainable growth potential of the Irish economy. These documents emphasise that a series of measures designed to reform the Irish labour and product markets could deliver medium-term growth through productivity gains. Our results show that although all the reforms boost aggregate output, they might have opposing implications for Ireland's employment and external compet-
Given that the Medium-Term Economic Strategy 2014-2020 (MTES) commits to a strategy of export-led growth and full employment, the reforms implemented under this programme need to be carefully assessed in order to ensure that they do not lead to counterproductive effects for employment and the export sector.

However, our results must be interpreted with caution. The model does not feature either liquidity constraints or labour market frictions and hence might fail to capture some key aspects in the adjustment path of the economy following the implementation of these reforms. This work should be viewed as a first step toward the development of a suite of DSGE models for Ireland and as an attempt to illustrate how the core EIRE Mod can be used for simulating policy scenarios for economic analysis. Therefore, although useful for policy analysis in its own right, the core EIRE Mod presented here will be extended in a number of ways. On the modelling agenda are more detailed analyses of the housing, fiscal and financial sectors, as well as the labour market. Each model extension will be specifically tailored to answer questions of vital interest to policymakers. Additionally, key aspects from the various extensions can be combined (e.g. the housing and financial sectors) to analyse important transmission channels between these sectors. Finally, the core model will be estimated using Bayesian techniques.

**Paper 12/RT/14: The Effects of Government Spending in a Small Open Economy within a Monetary Union**

Daragh Clancy, Pascal Jacquinot & Matija Lozej

Small open economies (SOEs) are extremely susceptible to external shocks. When SOEs are part of a monetary union, the response of nominal interest and exchange rates, based on area-wide aggregates, typically cannot be tailored to stabilise the impact of country-specific shocks. Fiscal policy is especially important for individual members of a monetary union, since it is the only standard stabilisation instrument available to national authorities to smooth business cycle fluctuations driven by these shocks. The recent financial crisis induced a severe recession and a large increase in the net foreign liabilities of many euro area (EA) countries. Addressing the accumulation of external imbalances is a key part of the post-crisis adjustment process. The incorporation of these imbalances into the EU economic governance structure via the Macroeconomic Imbalance Procedure further underlines their importance.

We assess the role that government spending can play in counteracting these imbalances using a global DSGE model, the EAGLE. The original model’s fiscal sector is extended to allow for: a distinction between government consumption and investment; an import-content of government expenditure; the accumulation of public capital; and complementarities between government and private consumption. To illustrate the heterogeneity of responses to various shocks, we calibrate the extended EAGLE to Ireland and Slovenia. They are both small, very open, and members of the EA. However, they differ in several important respects, in particular with regard to trade orientation, where Ireland tends to trade mainly with non-EA regions and Slovenia trades mainly with the EA. This implies that, for instance, the sensitivity of trade flows with respect to the euro exchange rate will be very different for each country. There are also other differences regarding the great ratios, nominal and real rigidities, tax rates, etc. As a consequence, their reactions to shocks can be very different.

We find that when private consumption and government consumption are complementary, short run government consumption multipliers can be substantial. While government investment has somewhat less impact on GDP in the short run than government consumption, our results show that through an increase in productive public capital, government investment improves a SOE’s external competitiveness in the medium run and thus can promote growth and counteract developing imbalances. This effect is magnified for a SOE in a monetary union.
union, where the area-wide interest rate does not react strongly to the increase in demand in a SOE. Even a budget neutral re-orientation of public expenditure towards investment can have a large positive impact in the medium run. The extended model allows for a rich set of new transmission channels of foreign government expenditure shocks to other economies. Our analysis shows that the positive spillovers from a fiscal stimulus in one region of a monetary union can be sizeable, with the sign and magnitude of the effect dependent on individual countries trade linkages.

Paper 13/RT/14: Housing Market Activity and Consumption: Macro and Micro Evidence
Daragh Clancy, Mary Cussen & Reamonn Lydon

Household consumption is a significant component of aggregate demand, accounting for over half of gross domestic expenditure in most developed economies. The purpose of this paper is to identify the structural factors which drive household consumption, paying particular attention to the role of the housing market. The economics literature has identified three drivers of household consumption: (i) changes in lifetime wealth; (ii) credit conditions; and (iii) income expectations. Housing market developments are closely related to each of these factors: an increase in house prices increases household wealth; changes in credit conditions can both affect house prices and the ease with which individuals can access housing wealth; and changes in income expectations also affect house prices by impacting on the demand for housing. Relating to this final point, the complementarity of house purchases and certain types of consumption, most notably durable goods, is also a factor in driving consumption trends. This is particularly true when house price booms (busts) are accompanied by very high (low) levels of housing turnover. Given the large-scale economic fluctuations caused by a housing boom and bust, Ireland is an ideal case study for analysing how the housing market impacts on consumption.

Using aggregate data, we show that housing wealth exerts a positive influence on the consumption of durable goods. However, the many ways in which the housing market can affect consumer spending complicates matters when it comes to modelling consumption. In particular, the identification of housing wealth effects separately from changes in credit conditions, income expectations or complementarity effects is difficult with aggregate data. Therefore, a common approach is to combine micro and macro data to quantify how the housing market affects consumption.

Using the micro data, we analyse households consumption decisions at different points throughout the business cycle and assess whether or not the same factors that are influential at the aggregate level remain so at the individual household level. The results show that there appears to be a role for wealth effects and credit conditions in driving consumption. However, the observed strong house price effects for younger cohorts who are predominantly renters suggests that income expectations or changes to permanent income are also important. Finally, there is also evidence of a high degree of complementarity between house purchases and durable consumption in particular. This complementarity accounts for the strong positive correlation we observe between (total) consumption growth and housing market activity during periods of strong house price growth.

These findings highlight the importance of decomposing consumer spending into its constituent parts to uncover the underlying factors driving aggregate consumption. Based on the results presented here, domestic demand may continue to be a drag on the recovery of the Irish economy following the property crash of 2007.
Non Technical Summaries of Research Technical Papers 2013

01/RT/13: On the Hook for Impaired Bank Lending: Do Sovereign Bank Interlinkages Affect the Fiscal Multiplier?

Robert Kelly & Kieran McQuinn

Given the difficulties in the Irish mortgage market, this paper assesses the implications for the Irish fiscal accounts due to the unique relationship between the sovereign and its main financial institutions. Macroeconomic policies, which reduce the loan impairments on the balance sheets of the guaranteed banks are likely to generate savings for the sovereign due to its capitalisation obligations. Using a broad empirical framework, the paper examines the relationship between house prices, unemployment and mortgage arrears in an Irish context. Loan loss forecasts over the period 2012–2014 are then generated for the Irish mortgage book under two different scenarios. It is shown that macroeconomic policies, which alleviate levels of mortgage distress, relieve the solvency position of the guaranteed institutions thereby reducing the Irish States future capital obligations. This impact on the sovereign’s fiscal accounts, while of particular interest in the case of Ireland, is also worthy of consideration in other countries where financial institutions are also experiencing significant loan impairment issues.

02/RT/13: Age or Size: Determinants of Job Creation

Martina Lawless

Aggregate changes in employment are the outcome of many individual firms making decisions on whether to expand or contract. The extent of this job churn is considerable and is typically many multiples of the net employment change. Small firms have been identified as tending to create and destroy jobs at higher rates than larger firms. However, the allegedly disproportionate contribution of small firms to net job creation has been disputed.

This paper shows that job turnover and firm growth vary systematically across firm size groups and that smaller firms do indeed make an important contribution to new job creation. There is a significant caveat, however; we find that it is not firm size per se that is driving these results but rather firm age.

The considerable overlap between the two measures, as young firms overwhelmingly tend to be small, has perhaps led to much of the effect of firm age being misattributed to size.

Using a panel of Irish firms covering almost forty years, we find that younger firms, and entrants in particular, are the largest contributors to the creation of new jobs. Younger firms are consistently more dynamic than older firms and this holds across all size classes, not just amongst smaller firms. In terms of firm growth and size, we find a inverse relationship exists for young firms but that this declines in magnitude and statistical significance very markedly when the analysis is done for separately for older age groups. This provides some support for Gibrats Law that size and growth are independent, but adds the qualifier that this holds once the firm has reached a mature state and does not apply to firms at the earliest stages of development.

From a policy perspective, these results imply that an environment supportive of business startups might be more effective in generating job creation than policies aimed more generally at specific size classes of firm. Many policies of benefit to business of course do not need to distinguish between whether they are useful to small or young or both, such as those relating to lowering red-tape burdens on firms. One area where such a distinction may be usefully made however is in policies to encourage early-firm funding access, as younger firms consistently report difficulties in access to formal sources of finance across a range of countries.
03/RT/13: Why Firms Avoid Cutting Wages: Survey Evidence from European Firms

Philip Du Caju, Theodora Kosma, Martina Lawless, Julian Messina & Taíri Room

The rarity with which firms reduce nominal wages has been frequently observed, even in the face of considerable negative economic shocks. This paper uses a unique survey of fourteen European countries to ask firms directly about the incidence of wage cuts and to assess the relevance of a range of potential reasons for why they avoid cutting wages. Concerns about the retention of productive staff and a lowering of morale and effort were reported as key reasons for downward wage rigidity across all countries and firm types. Restrictions created by collective bargaining were found to be an important consideration for firms in euro area countries but were one of the lowest ranked obstacles in non-euro area countries. The paper examines how firm characteristics and collective bargaining institutions affect the relevance of each of the common explanations put forward for the infrequency of wage cuts.

04/RT/13: Understanding Irish House Price Movements - A User Cost of Capital Approach

Frank Browne, Thomas Conefrey & Gerard Kennedy

This paper employs the user cost of capital to examine Irish house price movements. The bundle of services afforded by a dwelling can be accessed either by renting the dwelling or by outright purchase. Between 2002 and 2007, a combination of factors including rapid house price appreciation and the prevailing fiscal and monetary environment created a strong bias towards homeownership. This was reflected in a negative user cost of housing as capital gains exceeded funding costs (both direct mortgage cost and the opportunity cost) thereby incentivising home ownership and fuelling further increases in prices. We find that the collapse in house prices since 2007 has contributed to a reversal of this process. From mid-2007 onwards, the user cost has soared as capital losses have greatly exceeded the funding costs (albeit falling) causing house prices to fall further. Both fiscal and financial policy measures which could enable a more efficient functioning of the housing market are discussed.

05/RT/13: Spillovers in Euro Area Sovereign Bond Markets

Thomas Conefrey & David Cronin

This paper applies the Diebold and Yilmaz (2009, 2012) methodology to measure the varying extent to which shocks in euro area sovereign bond markets have spilled over to one another since the advent of the single currency in 1999. This approach allows one to quantify the relative importance of domestic/own market shocks and other member state/cross market shocks to a country’s bond yield at different points in time.

The changing spillover values over time shown in the econometric results lend support to the view that the euro area sovereign bond crisis has moved from being driven initially by broadly-based systemic concerns to a later focus on country-specific developments. While Greece had a strong influence on euro area bond markets around the time of its first bailout, this had diminished by the time of its second bailout. After that event, it became relatively detached from other markets. There is evidence pointing to the re-establishment of
spillover patterns that existed before the crisis with gross spillovers having fallen over time from 2009-10 levels and net spillovers again occurring from the core to the periphery.

Among the policy implications which stem from this analysis is that the influence of peripheral member states, in particular, Greece, on the euro area sovereign bond market has diminished and that pre-crisis interaction patterns appear to be reoccurring after a period of extreme stress. If this reflects a greater focus by financial markets on country-specific issues, it is a development that should be broadly welcomed. An emphasis on the fundamentals of each member state can help distinguish one country’s bond market from others and thus help avoid financial contagion (i.e., behaviour unrelated to fundamentals) occurring. Our results indicate that Greece became detached from other sovereign bond markets after its second bailout. This suggests that a credible adjustment programme can mitigate the influence of a distressed sovereign on other member states as well as having benefits for the member state itself.

The spillover index methodology can provide useful information to policymakers and market analysts. Its changing value over time can be quickly updated given the immediate availability of end-of-day bond yield data. It thus could prove an informative indicator for those tasked with monitoring sovereign market developments and their implications for financial stability.

**06/RT/13: Price Expectations, Distressed Mortgage Markets and the Housing Wealth Effect**

Yvonne McCarthy & Kieran McQuinn

The life-cycle theory of consumption draws a well-established distinction between the implications for consumption of changes in wealth perceived to be of a transitory as opposed to a permanent nature. In this paper, using a unique combination of regulatory and survey micro-data, we examine the importance of the life-cycle theory, in estimating housing wealth effects for the Irish mortgage market. In the aftermath of the recent financial crisis, this market has experienced substantial levels of house price declines and negative equity. Thus, house price expectations are likely to be of major importance in influencing housing wealth effects. Our results suggest that mortgaged Irish households exhibit a relatively large wealth effect out of housing when compared with other countries and, in accordance with the life-cycle theory, households price expectations are influential in determining the consumption response to shocks.

**07/RT/13: Was the Securities Markets Programme Effective in Stabilizing Irish Yields?**

David Doran, Peter Dunne, Allen Monks & Gerard OReilly

The Securities Markets Programme (SMP) was launched by the Eurosystem in May 2010 and involved the intermittent purchases of sovereign bonds of several euro-area Member States with the objective of addressing a perceived malfunctioning of these markets and to restore a well-functioning transmission mechanism for monetary policy. In a relatively narrow sense, we examine the effectiveness of SMP by measuring how purchases of Irish sovereign bonds contributed to the stabilisation of Irish sovereign yields themselves. This is a prerequisite for broader effects such as the stabilisation of bank funding costs or the reduction of yields on substitutes. Such an evaluation is complicated by a number of methodological issues.

1. Endogeneity bias arises from the fact that
interventions were usually triggered by adverse developments in yields. If one fails to control for this bias one may incorrectly conclude that intervention was ineffective or that it even led to yields rising. To address this endogeneity bias we use instrumental variable regression techniques. However, finding valid instruments is somewhat problematic. The use of intra-day data further clarifies the issue of endogeneity since one can exactly pinpoint how much yields have risen prior to intervention on a particular day.

2. There are many omitted information shocks during the period studied. Hence, yields may change for reasons other than intervention. We introduce control variables to mitigate some of this bias while the use of high-frequency intraday data further ameliorates such effects.

3. In terms of announcement effects we find, based on a detailed analysis of the first day of SMP (May 10th 2010), that about half of that days price rise (yield fall) occurred in advance of actual SMP purchases. Hence, the announcement of the programme moved markets prior to actual purchases. We find that this initial observation has a distortionary influence on most regression results obtained for the full sample of intervention days.

4. Standard regression analysis, in which the yield change is regressed on the amount purchased under SMP, will find no relationship between the dependent and independent variables if yields are stabilized by interventions. We find evidence, particularly from intradate data, in support of this supposition and this may explain why extant studies have failed to find a relationship between daily amounts of SMP interventions and yield movements.

Overall, we find that regression analysis involving daily yield movements produces rather weak evidence that interventions had any effect on yield movements but this must be interpreted in light of the identification issue if yield movements were stabilized. We explore intraday price effects through a Cumulative Average Return analysis (CAR) at 5 minute intervals around each days first SMP event. This makes it clear that interventions successfully halted a pronounced average decline in prices of bonds from the first intervention until the end of the intervention day. We conclude that SMP was effective on the days of intervention but adverse movements often reoccurred the following day and new interventions were applied with such a lag that pre-intervention yield movements led to a cumulative drift. This may have been inconsistent with the programmes monetary policy objectives but it seems likely that it prevented some catastrophic movements of yields when market participants most feared an absence of liquidity on the buy-side of the market.

In this paper we use two unique sources of data to examine the changing nature of credit conditions in the Irish mortgage market over the period 2000 to 2011. The first data source is the prudential loan level data collected as part of the ongoing stress-testing of Irish financial institutions. This is then complemented with the results of an income survey conducted on the mortgage books of the same institutions. Using these two databases we, firstly, quantify the respective contribution to house price movements of changing credit conditions and, secondly, estimate an index of mortgage credit availability, (MMCI), in the Irish property market. This indicator tracks the changing nature of credit conditions, while controlling for standard demand level factors such as income levels and interest rates as well as other household characteristics.

The Irish property market is particularly worthy of scrutiny for the period in question. Between 1995 and 2007 real Irish house prices grew by more than any other country within the OECD. The significant increases in house
prices went hand in hand with a sizeable rate of activity in the Irish market. Between 2004 and 2006, for example, an annual average of 85,000 residential units were being built compared with just over 200,000 units in the United Kingdom. The buoyancy in the property market was determined by a number of factors. The emergence of the so-called Celtic Tiger in the mid-1990s saw the size of the economy double over the period 1995 to 2005 resulting in a marked increase in affordability levels amongst prospective Irish homeowners.

Simultaneously, however, the Irish credit market experienced a considerable degree of financial liberalisation. The ability of Irish credit institutions post-2000 to access international wholesale markets, increased significantly the supply of credit available to the domestic banking sector. The already thriving nature of the residential and commercial property markets provided considerable demand for this increased source of funding.

Our results suggest that when Irish financial institutions were keen to increase the level of credit to the residential property market, they particularly availed of what we label the income fraction channel. Thus, for a given income level and mortgage interest rate, credit institutions were able to significantly increase the level of loans available by varying the income fraction. The MMCI estimated suggests that significant movements occurred in the mortgage credit supply function during both the boom and subsequent downturn in the Irish market.
Economic Letters

2014

   Thomas Conefrey and Richard Smith

2. Do Irish households respond to deposit rates?
   Jane Kelly, Nuala O’Donnell, Martina Sherman and Maria Woods

3. Profiling the indebtedness of Irish SMEs
   Fergal McCann

4. Operational targets and the yield curve: the euro area and Switzerland
   Danielle Kedan & Rebecca Stuart

5. Interest-only mortgages in Ireland
   Jane Kelly, Gerard Kennedy & Tara McIndoe-Calder

6. Corporate Liquidations in Ireland
   Eoin O’Brien & Rebecca Stuart

7. Mortgage Repayments after Permanent Modification
   Anne McGuinness

8. Irish SME property exposure: what do we know?
   Fergal McCann & Tara McIndoe-Calder

9. Housing market developments and household consumption
   Daragh Clancy, Mary Cussen & Reamonn Lydon

10. Macro-prudential Tools and Credit Risk of Property Lending at Irish banks
    Niamh Hallissey, Robert Kelly & Terry O’Malley

2013

1. The impact of the financial crisis on banks’ net interest rate margins
   Sarah Holton, Jane Kelly, Reamonn Lydon, Allen Monks, and Nuala O’Donnell

2. Do households with debt problems spend less?
   Reamonn Lydon

3. A monthly business cycle indicator for Ireland
   Thomas Conefrey and Joëlle Liebermann

4. Profiling the cross border funding of the Irish banking system
   Dermot Coates and Mary Everett

5. The importance of banks in SME financing: Ireland in a european context
   Fergal McCann, Martina Lawless and Conor O’Toole

6. Re-employment Probabilities for Unemployed Workers in Ireland
   Thomas Conefrey, Yvonne McCarthy and Martina Sherman
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* This is a list of visiting speakers who presented at the Central Bank since October 2014.
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