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Abstract

Borrower-based macroprudential policies, such as limits to loan-to-value and loan-to-income ratios, have grown in popularity in the last decade globally. An understanding of their effects, both intended and unintended, is continuously evolving. In this *Note*, we discuss the macroeconomic channels through which such measures, like all economic policies, can both benefit and impose costs on the economy. System-wide benefits of such measures arise predominantly through the taming of housing-credit cycles, which lower both the probability and the severity of financial recessions, as well as avoiding resource misallocation. Such crises have been shown to have particularly harmful effects, are followed by slow recoveries and can have persistent adverse macroeconomic effects. The macroeconomic costs of such measures operate through liquidity constraints on renters, and reductions in consumption and construction activity that may arise through dampened house prices and expectations. These macroeconomic costs are more likely to be short-term, and less likely to affect the productive capacity of the economy in the long-run.

1 Introduction

In response to the previous global financial crisis, the last decade has seen wide implementation of borrower-based macroprudential policies in developed economies. In Ireland, limits on Loan to Value (LTV) and Loan to Income (LTI) ratios at mortgage origination were introduced in February 2015, and remain in place to this day. The measures in Ireland have two objectives: firstly, to promote bank and borrower resilience to adverse shocks; secondly, to limit the risks of excessive and damaging pro-cyclical dynamics between house prices and mortgage credit emerging.

In this *Note*, we highlight the *macroeconomic* channels through which macroprudential mortgage policies such as the Central Bank of Ireland's LTV and LTI limits (referred to hereon as "the measures") affect the economy. We present the macroeconomic benefits of mortgage measures in a similar light to that used in the "optimal bank capital" literature ([Miles et al. \(2013\)](#), [Brooke et al., 2015](#)), whereby the benefits of a regime can be thought of through the reduction of both the probability and the severity of a damaging economic downturn resulting from an expansion in household debt. The macroeconomic costs of introducing mortgage measures are likely to be more short-term in nature than the benefits, and relate to issues such as the consumption-reducing

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effects of increased savings requirements among would-be purchasers, weaker housing equity positions which limit borrowing capacity, less house purchases, and potentially less construction.

Previous research by the Central Bank of Ireland has considered some of the channels through which macroprudential mortgage policies affect the economy. Housing demand and supply channels, for example, are considered in [Kennedy and Stuart \(2015\)](#) and [Cussen et al. \(2015\)](#). Models of the Irish macroeconomy have also been deployed to assess some of the aggregate effects of borrower-based measures. [McInerney \(2020\)](#) shows that regulatory changes to LTI and LTV ratios are particularly effective in limiting credit growth and, indirectly, house price appreciation. [Lozej and Rannenberg \(2017\)](#) calibrate the Central Bank of Ireland's DSGE model ([Clancy and Merola, 2016](#)) using Irish data and find that, while these restrictions do lower economic activity in the short run, they improve welfare in the longer term by reducing household leverage and subsequent levels of default.

Taking a micro-level view on topics of macro-financial relevance, [Kinghan, McCarthy, O'Toole \(2019\)](#) explore the effects of the macroprudential measures in the mortgage market on the leverage of Irish borrowers, while [Kelly, McCann and O'Toole \(2018\)](#) show how LTV and LTI limits reduce credit availability and house prices. Acharya et al. (forthcoming) show that after the 2015 introduction, house prices slowed more rapidly in regions where more potential borrowers were drawing down high-LTV and high-LTI loans in 2014.

The aforementioned Central Bank of Ireland research sits within a rapidly expanding international literature. This literature, using both empirical and theoretical methods, has arrived at a consensus on the benefits of macroprudential mortgage policies, in particular that they are indeed effective at taming credit and household indebtedness, with less conclusive but partial evidence of their effect on house prices ([Cerutti, Claessens, Laeven, 2017](#)). The literature is less developed on the costs of such policies. One exception at the macro level is [Richter, Schularick and Shim \(2019\)](#), who show that LTV restrictions are associated with reductions in output, predominantly in emerging market economies.² A larger literature has discussed issues relating to the cohort-specific effects of such policies, for example in accessing the mortgage market and in the type and location of housing chosen across households.³

The era of macroprudential policy has coincided with a period of low global interest rates, weak housing supply responses across many countries since the global financial crisis, and increased difficulty in housing affordability. Many of the affordability challenges facing potential borrowers have a range of solutions, and in many cases policy measures that increase the supply responsiveness of housing, for example through lowering of construction costs and barriers, may be of more long-term benefit than policies that loosen credit access during periods of tight housing supply.

In this Note, we build on the aforementioned macroeconomics literature, and on [Aikman \(2021\)](#), to provide a simple framework through which a wide range of macroeconomic benefit and cost channels of macroprudential mortgage policies can be considered. Future work will consider how costs and benefits can be compared within a unified framework.

² Drawing comparisons across central bank instruments they show penal restrictions of 10 percentage points in the LTV ratio are required to reduce output by the same amount as a 25bps increase in the monetary policy rate, suggesting that the short-term costs of LTV restrictions, while statistically significant, may not be particularly large in magnitude.

³ Acharya et al. (forthcoming) show that, in Ireland, mortgage volumes grew disproportionately among higher-income households after the introduction of the mortgage measures in 2015. [Lydon and McCann \(2017\)](#) show that the tendency for higher-income households to account for the highest shares of mortgage originations has held over two decades in Ireland, and has been growing since 2009.

2 Conceptual Framework

For the purposes of this Note, the macroeconomic channels through which mortgage measures can influence the economy, whether as costs or benefits, are discussed in the same unit of measurement aimed at capturing overall household welfare. We use aggregate household consumption, a proxy for the living standards or well-being of all households, as the unit in which these costs and benefits can be measured. The expression of costs and benefits of these policies in the same unit has some particularly useful features, most notably that when measured in a common unit, costs and benefits of policy decisions can be weighed against each other.

Figure 1, borrowed from [Aikman \(2021\)](#), provides a stylised illustration of the costs and benefits of macroprudential mortgage measures. The blue solid line shows the path of aggregate consumption we might expect with no measures in place to limit household indebtedness. Consumption has a positive trend, but there are occasional debt-driven crises causing sharp and persistent declines in its level. The red dashed line shows the path of consumption with the measures in place. The benefits of these policies manifest themselves in crisis times: these downturns are less severe. Their costs manifest themselves in non-crisis times, where consumption is lower.

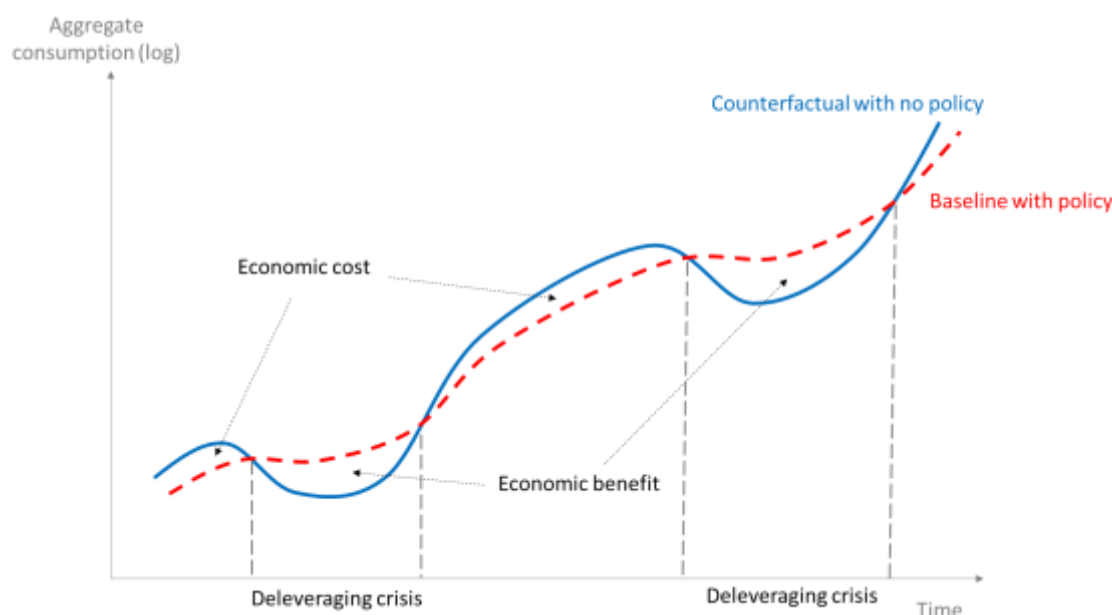
In our stylized depiction, the slope of the “no policy” blue line is shown to revert to pre-crisis trends. In practice, research suggests that in some cases financial crises can lead to scarring effects that mean that such reversion only happens over a very long time, if at all. [Bhattarai, Schwartzman and Yang \(2021\)](#), for example, show the deeper house price falls across US states were associated with protracted recoveries in employment and value-added that lasted until 2018. [Jorda, Schularick and Taylor \(2013\)](#) confirm this pattern of persistent output declines after financial recessions across countries. In thinking through the lens of our framework, the longer and more persistent are declines in aggregate consumption, the greater we would expect the benefits of macroprudential mortgage policies to be.

The net benefits of the policy are given by the expected present discounted value of aggregate consumption with the policy measures compared to the discounted consumption in a counterfactual absent of the policy measures. In Figure 1 this is the area between red dash line and blue solid line, appropriately discounted. In a framework such as this, the objective of a macroprudential policymaker is to set policy aiming to maximise the present discounted value of social welfare provided by the resulting consumption stream. If the net benefits across time, appropriately discounted, are negative, then society would be better served moving to a more loosely calibrated policy regime.

A central issue that faces macroprudential policymakers when thinking through the lens of a framework such as that of Figure 1 is the time horizon of costs and benefits. In a setting where a policymaker places a very high weighting on the short run (high discount rates), it is likely that the discounted value of costs will be relatively greater, motivating a looser policy calibration. In the opposite case, where relatively more weighting is given to outcomes far into the future (low discount rates), the benefits of tighter policy will weigh more heavily in the overall calculation, justifying tighter policy calibrations. The precise balance between the short and long-run when designing and calibrating macroprudential policy tools requires significant discretion on the part of the policymaker, rather than adherence to a single formal rule. A feature of the operational independence of authorities such as central banks is that policy levers within their remit are insulated from the risk of an excessive focus on short-run costs at the expense of long-run benefits.

One particularly relevant feature when considering discount rates in recent years has been the “lower for longer” interest rate environment in place in most developed economies. The prevalence of zero or negative interest rates currently, and the expectation of low interest rates far into the future, would suggest that, all other things equal, discount rates have fallen globally since the measures were introduced in 2015. This lowers short term costs relative to longer term benefits. In the following sections we discuss in detail the nature of the macroeconomic benefits and costs of macroprudential mortgage measures.

Figure 1: Stylised depiction of macroeconomic costs and benefits of macroprudential mortgage policy



3 System-wide benefits of mortgage measures

The primary macroeconomic benefit of macroprudential policy is in reducing build-ups of higher-risk mortgage debt. Macroprudential mortgage limits do this directly in the case of new mortgage lending issued subject to the policy, but there is also an indirect effect in dampening feedback loops that operate via rising house prices, easing borrowing capacity through collateral channels, and further increasing house price expectations.

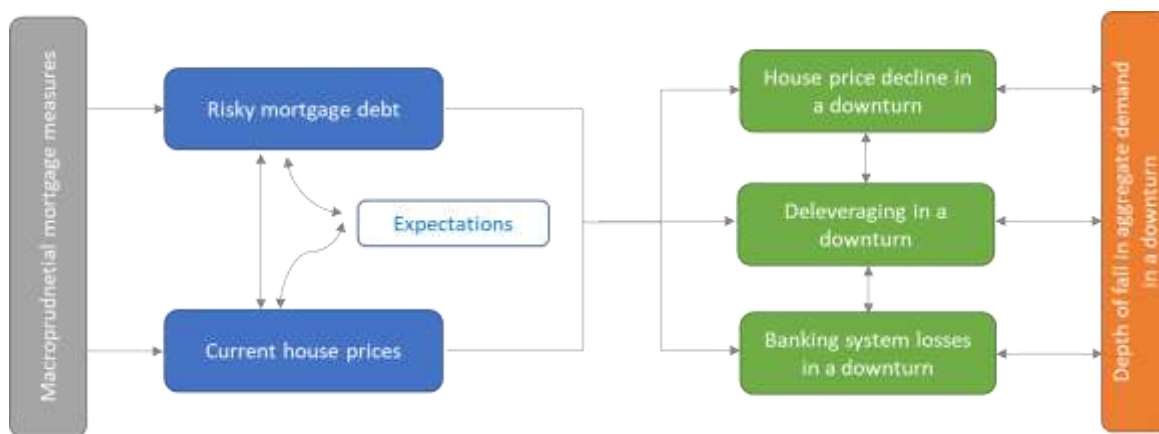
What is the benefit associated with the prevention of the build-up of risky mortgage debt? The ultimate aim is to reduce both the probability and the depth of associated economic contractions. A substantial research literature confirms that large build-ups in household debt are followed by particularly severe contractions and slow recoveries.

For example, [Mian, Sufi and Verner \(2017\)](#) highlight the link between household debt growth, flawed optimism in economic expectations, and subsequent weakness in output and employment, with an exacerbating effect among countries with fixed exchange rate regimes such as Ireland. [Jorda, Schularick and Taylor \(2015\)](#) highlight the important role played by build-ups in household leverage in explaining financial crises and subsequent deeper recessions. Looking within the USA, [Mian, Rao and Sufi \(2013\)](#) show a strong effect of declining household net worth on consumption across states. [Mian and Sufi \(2018\)](#) summarise many of these patterns under the term “the credit-driven household demand channel”.

The level of household debt impacts the transmission of other policy actions. [Alpanda and Zubairy \(2018\)](#) show that the effects of monetary policy in stimulating employment, output and the housing market are weaker during periods of high household debt, with a key role played by home equity as a source of borrowing. On fiscal policy, [Bernardini and Peersman \(2018\)](#) show that fiscal policy is more potent in stimulating demand across US states where there is a high degree of private indebtedness, suggesting that indebted households are likely to be particularly constrained and therefore more likely to respond to government spending stimulus. [Cloyne and Surico \(2017\)](#) observe a similar pattern within the UK, observing that consumption of households with a mortgage respond strongly to income tax changes, whereas those without a mortgage are irresponsive – again indicative of a role for household debt in constraining households’ spending capacity.

There are three “financial stability” channels via which macroprudential policy can achieve this (shown in the green boxes of Figure 2, again borrowed from [Aikman \(2021\)](#)). First, the measures reduce the likelihood and severity of deleveraging by borrowers with high marginal propensities to consume. Second, they reduce the likelihood of sharp house price declines, and the resulting impact of tightening borrowing constraints that may trigger further deleveraging, erode confidence, and constrain consumption. Third, they reduce the likelihood of large banking system losses that risk triggering a bank loan supply crunch and in the extreme, the need for resolution or restructure. We discuss each in turn.

Figure 2: transmission map of the macroeconomic benefits of macroprudential mortgage measures



Outside of these three channels relating to long-run financial stability, which are discussed in more detail below, there will be benefits to consumption among those accessing a mortgage in all periods after they purchase their home. These benefits arise because, relative to the no-policy counterfactual, mortgage borrowers allocate less of their income to the mortgage, and more to non-housing consumption, due to the limits in place and their knock-on effects on house prices.

Separately, measures which limit unsustainable borrowing and lending are also beneficial from a capital allocation perspective. Periods of financial excess are often associated with misallocation of capital and labour towards unproductive non-tradable sectors linked to the “boom” sector (often construction and real estate). Aside from the channels indicated above, which relate predominantly to the role played by financial excesses in increasing the risk of a harmful downturn, long-run productive capacity can also be harmed if incentives for workers and entrepreneurs are skewed away from participation and investment in sectors with long-term innovative and export potential. [Chakraborty, Goldstein and McKinlay \(2018\)](#) display this mechanism by showing that since the 1980s, banks have responded to profitable lending opportunities in real estate by skewing overall lending towards mortgages, at the expense of credit availability for corporate investment.

3.1 Debt-deleveraging

Our first hypothesis for a link between high household debt and subsequent weak consumption is that it reflects debt overhang dynamics, whereby borrowing constraints tighten in a downturn, forcing highly indebted households to cut spending to pay down debt – an effect that could be exacerbated by voluntary deleveraging by households for precautionary reasons. A related hypothesis is that highly indebted households are more sensitive to tightening credit conditions in

a downturn, reducing their cash flow and hence consumption.⁴ As we will come on to discuss, these arguments provide a rationale for macroprudential policies that limit household debt booms.

This debt deleveraging channel has been given rigorous conceptual foundations in recent years. [Eggerston and Krugman \(2012\)](#), for example, model the aggressive build-up in risky debt by borrowers, which following a “Minsky style” turning point in the financial cycle, requires a reduction in consumption as borrowers pay down their debts. At the zero lower bound, their model generates recessions as the central bank is unable to sufficiently reduce interest rates to stimulate over-indebted households to spend.

[Korinek and Simsek \(2016\)](#) explore the implications of this ‘aggregate demand externality’ for policy makers in the credit boom phase. Their idea is that households’ spending decisions that affect aggregate demand also affect the economy’s overall level of output produced and therefore other households’ income. Borrowers, even if they behave individually rationally, are unlikely to take these general equilibrium effects into account, leading them to take on excessive debt relative to the socially optimal level. This provides a rationale for macroprudential policies that limit build-ups of indebtedness.

Empirically, at the micro level, the evidence on whether individual households with higher levels of debt reduce spending by more during a downturn is mixed. [Dynan \(2012\)](#) offered seminal evidence on the role of “debt overhang” (a higher debt level, independent of changes in net worth) in harming consumption between 2007 and 2009 in the USA. [Fasianos and Lydon \(2021, forthcoming\)](#) analyse panel data from the UK and document that indebted households are significantly more sensitive to falls in their income, with the largest effects for households with heavier mortgage debt-service burdens. Locally in Ireland, [Le Blanc and Lydon \(2019\)](#) provide supportive evidence using pseudo-panel methods for the proposition that debt overhang, through higher LTVs, leads to weaker consumption growth, and in particular makes consumption more responsive to negative income shocks.

However, a number of research papers have since argued that the empirical correlation between high debt levels and subsequent weakness in consumption could be explained by over-optimism during the upswing, followed by a correction during the downturn that represents a return to normal ([Andersen, Duus, and Jensen, 2016](#)), [Svensson \(2019a\)](#), [Svensson \(2019b\)](#). Recent work on UK data suggests that there is likely merit in both a debt overhang *and* a spending normalization story, with both growth rates and levels of LTV pre-2007 associated with weaker spending in 2008-09 ([Bunn and Rostom, 2021](#))

Regardless of the uncertainty around micro-estimates of household responses to debt overhang, at the aggregate level, the fact that deeper recessions follow, causally, greater build-ups in household debt appears to have consensus, as outlined at the beginning of this section. This provides an important motivating rationale for macroprudential mortgage policies: even in the presence of debate and uncertainty around the direct role at the individual borrower level, their benefits can be said to arise through the protection of all citizens via the taming of housing-credit cycles and the reduction in both the likelihood and severity of harmful financial recessions. Sections 3.2 and 3.3 deal directly with the house price and banking sector channels that support this view.

3.2 House price declines

A key channel through which macroprudential mortgage measures influence the financial cycle is through their effect on house prices. During an upswing, in the absence of macroprudential

⁴ As pointed out by [Svensson \(2021\)](#), for an economy with independent monetary policy and significant headroom above the effective lower bound, this cash flow effect is a double-edged sword as it also implies a stronger transmission from cuts in interest rates. But for a small open economy with a fixed exchange, these monetary transmission benefits are not available unless policy rates are being cut in the anchor country.

regulation, the pro-cyclical relationship between credit and house prices emerges through both the supply of, and demand for credit: as looser credit leads to higher house prices, so collateral constraints are loosened among those with housing equity, which begets further borrowing either for additional house purchase, or for other consumption. These “financial accelerator” dynamics have a long history in macroeconomic models (see, for example, [Bernanke and Gertler, \(1999\)](#) and [Iacoviello, \(2005\)](#)). Critically from our perspective, over-valuations in housing prices resulting from such accelerator effects are likely to increase the probability and the severity of financial recessions ([Richter, Schularick and Wachtel, 2021](#)).

Once an inflection point has been reached and house prices begin to decline, the existence of high household debt levels becomes an amplifier of the downturn. High debt levels, combined with over-valued housing, lead to widespread increases in the prevalence of negative equity among households. Once this condition has been met, borrowing constraints tighten dramatically in the economy, with housing market activity severely curtailed, and home equity unavailable to facilitate borrowing for consumption purposes. It must be noted that these consumption reductions are more likely for durable goods that are more likely to be financed procyclically with home equity borrowing ([Berger and Vavra, 2015](#)), rather than items such as food and services associated with day-to-day expenditure. All of these channels transmit beyond the group of over-indebted borrowers as general equilibrium effects kick in, with lower demand from one group affecting demand throughout the economy. A particularly prominent example is the Irish construction sector, the collapse of which from 2008 onwards affected local demand in a wide range of ancillary services.

This strengthens further the rationale for macroprudential policies that limit build-ups in risky mortgage debt ex ante. Such policies tighten borrowing limits directly and have the indirect benefit of mitigating the pro-cyclical feedback loop between house prices and debt capacity described above. LTI limits are particularly effective in this regard given that borrowing capacity is tied to borrowers’ income, which tends to be relatively stable over the cycle. LTV limits are less effective in constraining borrowing among those already with housing equity in an environment of rising house prices unless the calibrated limit is tightened in such periods; however LTV limits do increase the “time to save” among renters looking to enter the First Time Buyer market through increases in downpayment requirements owing to price rises.

3.3 Banking system losses

One relevant consideration in predicting the magnitude of debt-deleveraging effects on consumption in downturns is the propensity of households to default on their mortgages during periods of economic stress. In economies where legal or institutional forces mean that default is rare, the effect of a downturn is likely to be felt predominantly through consumption reductions. However, when shocks are large or where the propensity to default is higher, we may see adverse shocks manifest themselves more quickly in terms of mortgage defaults. This may alleviate the direct debt deleveraging channel among households opting to default rather than curtail consumption, by transferring more of the risk directly to mortgage lenders.

Given the large direct exposure of the banking system to the housing market, the impact of a wave of mortgage defaults on banks’ equity capital and hence loan supply can be significant. Moreover, banking sector resilience issues can spill over into fiscal crises, which themselves can amplify recessions, most obviously evidenced by the experience of economies such as Ireland, Spain, Greece and Cyprus during the European crisis following 2008. Despite progress globally in the resolution of banks and attempts to mitigate “Too Big to Fail” issues, the potential for bank capital adequacy concerns to trigger the need for bailouts and associated fiscal retrenchment is a potentially large cost of a household debt-driven boom-bust cycle. Such effects are especially

relevant in the Irish case where the government remains an equity shareholder in retail banks as a legacy of the 2008 crisis.

Macroprudential debt limits can limit macroeconomic damage through the banking sector via three channels. First, it is well known that the default probability (PD) for a mortgage is influenced by a range of borrower and loan characteristics, including current LTV, LTI, and debt service burden, and these values at the origination of the loan.⁵ These are factors that are directly influenced by macroprudential debt limits. Second, macroprudential policy can influence the loss given default (LGD) by ensuring that mortgages are better collateralised, i.e., have lower LTV at origination. And third, there is an indirect macroeconomic channel: if these policies, as one would expect based on Sections 3.1 and 3.2, mitigate debt deleveraging, economic downturns should be less severe, the volatility in house prices should be lower, improving stressed PDs and LGDs further.

There is substantial empirical evidence on these links, including for the Irish experience. [Kelly and O'Malley \(2016\)](#) find that, in addition to macroeconomic factors, the current LTV and debt service ratio are significant drivers of the transition to default for Irish mortgages. [McCarthy \(2014\)](#) confirms that both income shocks and current LTVs, explain mortgage arrears in a 2012 survey. [Kelly et al. \(2015\)](#) present evidence that higher levels of LTV and LTI at origination are associated with subsequently higher default probabilities for Irish households. [McCann and Ryan \(2016\)](#) find that, for a given distribution of house price shocks, the reduction in LTV at origination generated by these policies has reduced the severity of losses on Irish mortgages in the event of default.

Finally, it is worth noting that the resilience benefits of lower PDs and LGDs in banks' mortgage portfolios will over time feed through into lower required capital for banks using model-determined risk weights. The extent to which this happens will depend on the relationships embedded in banks' internal ratings models, but in principle, the lower RWA density coming from these improvements in credit quality will mean that there will be less loss-absorbing capital within the banking system, implying a partial offset of the resilience benefits associated with lower PD and LGD for mortgage borrowers.

3.4 Features specific to Ireland

The channels outlined in Sections 3.1 to 3.3 are general in nature, and apply to all economies. In this section, we highlight specific features of the Irish economy that may make certain channels all the more relevant or virulent in the Irish setting.

When looking at models that explain financial recessions resulting from unsustainable build-ups in household indebtedness and the zero lower bound, the dynamics illustrated are likely to be accentuated in the case of an economy operating in monetary union, such as Ireland as a small member of the euro area. Highly indebted households living in a small economy within a monetary union would need to reduce their outstanding debt by more than in a flexible exchange rate regime because there is less capacity for the central bank to use its monetary policy to ease financial conditions and borrowing constraints, particularly if the small economy is out of sync with the financial cycle of the union. The impact on aggregate demand will also be greater because the central bank cannot use its monetary policy to stimulate consumption of savers.⁶

Added to this, the process of "internal devaluation", whereby an economy in a monetary union attempts to restore competitiveness by cutting production costs, can amplify economic costs significantly. This is particularly true when fiscal retrenchment is part of the policy response, as illustrated by the large size of [fiscal multipliers](#) estimated for "peripheral" economies during the European sovereign debt crisis.

⁵ Campbell and Cocco (2015) present a model of households' mortgage default decision which emphasises the role of LTV in determining the likelihood of negative equity and LTI and debt service ratios as determining loan affordability.

⁶ See Fornaro (2018) for a model of debt deleveraging in a currency union.

This latter channel, whereby fiscal retrenchment may be required during a debt-led financial recession, will be particularly strong in countries that enter a recession with a high debt-to-GDP ratio, which raises the likelihood of a relative increase in sovereign borrowing costs. Ireland in 2021 remains one of the economies with the highest debt-to-output ratios (measured using GNI*) in the European Union, and has a number of fiscal vulnerabilities relating to an increased reliance on corporation tax for ever-increasing shares of total tax in recent years.⁷

An additional channel is at play in cases where the government is a shareholder in the domestic banking system. In such cases, the sovereign-banking nexus presents an additional source of risk during a financial downturn, as banking sector losses will spill more directly over to the national balance sheet through valuation effects, reducing “fiscal space” to respond to the recession with stimulus. Ireland, in 2021, retains more than 70 per cent shareholding in two of the three major domestic retail banks, and is on a path to reducing a 15 per cent shareholding in the third, highlighting the relevance of protracted recession were there to be an excessive build-up of risky debt in the future.

Fourthly, the weight of evidence suggests that in Ireland, households facing financial distress are more likely to default for a given income shock than in many other countries. While to a large extent high default rates can be explained by the depth of the crisis experienced in Irish housing and mortgage markets after 2008, there are institutional features that may have led to higher default rates. [Donnery et al. \(2018\)](#) provide a comprehensive overview of the response to NPL resolution in Ireland after 2008, highlighting the importance to the policy response of the retention of homeownership, the protection of distressed borrowers and focus on mortgage modification, and slow progress through the courts system in cases where repossession is pursued. [O'Malley \(2021\)](#) provides well-identified evidence of additional defaults during a period of borrower protection owing to frictions in the court system after 2011. Strikingly, given the speed of recovery in the years preceding the pandemic in Ireland, the issue of “long-term mortgage arrears” remains a key policy priority in 2021 for the Central Bank of Ireland ([Sibley, 2021](#)), highlighting challenges relating to the continued existence of arrears cases a decade after the crisis first emerged.

Finally, as a small open economy, Ireland is, all else equal, likely to be more prone to tail risk resulting from shifts in global financial conditions.⁸ This structurally higher level of volatility may mean that the benefits of prudential policies are greater, given the relatively higher probability and severity of crises due to these external forces.

4 Macroeconomic costs of mortgage measures

Macroprudential policies, when limiting effective mortgage demand, will have an effect on the housing market. Whether this effect primarily operates through lowering of prices relative to rents, or through changes in the homeownership rate, will depend on the degree of segmentation between the rental and owner-purchaser parts of the housing market (see [Aikman \(2021\)](#) and [Greenwald and Guren \(2020\)](#) for further insight). Where the rental market and owner market are highly segregated, it is more likely that house prices will fall relative to rents; on the other hand, with a highly integrated housing market, it is more likely that would-be first-time-buyers (FTB) are displaced by unconstrained investors once credit limits are applied, lowering the homeownership rate.

Where there are effects of macroprudential policies on the housing market, there are likely to be knock-on economic effects through the restriction of a range of accelerator channels (collateral channels, wealth effects, expectations, general equilibrium knock-on effects from the construction

⁷ This trend has been highlighted, for example, in multiple iterations in recent years of the Central Bank of Ireland's *Financial Stability Review*, Sovereign Resilience section.

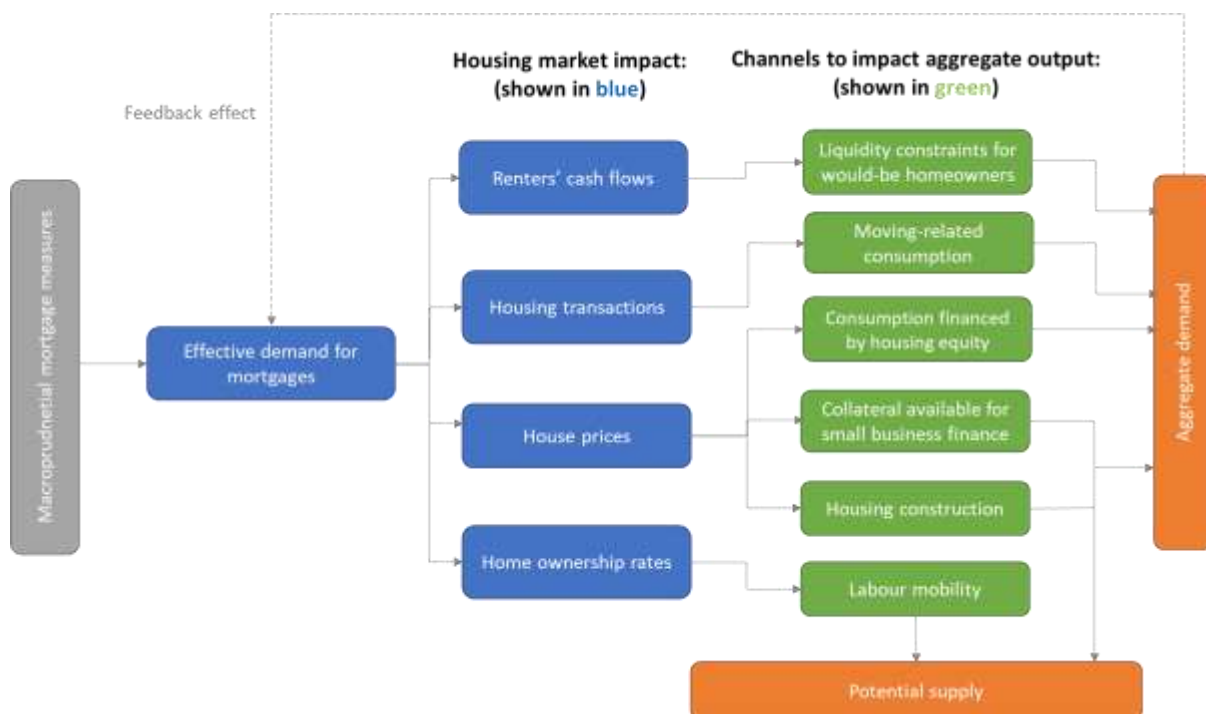
⁸ See for example Box 1 in the Central Bank of Ireland *Financial Stability Review 2020:1*, which shows that GDP tail risk is greater for countries with less flexible exchange rate arrangements, high household debt levels, and high foreign currency exposures.

sector, consumption of white goods) that are discussed in Section 3. While these may, in the long run, represent benefits of policies through their mitigation of the risk of cyclical crises, they can also be said to represent short-run costs to the economy.

In Figure 3, we depict the range of channels through which these housing market effects may operate. We discuss each in turn below.

Overall, the strength of these channels, where either rents or house prices (or both) are implicated, is likely to be determined by (a) the existing wedge between the user cost of housing and rental prices, (b) the response of rental prices and house prices to macroprudential policy, (c) the gap between marginal propensities to consume by those living in rental accommodation and investors/ landlords, and (d) the proportion of foreign investors/landlords in the market.

Figure 3: the costs of borrower-based measures: macroeconomic channels



4.1 Liquidity constraints for would-be homeowners

The first channel we consider derives from the impact of macroprudential policies on would-be homeowners, i.e., the marginal prospective buyers who are unable to access mortgage credit and are forced to remain in the rental sector. It is important to acknowledge that, even in the absence of macroprudential policies, many households would typically be unable to access a mortgage based on banks' own underwriting criteria. The focus here should be seen as being on those that are additionally constrained or delayed in accessing the mortgage market due to the nature of mortgage measures. Evidence on the size of the potential effects outlined here is difficult to identify due to the range of confounding forces that have been operation globally since macroprudential policies have become more common. Examples include weak housing supply, wage growth that is below house price growth, and demographic factors and preferences that may skew demand towards the rental market.

The first channel stems from deposit requirements: when an LTI or LTV limit is put in place, many borrowers will likely require an increase in savings rates to fund a housing deposit, which will come in many cases at the expense of consumption.

Separately, an additional cash flow hit may arise where rents happen to be higher than mortgage payments on similar properties, as is the case in Ireland and many countries currently, given the low level of interest rates. Economic models of housing typically assume that in long-run equilibrium, the “user cost” of mortgaged housing equates to the rental level. However, in practice there are frictions to this equalisation which may be amplified by macroprudential debt limits.

In circumstances such as those in Ireland currently, where a lack of supply has led to unprecedented growth in rental prices, the cash flow impact of macroprudential debt limits is likely to be material, as would-be homeowners unable to access the owner-occupier market take a direct cash flow hit through paying rent prices that are higher than mortgage payments. The impact of macroprudential mortgage policy on consumption is likely to be compounded if, in addition, there is any causal effect of the borrowing limits on rental prices themselves (which even if in operation, are likely to be temporary as the housing market adjusts to changing owner-renter composition).

The macroeconomic impact on consumption of any cash flow tightening in the rental sector will partly be offset by higher rental income for landlords and investors. However there are two reasons why the overall impact on aggregate demand is likely to be negative. First, households living in rental accommodation are likely to have higher marginal propensities to consume out of income than landlords and investors.⁹ Second, to the extent that some of the higher rental income flows to foreign investors investing via Real Estate Investment Trusts and overseas landlords purchasing property outright, there is a leakage from domestic demand.

Empirical evidence on the liquidity and savings effects of borrower-based measures is relatively sparse. [Juelsrud et al. \(2020\)](#) show that savings balances in Norway fall by 9 per cent after an LTV tightening, implying that funds previously available for either consumption or as liquidity buffers are absorbed into the housing market through the downpayment requirement. Locally, survey evidence in Ireland suggests that these short-term liquidity effects do exist; [O’Toole, McQuinn and Economides \(2018\)](#) show that renters looking to purchase a home were most likely to increase savings rates in the years following the introduction of the Central Bank’s mortgage measures. At a macroeconomic level, using a difference in difference methodology, [Teixeira and Venter \(2021\)](#) show that countries that have introduced macroprudential policies since 2000 have had the greatest increases in savings rates. The authors interpret these findings through the aforementioned savings requirement channel.

4.2 Moving-related consumption

The second channel we consider derives from the fact that some portion of consumer spending is likely to be complementary to housing market activity. This includes expenditures tied to transactions such as moving expenses and spending often associated with house purchases such as furniture, appliances, and other durables. The presence of

⁹ [McCann and Lydon \(2017\)](#) show that Buy to Let mortgagors typically come from the top of the income distribution in Ireland.

such complementarity is one factor that might explain lumpy adjustment in the stock of durables at the microeconomic level. This suggests macroprudential policy might exert a contractionary effect on consumption to the extent these measures reduce overall transactions in the housing market.¹⁰ The effect would likely be temporary, reallocating spending on durables to future periods, although there is uncertainty over the precise path for homeownership and housing transactions depending on the calibration of macroprudential policy and other policy factors relating to housing supply.¹¹ Finally, the volatility of consumption is worth considering: while it may appear costly for macroprudential mortgage policies to lead to a reduction in this category of consumption in the short run, limitations on these particularly volatile forms of activity likely have long-term benefits beyond those discussed in Section 3, for example from a resource allocation perspective.

4.3 Consumption financed by housing equity withdrawal

A third channel linking macroprudential mortgage measures to overall household consumption and aggregate demand operates via Housing Equity Withdrawal (HEW).¹² This measures the equity released by households through mortgages to provide a source of funds available for consumption spending or investing in other assets. It is the difference between mortgage transactions and investment in new housing assets.

The channel operates via the impact of macroprudential policy on house prices and hence existing homeowners' housing equity. It rests on there being credit-constrained homeowners who wish to borrow more today to smooth their consumption. To the extent that these households can borrow more cheaply out of their housing equity than from other sources, then their consumption may be depressed by macroprudential policies. Similar reasoning suggests housing improvements/investment may also be affected by these policies, for example where borrowers may wish to borrow against home equity to finance environmental improvements to their homes. This effect is likely to be larger for households with lower credit scores and higher levels of existing unsecured debt. Theory suggests the effect should be temporary, with reduced HEW leading to tighter credit conditions, tilting the optimal consumption path towards lower present consumption but higher future consumption.

Mian and Sufi (2011), Mian, Rao and Sufi (2013) and Mian and Sufi (2014) emphasise the importance of this channel for explaining the significant rise in household leverage in the United States in the pre-Global Financial Crisis period. They find evidence that home equity-based borrowing was not used for purchasing additional real estate or financial assets, nor was it used for paying down credit card debt, suggesting that the proceeds were used to fund consumption or home-improvement.

[Clancy et al. \(2014\)](#) study the importance of this channel, amongst others, for explaining Irish households' consumption and find mixed results. They estimate a marginal propensity

¹⁰ If instead the fall in transactions by owner-occupiers is offset by an increase in transactions – and hence consumer durables expenditure – by buy-to-let investors, then this channel would be blunted.

¹¹ This is likely to be the case even if macroprudential mortgage debt limits exert a persistent effect on housing transactions. Given individual households' lifetime budget constraints, lifetime expenditure on consumer durables is likely to be unaffected. This channel instead operates via the timing of such expenditure.

¹² The role of housing equity withdrawal in financing consumption is emphasised in credit channel models of the household sector (e.g., Iacoviello, 2005 and Aoki et al., 2004). These models have highlighted the potential for swings in housing collateral values to amplify the effects of fundamental shocks.

to consume out of housing equity of 0.075 for homeowners with no dependent children (and even higher for durables only), but a value that is insignificantly different from zero for those with dependent children.

4.4 Collateral available for small business finance

One such channel operates via house prices and housing collateral, which in addition to affecting consumer demand, also influences the borrowing capacity of small firms. It is well known that small firms often face difficulties accessing external finance because of informational asymmetries that limit their borrowing capacity (see e.g., Beck et al. (2006)). Through this channel, changes in house prices brought about by macroprudential mortgage debt limits can influence investment spending and employment decisions of small firms, with company directors of such firms using their residential property as security for business loans.

This channel would be expected to be larger (a) the greater the impact of macroprudential policy on house prices, (b) the larger the financing frictions suffered by small businesses, and (c) the greater the proportion of investment and employment accounted for by such businesses.

A recent empirical literature has studied this channel, finding generally modest effects. [Adelino et al. \(2015\)](#) examine the US housing price boom prior to the Global Financial Crisis and find that areas with rising house prices experienced an increase in small business start-ups and a rise in the number of people employed in establishments with fewer than ten employees compared to areas where house prices did not increase. They find that a 1% increase in house prices translates into a 0.19% increase in employment at these firms. These effects are not present for larger existing companies. [Bahaj et al. \(2016\)](#) estimate that a 1% increase in house prices leads to a 0.13% increase in UK business investment. [Banerjee and Blickle \(2016\)](#) find a similarly limited impact for small French, Spanish, Italian and UK firms.

4.5 Housing construction

Along a given housing supply curve, without a change in the elasticity of supply, macroprudential policy may lead to less housing construction output through its dampening effect on price growth and expectations. Such a reduction in housing construction directly reduces aggregate output, with a “Keynesian cross” multiplier effect for consumer spending and business investment. Over time, this response of the supply of housing would be expected to dampen any impact of macroprudential policy on house prices.

The relationship between housing construction and the economy’s potential output is complex. If housing is scarce and there is a sustainable demand for the new houses that would have been constructed absent the borrowing limits, then the productive capacity of the economy might be harmed by macroprudential policy. However, if macroprudential policies limit unsustainable construction booms – booms that result in an overhang of houses for which there is little demand, as was the case in Ireland, the US and Spain following the Global Financial Crisis – then the economy’s supply potential will be enhanced over the long term, by helping to avoid a misallocation of resources (see Turner (2014) for an articulation of this argument). [Hsieh and Moretti \(2019\)](#) highlight the wider

economic importance of frictions that restrict housing supply from meeting demand: using building restrictions in US cities, they show that such construction misallocation has lowered US growth by 36 per cent since the 1960s.

Principally, demand for housing is driven by demographics and societal changes to household size and composition. Therefore, in cases where macroprudential measures restrict access to the mortgage market, demand for rental units would increase. The substitutability of the rental and owner occupier housing stock may provide a friction but in the longer run, the relative size of mortgaged and rental demand should influence the composition of housing supply.

The strength of the channel depends on (a) the impact of macroprudential policy on house prices (b) the price elasticity of housing construction, and (c) whether there was sustainable demand for the new houses that would have been constructed absent the policy.

Finally, it is important to recognise that there are many other policy levers that governments can use to influence housing construction including through the planning levies, building regulations and the tax system. The economy is likely better served by a policy mix that stimulates additional housing supply through reductions in construction costs, rather than through increased price levels resulting from higher borrower indebtedness.

Figure 4 summarises the range of channels, and the directional effect expected by economic theory, from a tightening of borrower-based macroprudential policies.

Figure 4: Summary of the impact of a tightening of macroprudential mortgage debt limits on aggregate demand and potential output

Channel	Impact on aggregate demand	Impact on potential supply	Increasing in:
Consumption by would-be homeowners forced to remain in expensive rental sector	Negative	None	Impact on homeownership rates
“Moving-related” consumption	Negative (Likely to be small)	None	Impact on housing transactions
Consumption financed by Housing Equity Withdrawal	Negative	None	Impact on house prices
Small business investment financed by Housing Equity Withdrawal	Negative	Negative (Likely to be small)	Impact on house prices
Housing construction	Negative	Negative or Positive	Impact on house prices

5. Concluding Remarks

This Note set out the conceptual macroeconomic channels through which macroprudential borrower based mortgage measures can both benefit and impose costs on the economy. Further, it considers how features specific to Ireland may amplify or dampen each of the channels.

The Central Bank of Ireland's mortgage measures currently have two objectives; to improve bank and borrower resilience to adverse shocks, and to limit the risk of a damaging pro-cyclical spiral between credit and house prices emerging. These objectives are consistent with the framework of this Note in that they are “benefits” of the measures, with both objectives relating to improvements in financial stability outcomes.

On borrower resilience to adverse shocks, this objective is clearly consistent with the macroeconomic framework described here, given that higher LTV or LTI, at the individual level, can drive higher deleveraging and weaker consumption in a downturn. Similarly, higher debt implies a higher chance of negative equity when house prices fall, which can reduce the scope for refinancing, equity withdrawal, and mover-purchasing, all of which have knock-on implications for consumption and can have negative knock-on “multiplier” effects throughout the economy.

The promotion of bank resilience also nests within the wider macroeconomic framework, given that less resilient banks are prone to both creating and becoming amplifiers of an adverse shock, leading to weaker economic outcomes through credit supply channels. Further, bank shareholders (including the State in Ireland), will suffer when less resilient banks struggle during a credit-led downturn.

The Central Bank's current second objective, to mitigate the risks arising from credit-housing spirals, has a central importance within our proposed framework. These spirals increase the probability of financial recessions occurring, and the severity when they do occur. When these downturns follow credit-led booms, it is likely that all households, regardless of their mortgage status, will suffer through negative equity effects, bank credit supply shocks, and wider general equilibrium effects associated with weaker household and bank balance sheets. All of these channels, along with potential for a weakened capacity for the State to support demand, suggest that the limitation of pro-cyclicality between housing and mortgage finance can have important long-run benefits for aggregate consumption and economic activity.

The Central Bank of Ireland is currently conducting a framework review of its mortgage measures. This review will go beyond the question of whether the mortgage measures are meeting their stated objectives, which forms the core of every annual review carried out since the policy was introduced. Rather, the framework review will assess whether the overall policy framework remains fit for purpose, not just now, but into the future. This includes consideration of deepening the toolkit for joint assessment of both costs and benefits associated with macroprudential mortgage policies, in line with the channels outlined in this Note.

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