

Riding with Stabilisers: Ireland's Macroprudential Policy

Conor Murphy, Senior Sophister

Philip Pollock, Senior Sophister

Despite the recovery in property prices over the past decade, it is very difficult to forget the monumental crash in the Irish property market in 2007 and the subsequent banking crisis. The bursting of the property bubble wrought economic and social havoc upon Ireland, and naturally, the Central Bank of Ireland have recently implemented policy seeking to avoid a repetition of this catastrophe. Conor Murphy and Philip Pollock investigate the efficacy of the “Mortgage Measures” introduced by the Central Bank, using dynamic panel-data regression techniques to determine whether or not these measures have successfully prevented or contained another Irish property bubble. The mortgage measures have been subject to quite considerable criticism from the general populace given that they are perceived to be pricing many first-time buyers out of the market, but is this the only way to escape the boom and bust cycle of the property market? The authors suggest that, when complemented by an increase in the supply of housing, the mortgage measures can be successful in reining in property prices and ensuring economic stability.

Abstract

The Irish housing market has been a turbulent issue for a number of years. Recent policy has attempted to constrain the unsustainable demand for housing witnessed during the Celtic Tiger Era, seeking to avoid another housing bubble and crash as was seen in 2007-2008. Our paper tests the efficacy of this policy, in the face of increasing political scrutiny,

and discusses the implications of these results for policymakers.

I. Introduction

Two issues loomed large in Ireland's recent general election: health and housing. This paper deals with the latter, bearing a perspective towards the Central Bank of Ireland's recent macroprudential policy - the Mortgage Measures. The paper will be structured in two parts. Initially we will seek to find evidence of a relationship between the Mortgage Measures & House Prices using dynamic panel-data regression techniques. Our findings will then be applied to the current housing market, in the interest of identifying the potential containment of a housing bubble in recent years.

What are the Mortgage Measures?

The mortgage measures were introduced by the Central Bank of Ireland (CBI) in 2015. They are a form of macroprudential policy, that is, regulation aimed at mitigating risk to the financial sector as a whole. Specifically, the mortgage measures aim to prevent the build-up of excess leverage in the mortgage market and improve the resilience of the economy in the long run. The mortgage measures require that first-time buyers (FTBs) possess a 10% deposit on their mortgage (Loan-to-value ratio [LTV]) and that they cannot borrow for an amount which exceeds their gross income by three and a half times (Loan-to-income ratio [LTI]) (CBI, 2019).

Following the Global Financial Crisis, macroprudential policy has become a common feature of the policymaker's toolkit. The crisis revealed that reckless lending had led to an unsustainable build-up of credit in the financial system. In Ireland, the excessive build-up of credit was particularly prevalent in the housing market - as such, when the bubble burst, it brought the whole economy to its knees (Lyons, 2013).

Same Background, Different Story?

Interestingly, the economic environment of Ireland today is quite similar to the climate that spurred the housing bubble. Interest rates are low, and look set to persist at the present rate. The economy is performing well, as evidenced by near-potential employment rates (RTE, 2019). While immigration may not be as pronounced as it was in the early 2000s, the supply of housing is much tighter, particularly across Dublin. These

conditions have caused an upsurge in prices over the last few years, a phenomenon well-documented by the media, with the country declared to be in the grips of a housing crisis.

Drawing from the Financial Crash & bursting bubble, the measures appear to have been a sensible policy response. However, there has been strong socio-political backlash to these measures, with former Taoiseach, Leo Varadkar taking the unusual step of criticising the CBI directly over this policy (Kelly & Leahy, 2019). The mortgage measures' stringent requirements have made it more difficult to obtain the credit necessary to acquire a house, particularly as house prices show little sign of decline. Therefore, the measures have had the effect of crowding some buyers out of the market, coming under criticism as a result.

This paper presents evidence that the mortgage measures have placed a cap on house prices, underlying the importance of the credit channel in determining Irish house prices. While we cannot conclusively say that the measures have contained a house price bubble, we can say that they are achieving their stated aims; preventing the excessive build-up of credit in the Irish housing market and improving the resilience of the wider economy as a result. These aims are surely in the interest of the wider public in the long run, despite causing some short-term pain. They give credence to the notion of Central Bank independence, particularly given the political pressures these policies have come under due to their short-run consequences.

The rest of the paper is structured as follows: Section 2 provides a description of the dataset, outlining the basis for selected control variables in the construction of our regression model. Section 3 investigates the influence that the mortgage measures have had over house prices and sets out the empirical approach taken to determine if a bubble was/is present in the Irish housing market. Section 4 concludes by breaking our findings down to a context applicable to policymakers.

II. Description of dataset

As the mortgage measures were introduced in early 2015, our dataset suffers from a limited timescale. Data was collected across 11 regions on a quarterly basis between 2010 and mid-2019. This captured the drop in house prices at the start of the decade before their resurgence preceding 2013, a common trend as depicted in figure 1.

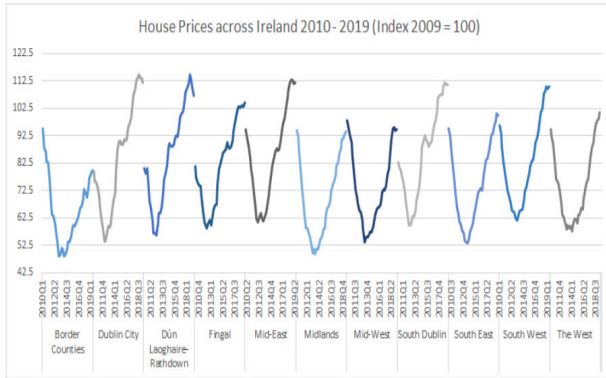


Figure 1

Interestingly, one can note an apparent slump in the growth of house prices almost simultaneous to the introduction of the mortgage measures, a trend more apparent when examining the rate of change depicted in *Figure 2*.

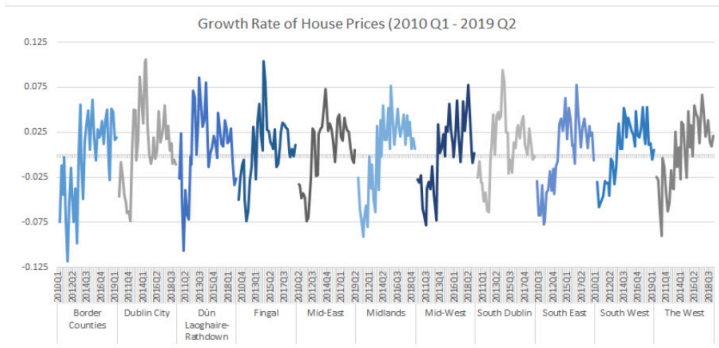


Figure 2

The initial volatility appears to level off as we see a slowdown in the growth of house prices, suggesting a positive influence of the mortgage measures - a relationship we seek to better understand within the scope of this paper.

Controlling for other variables that affect house prices, Mangan

(2019) provides useful proxies for the determinants of housing supply: items like construction costs, house registrations and the number of planning permissions granted. Drawing from Lyons (2014), local authority permissions granted for dwellings acts as a proxy for construction regulation, assuming that an increased cost for construction reduces the number of applications for planning permission.

Given the scope of this paper, the other control proxies were limited to primary macroeconomic factors such as net migration, population size, the interest rate and the unemployment rate. Sibley (2018) outlines that increases in the population play a fundamental role in elevating demand. The Irish Independent (2018) claims the average age for home buyers has increased in recent years, with FTBs on average being 34 years old whilst Second & Subsequent Buyers (SSBs) are now likely to be 41 years old on average - prompting a closer examination of the impact 25-44 year olds have in determining house prices, either through migration or their overall proportion in the population.

<i>Variable</i>	<i>Key</i>	<i>Obs</i>	<i>Mean</i>	<i>Std. Dev.</i>	<i>Min.</i>	<i>Max</i>	<i>Source</i>
Region Code	RCODE	418	6	3.166	1	11	
Time per Year & Quarter	TIME_YQ	418	218.5	10.979	200	237	
Log of House Prices	lnPRICE	418	4.337	0.219	3.884	4.744	CSO
Log of Rental Incomes	lnRENT	418	4.475	0.152	4.277	4.828	RTB & ESRI
FTBs Loan-to-Income Ratio	FTLI	418	4.068	0.414	3.7	4.9	CBI
Log of FTBs Loan-to-Value Ratio	lnFTLTV	418	4.511	0.109	4.5	4.522	
SSBs Loan-to-Income Ratio	SSLI	418	3.437	0.16	3.2	3.8	CBI
Log of SSBs Loan-to-Value Ratio	lnSSLTV	418	4.464	0.04	4.396	4.5	
Net Migration	NMIG	418	-1.595	22.932	-27.5	34	CSO
Net Migration for 25-44 year olds	MYA	418	0.726	12.192	-17.7	20	CSO
Log of Population	lnPOP	418	8.452	0.023	8.424	8.0501	CSO
Log of Population of 25-44 year olds	lnYPOP	418	7.255	0.014	7.241	7.278	CSO
Unemployment Rate	UNEMR	418	11.009	3.762	5.067	15.967	CSO
Log of Construction Costs	lnCCOST	418	5.334	0.0145	5.304	5.352	CSO
Log of Housing Registrations	lnREG	418	6.547	1.024	4.828	8.006	CSO
Interest Rate	INTR	418	-0.105	0.304	-0.4	0.75	ECB
Log of Planning Permissions Granted	lnPERM	418	7.099	0.275	6.621	7.508	CSO

Figure 3 - Summary Statistics

Inclusion of the unemployment rate serves as a simple proxy for Irish economic performance, a method proposed by Roche (2003). Interest rates are controlled for given their well-defined influence over money supply within the mortgage market. Similarly, pathologists of the Financial Crisis often cite inappropriate interest rates across the periph-

ery of the Eurozone as a leading factor for preceding financial instability (Seyfried, 2010). Lastly, data for housing rents is collected for use in determining if the mortgage measures contained the formation of a more recent housing bubble in Ireland.

Summary statistics for the included variables are depicted in Figure 3, outlining data sources such as the Central Statistics Office, the European Central Bank, the Central Bank of Ireland and lastly the Residential Tenancies Board and the Economic & Social Research Institute.

III. Empirical approach

As mentioned, this paper employs a two-step investigation, first seeking to establish the relationship between mortgage measures and house prices before investigating for the presence of a housing bubble within the dataset.

Establishing the Model

The regression equation (1) is constructed incorporating a cross-sectional component across our studied regions and a time-series process between 2010 and 2019. Variables are selected on the basis of correlation, in an attempt to avoid multicollinearity in the model, while lagged dependent variables are proposed to control for omitted variable bias.

$$\ln\text{PRICE}_{it} = \beta_0 + \beta_1 \ln\text{FTLTV}_{it} + \beta_2 \text{SSLTI}_{it} + \beta_3 \ln\text{RENT}_{it} + \beta_4 \ln\text{PRICE}_{it-1} + \beta_5 \ln\text{PRICE}_{it-2} + \beta_6 \text{NMIG}_{it} + \beta_7 \text{UNEMR}_{it} + \beta_8 \text{INTR}_{it} + \varepsilon_{it} \quad (1)$$

Empirical Approach

This paper follows three different regression techniques in pursuit of identifying a relationship between our variables of interest, beginning with a fixed-effects panel data estimation. This method intends to correct for the presence of unobserved or misspecified regional-specific effects within the sample data.

Building from this, concerns exist around the model's vulnerability to autocorrelation & heteroscedasticity, prompting the use of a Generalized Least Squares (GLS) model. While neither autocorrelation nor heteroscedasticity violate the point estimates of our regression coefficients, they bias the error terms for our figures, rendering hypothesis

testing or other means of statistical inference as void. GLS widens the range of our error terms in an attempt to better account for these possible deficiencies.

Finally, the simplicity of our model spikes fears of the presence of endogeneity - a phenomenon characterised by a correlation of the independent variables to the error, resulting in a violation of the Gauss-Markov assumptions and bias of the point estimates. The Arellano-Bond generalized method of moments estimation (GMM) is conducted as it better accounts for the dynamism of the dataset (Baum, 2013). The GMM approach is widely adopted in practise as it better draws from the information of the model, offsetting the need for an instrumental variable approach in correcting for endogeneity.

Empirical Results & Robustness

Regression 1 finds the Loan-to-Income ratio of Second & Subsequent buyers to be lowly significant, however an analysis of regressions residual output confirms suspicions of the model's vulnerability to autocorrelation & heteroscedasticity. A scatter plot reveals a strong, positive relationship between the residual and its lagged value, a relationship deemed significant following a regression of these two variables.

Deviations in the point estimates of regression 2, our GLS model, imply the coefficient estimates of regression 1 were biased, likely as a result of the previously assumed endogeneity - justifying the usage of the Arellano-Bond GMM approach in regression 3. In this final case (3), both variables of interest, $\ln\text{FTLTV}$ and SSLTI , are found to be significant. We find a 1% increase in the LTV ratio for first-time buyers leads to a 0.64% increase in house prices, a finding in line with those of Lyons (2018) albeit at a lower magnitude. This deviation is likely due to the simplicity of our data, and the lesser focus employed to the microeconomic determinants of house prices. Consequently, a unit increase in the LTI ratio for second & subsequent buyers indicates a 0.055% increase in house prices, a finding of greater magnitude to what was suggested by the limited output of regression 1. It is important to distinguish terminology, such that an increase in the LTI or LTV ratio implies looser regulation, i.e. the potential buyer will have to hold lower collateral.

	(1)	(2)	(3)
	lnPRICE	lnPRICE	lnPRICE
lnFTLTV	0.535 (0.295)	0.368 (0.302)	0.642* (0.282)
SSLTI	0.0322* (0.0152)	-0.00605 (0.0142)	0.0551*** (0.0155)
lnRENT	0.0905* (0.0386)	0.0825** (0.0264)	0.0838* (0.0376)
L.lnPRICE	1.213*** (0.0471)	1.320*** (0.0446)	1.150*** (0.0472)
L2.lnPRICE	-0.338*** (0.0458)	-0.387*** (0.0441)	-0.307*** (0.0442)
NMIG	-0.00126*** (0.000374)	-0.00136*** (0.000384)	-0.00118*** (0.000356)
UNEMR	-0.00977*** (0.00250)	-0.00802*** (0.00236)	-0.0111*** (0.00240)
INTR	-0.0464*** (0.0102)	-0.0492*** (0.0104)	-0.0444*** (0.00966)
_cons	-2.285 (1.340)	-1.637 (1.374)	-2.660* (1.277)
N	396	396	385
R-sq	0.986		
adj. R-sq	0.985		
rmse	0.0245		
rss	0.226		0.406

Standard errors in parentheses

* p<0.05, ** p<0.01, *** p<0.001

These findings suggest that in an environment of loose credit conditions and a relaxing of lending standards house prices will rise. This highlights the significant role the credit channel plays in the determination of Irish house prices, and consequently supports the basis for capping these ratios under the mortgage measures proposed by the Central Bank of Ireland.

Finally, the significance of the lagged variables implores us to consider the role of expectations in the determination of house prices, an idea that will later be discussed with reference to the financial accelerator mechanism. One can consider the mortgage measures as an attempt to disrupt rising expectations, serving as a means of anchoring expectations in the face of rising house prices and containing the volatility of this asset class. This suggestion prompts the second piece of our analysis, investi-

gating whether the mortgage measures may have contained the formation of another Irish Housing Bubble during the period of resurgence in 2013.

The Bubble Case

Literature

A bubble is typically characterised by a discrepancy between an asset's price and its fundamentals (Vyacheslav & Zemčík, 2009). This divergence can continue growing and cause prices to increase to unsustainable levels, eventually causing the bubble to burst. Irving Fisher (1933) aptly captures the economic sentiment towards bubbles by saying: “*overinvestment & overspeculation are often important; but they would have far less serious results were they not conducted with borrowed money*”.

An asset bubble can be characterised by exploring the mechanism of the financial accelerator: the idea that developments within the financial system amplify real changes in the economy (e.g. how relatively small changes in credit conditions could trigger larger shocks throughout the economy) (Bernake et al., 1999). The financial accelerator theory proposes that economies overextend themselves as they reach the peak of the business cycle. To put this into a recent context, financial innovations such as mortgage securitization led to misconceptions surrounding the risk of leveraging & lending in the lead up to the Great Recession of 2008. This surge of borrowing inspired exorbitant levels of economic activity and prosperity, yet crippled the economy once it began to default.

Empirical Approach

This paper follows the methodology outlined by Diba & Grossman (1988), examining properties of stationarity for the respective price and dividend series (PRICEit and RENTit) of an asset class. If rental prices are explosive compared to house prices, then a bubble is present. This is a straight-forward test checking the individual series for the presence of a unit root, regressing them against one another and subsequently testing the residual output, such that:

Given: $PRICE_{it} \sim I(1)$ and $RENT_{it} \sim I(1)$

Run: $PRICE_{it} = \beta_0 + \beta_1 RENT_{it} + \varepsilon_{it}$

Isolate residual such that:

$$\varepsilon_{it} = PRICE_{it} - \beta_0 - \beta_1 RENT_{it}$$

$\varepsilon_{it} \sim I(1) = \text{Bubble}$ or $\varepsilon_{it} \sim I(0) = \text{No bubble}$

This procedure will be run three times over, applied to different time periods to ensure a concise evaluation of our sample data in the event a bubble is found. The entire time period will be examined first, before breaking it into two: testing for a bubble prior to the introduction of the mortgage measures in Q1 of 2015 and in the period that followed.

This seemingly simple approach for the determination of an asset bubble is not without critique: Evans (1991) comments that the tests for stationarity lose power if the sample data includes multiple bubbles that emerge and collapse across the sample. Given the limited scope of this investigation, the use of panel data is an attempt to ensure a greater level of accuracy for subsequent testing, achieved through a higher number of observations.

The conventional test for stationarity, the Dickey-Fuller test, is not applicable for panel data, prompting use of the Levin-Lin-Chu unit root test instead, where a rejection of the null hypothesis implies stationarity of all panels within the dataset. Failure to reject the null hypothesis for the initial level, followed by a subsequent rejection when examining the first difference of this series, provides sufficient evidence to suggest the series is integrated to the order of one, an $I(1)$ process.

Findings & Implications

The dependent variable is found to contain a unit root at its level, \lnPRICE_{it} , with this finding rejected under first differencing, $d.\lnPRICE_{it}$. It is therefore interpreted to be an $I(1)$ process, an expected finding given the substance of this variable in reality. The same outcome occurs for \lnRENT_{it} , the dividend series for this asset class.

The variables are regressed upon one another with the residuals identified as stationary at its level, $I(0)$. As discussed, this finding suggests a bubble is not present, an outcome occurring for testing of each period. As such, there is no substantial evidence to suggest an explosive growth in rental prices relative to house prices, but rather we can confirm a steady co-integrated movement of these variables together across time. This finding signifies that should house prices decrease, rental incomes will follow.

The work of Wheaton & Nechayev (2008) builds on this point as they find that house prices are more likely to deviate from their fundamental value in regions with substantial subprime lending. Suppressing reckless leveraging by capping the LTV ratio can act as a way to disrupt the feedback flow of the financial accelerator mechanism. These findings highlight the importance of macroprudential policy, particularly for the CBI given the fragility of the Irish housing market (Galati & Moessner, 2018).

IV. Implications for policymakers and conclusion

Owing to the admitted shortcomings of this paper, it is inconclusive to say the mortgage measures directly prevented or contained another Irish housing bubble. LTI & LTV ratios were falling prior to the introduction of the mortgage measures as a result of self-imposed regulation & scrutiny on part of the banking system, yet this policy could be investigated from another angle as a way of quantifying & communicating intent to quell rising house prices, therefore shackling expectations going forward.

With this in mind, it is therefore important to consider the intention of the mortgage measures, rather than abandon judgement to the obloquy they have endured - a consequence of shortcomings in the market which exceed the scope of this policy. The mortgage measures are concerned with the sustainability of the financial system, implementing

limitations for the amount an individual can borrow with respect to their income (LTI) or ensuring the loan is unlikely to enter negative equity (LTV) - relatively simplistic requirements that were brushed under the carpet during the era of the Celtic Tiger. As such, the mortgage measures focus on the demand side for the housing market, ensuring unsustainable or reckless borrowing does not pollute the financial system.

Frustrations towards the mortgage measures are understandable, if not justified, as they by design do restrict individuals from entering the market. The magnitude of discontent is likely relative to a perceived over-pricing of houses, as many feel unjustly forced out of the market. Speaking towards a long-term perspective, these measures on the demand side of the market will be considered fairer in response to coordinated policy on the supply side, be it through lowered construction costs or better incentives for developers to build.

Ed Sibley of the CBI (2018) has recognised the mismatch between supply and demand in the Irish housing market but has insisted that the solution is not reckless lending; rather, it is an increase in the supply of homes. Our paper has shown that the measures go some way in controlling the rise of prices, yet more importantly that they achieve their stated aims in ensuring economic stability. Following an election that has been centred on housing, the new government should take heed of these findings. The best solution to reducing house prices is to build more homes. Meanwhile, the CBI must be allowed their constitutional independence to continue guarding consumer welfare.

V. References

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