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Abstract

I measure shares of mortgage finance in different price segments of the property market by comparing loan-level records of mortgage originations by Irish banks to the national register of property transactions between February 2015 and June 2018. Mortgage finance is more frequent at higher prices for all but the most expensive properties, rising from 5 per cent of purchases in the first price decile to 72 per cent in the ninth decile. The relationship between price and finance is similar in urban and rural regions. Price grew more quickly between 2015 and 2018 at lower price levels, where buyers rely less on mortgage finance.

1 Introduction

Mortgages in Ireland tend to fund residential property purchases at prices above average, but we know less about mortgage finance shares in different price segments.[1] By comparing two comprehensive lists of property purchases between February 2015 and June 2018, I reveal that mortgages funded less than 5 per cent of buyers at the lowest prices, versus two-thirds at prices above average. Properties at lower prices experienced faster growth in both mortgage finance share and transaction value during that time.

I extract the distribution of residential property purchase prices from a comprehensive national sales register. In each year, I classify sales into ten categories of equal size in increasing order of price, known as "deciles". Every mortgage from supervisory records of loan originations can be assigned to one of these deciles.

The note proceeds as follows: Section 2 connects residential real estate prices to financial stability. Section 3 outlines what is known about the mortgage finance share in Ireland. Section 4 describes the transaction price sources and matching technique. Section 5 presents mortgage and buyer type shares among different types of property purchase. Section 6 reviews the method and comes to conclusions.

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[1] Mean property values of mortgages in Central Bank of Ireland publications such as Kinghan (2018) exceed prices in Central Statistics Office time series of Residential Dwelling Property Transactions (CSO HPM02).

2 Financial stability and property purchase finance

Financial stability experts implicate real estate boom-bust cycles as a leading systemic risk to advanced economies, especially when credit propels the upswing. Crowe, Dell'Ariccia, Igan and Rabanal (2013) survey 40 countries to conclude that leveraged asset price inflation causes costly downturns, which justify pre-emptive intervention in financial markets. Jordà, Schularick and Taylor (2016) study household mortgages as the agent of long-term growth in bank credit during the 20th century. Using time series from 17 developed countries, they claim that mortgage booms became a uniquely powerful source of financial instability and long recessions after the Second World War. This research agenda motivates macroprudential policies to regulate mortgage finance in many countries.

Recognising the link between credit and house prices through leverage, the Central Bank of Ireland imposes macroprudential mortgage measures on residential property loans to households, which address the risks of leverage to bank and borrower resilience. The measures limit the shares of local mortgage lending at high leverage (the *loan-to-value* measure) and large multiples of household income (the *loan-to-income* measure).[2] As lending by Irish banks is heavily concentrated in local real estate, mortgage measures influence a large share of all credit extended to the Irish private sector.

Is real estate lending itself concentrated in particular market segments? A buyer may tend to pursue properties of a certain value in a certain location. Changes in lending conditions may be felt most keenly at price points where buyers tend to use credit. This question cannot be answered using mortgage data alone. It is necessary to profile mortgage lending against the property market as a whole.

3 Identifying non-mortgage property purchases

The variety of non-mortgaged "cash buyers" poses the main challenge to any description of the totality of the Irish property market. Non-mortgaged buyers may be corporate, non-profit or government entities, or households financed with equity from the sale of another property, large bank deposits or non-mortgage credit. In the absence of the standard product range that banks offer in the mortgage market, it was difficult to measure property sales to non-mortgaged buyers. This challenge was so severe that until September 2016, Irish residential property price indices were calculated using mortgage statistics only.

Blending public and proprietary information, Savills *Residential Property Q1 2015* claims cash-only sales varied between 40 and 65 per cent since 2011. Coates, McNeill and Williams (2016) introduce a method to estimate non-mortgaged purchases by using only public statistics from the Banking and Payments Federation Ireland (BPFI) and the Residential Property Price Register (PPR). They estimate a lower cash buyer share than Savills, rising from 10 per cent in 2011 to 40 per cent in 2014.

The Central Bank's 2017 *Review of residential mortgage lending requirements* shows that the share of mortgage finance in 2015 and 2016 may be between 40 and 60 per cent, depending on whether we include discounted purchases and non-household activity. Subsequent editions of the *Macro-Financial Review* state that the share increased in 2017. The current note develops our understanding of housing finance by using the full distribution of purchase values. Lydon and McCann (2017) adopt a similar approach by assigning mortgage borrowers to quintiles of Irish household incomes.

[2] https://www.centralbank.ie/financial-system/financial-stability/macro-prudential-policy/mortgage-measures

4 Property price data

4.1 Data sources

Banks declare mortgage collateral values in supervisory returns to the Central Bank of Ireland to show that they comply with loan-to-value ratio limits. While every lender must comply with the mortgage measures, banks report property values only upon extending mortgage credit of 50 million euro or more of during a half-year reporting period. The Appendix provides evidence that these loan-level reports closely match the population of Irish mortgages, including timing, buyer type and location.

I extract *mortgages for purchases* by excluding refinances, restructures, top-ups, equity releases, self-build mortgages and transfers of title with no evidence of a purchase. Multiple properties as collateral on one loan agreement are listed separately, while multiple loans secured on the same property are consolidated. Records begin upon introduction of the regulations on 9 February 2015 and end on the most recent reporting date, 30 June 2018. Kinghan (2018) outlines the characteristics of the mortgage records in early 2018.

Beyond mortgages, we can profile the entire property market by using the Property Price Register. The Property Services Regulatory Authority compiles the PPR from buyers' declarations to the Revenue Commissioners for stamp duty purposes, including the date of transfer of ownership, price and tax basis. To make these conform to mortgage collateral values, I apply rules based on the Residential Property Price Index (RPPI) methodology of the Central Statistics Office (CSO). Prices are quoted inclusive of value-added tax. A small number of portfolios of multiple dwellings are confirmed by name and removed, following Coates et al. (2016). Multi-unit signifiers include multiple house numbers, the sale of a "block" and known sales by bulk vendors such as the National Asset Management Agency.

All transactions must be on "market" terms, i.e. no familial or business relationship and of value above 25,000 euro, even though some mortgages may finance non-market purchases. Market prices yield the most accurate distribution, but may exclude valid mortgaged purchases. The removal of low-value and "transfer of title" mortgages reduces this problem.

Table 1 summarises the transaction records. The typical property traded for 200,000 euro. Half of buyers were mortgaged households, paying 10 to 30 per cent above average prices. The share of mortgaged purchases grew slightly from year to year.

4.2 Property purchase price deciles

One may delineate segments of the property market using absolute or relative prices. Absolute prices have certain uses; for example, housing market policies may have euro value thresholds which affect buyer behaviour at those margins. However, prices grew by 37 per cent over the sample, so each price relates to different types of property over time. Low-value transactions largely comprise earlier sales, and *vice versa*.

Therefore, I choose to measure *relative price* by classifying purchases into deciles of PPR transaction prices within calendar year of sale. Table 2 lists decile cut-off points. These illustrate that a single price takes lower positions in the distribution over time.

Relative prices allow us to compare similar market segments over time if housing quality remains stable. In support of this, the duration of the study is short, new houses entering the stock were a relatively small share of sales, and growth in the quality-adjusted RPPI was similar to the unconditional mean of market-based household purchase prices.[3]

[3] CSO data series HPM06 and HPM03 for market-based household purchases.

When prices are rising, annual deciles exhibit a weak version of the tendency to include more sales from later periods, such as December each year. However, different types of property are sold at specific times of year, which means any shorter window would distort the sample. For example, new homes sales fall sharply after summer and winter holidays.

5 Mortgages by price decile

Transactions are classified by the type of buyer listed in supervisory returns, as follows:

- First-time buyers with mortgages, who borrow to become owner-occupiers;
- Second-time and subsequent owner-occupier borrowers;
- Buy-to-let mortgages;
- Non-mortgaged buyers, being non-households or households purchasing with other kinds of finance, such as cash. (The residual of total transactions minus mortgages.)

The share of mortgaged purchases grew faster at lower prices (Figure 1). Mortgages and non-mortgage finance are not completely separate in the property market, but variance in the mortgage share across price deciles significantly exceeds variance across time. The mortgage share rises from 5 per cent in the first decile to 72 per cent at the ninth decile. At the tenth decile, the trend reverses as mortgages become less dominant. This is due to falling mortgage propensity after the 97^{th} percentile, around 700,000 euro. At prices above one million euro, fewer than half of purchases are funded by mortgages.

I derive the non-household buyer share from the CSO series of property transactions at market prices. Non-households bought 15 per cent of properties in the sample, at lower average prices than those paid by households. That leaves the remaining 35 per cent as "cash buyer" households without mortgages. It may be inferred that the typical cash buyer paid prices below the market average. The CSO also publishes household buyer types, but it does not measure first-time buyers in the same way as supervisory returns, so no analysis of mortgage share by buyer type is possible.

Figure 2 shows the shares of each buyer type per decile. First-time borrowers drew down the most mortgages, funding almost half of all purchases at the sixth and seventh deciles. As a result, lending conditions for first-time buyers may strongly influence mid-market price segments. By contrast, second-time and subsequent borrowers become more prevalent as prices rise, up to the 97^{th} percentile. Prices in the small buy-to-let mortgage market are more evenly distributed; mean prices are almost the same as the market average.

Location has a strong influence on price, as buyers seek not only a dwelling but the access to jobs or amenities that it may afford. I find that location does not explain the link between prices and mortgages; rather, urban and rural distributions are similar. Figure 3 highlights Dublin and Mid-East, the most expensive and urban regions in Ireland. These account for less than 15 per cent of purchases in the bottom two price deciles, versus more than 80 per cent in the top two deciles (Figure 3a). Mortgages fund 60 per cent of purchases in Dublin and Mid-East, versus 40 per cent elsewhere. However, conditional on price, the Dublin share of mortgages among purchases is *lower* than average (Figure 3b). Its high mortgage share is due to the local price level.

Finally, I review changes in average price within each decile over time, in light of the mortgage share evidence. Prices grew more readily at the lower end of the market (Figure 4), by up to 15 per cent per year among the bottom three deciles, compared to 6 per cent among the top three deciles. Table 2 shows strong gains in euro value in low deciles, contributing to growth in average market prices. These gains may interact with the rise in non-mortgaged purchase prices in recent years. However, they may also be due to the increase in mortgage share at low prices (Figure 1). The coinciding factors of rapid price growth and low recourse to mortgage finance at lower prices agree with the 2017 *Review of residential mortgage lending requirements*, which reports that mortgage-financed transaction prices grew more slowly than non-mortgage purchases.

6 Conclusions

I draw together two sets of Irish transaction prices to show substantial differences in residential mortgage finance among different market segments. Banks typically lend to finance property purchase at higher prices, while non-mortgage finance is dominant at lower prices.

The macroprudential regulation of mortgage credit may influence property price growth. It may do so to a different, and probably smaller, extent in segments where the regulated product is less prevalent. The findings point to higher-priced segments of the property market where one would expect mortgage regulation to affect prices directly through the participation of many affected borrowers, and to lower-priced segments where the effect would be less immediate or direct. Given the respective contributions of low and high price segments to average residential property prices, variation in mortgage share acts as a structural limit to the influence of mortgage measures on price growth.

Appendix

I validate the mortgages for purchases records using two alternatives. First, the BPFI reports the number of mortgages drawn down from a subset of its members each quarter. Some smaller lenders report mortgages only to the BPFI and not to the Central Bank. Loan-level supervisory mortgage records comprise 97 per cent of the BPFI total. The loan-level and aggregate series largely agree on timing and buyer type. Differences may be due to niche lenders or products excluded from mortgages for purchases.

Second, a Census of Ireland on 24 April 2016 asked questions on household tenure, including whether the property was owner-occupied with a loan or mortgage and whether the reference person moved within Ireland in the previous year. The number of responses is available for each city and county. I compare this mortgaged movers estimate to mortgages for purchases by owner-occupiers originated between April 2015 and March 2016. The national totals differ by less than 1.5 per cent. Location matches are also close, given the potential differences between the two definitions (Figure 5b).

Local authorities and credit unions are the main lenders that do not complete supervisory returns. The method in this note counts property purchases funded by these lenders as "non-mortgages". The Department of Housing, Planning and Local Government reports 702 local authority loan payments between 2015 and 2017 for purchases and self-builds, which is 0.5 per cent of all property purchases. Credit unions declared total outstanding house loans of 146 million euro in a 2017 thematic review by the Central Bank. The purposes of house loans include purchase, self-build, renovation and refinance. I estimate that credit union house loans funded between 0.25 and 1 per cent of property purchases since 2015.

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Tables and Figures

All 2015 data begin on 9 February 2015. All 2018 data end on 30 June 2018.

Table 1: Summary of supervisory and administrative price data

Statistic	Total	2015	2016	2017	2018
Mortgages for purchases					
Mean price (EUR th)	304	278	298	318	328
Median price (EUR th)	260	233	250	275	285
Count	78,914	19,283	21,658	25,879	12,094
Dublin	30,993	7,297	8,613	10,277	4,806
Mid-East	13,604	3,268	3,552	4,666	2,118
First-time borrowers	46,416	11,128	12,475	15,462	7,351
Other owner-occupiers	27,933	6,925	7,816	9,067	4,125
Buy-to-let	4,565	1,230	1,367	1,350	618
Purchases					
Mean price (EUR th)	257	227	249	275	286
Median price (EUR th)	200	172	193	221	235
Count	158,697	40,631	45,809	49,832	22,425
Dublin	50,410	12,188	14,461	16,113	7,648
Mid-East	23,152	5,786	6,367	7,714	3,285
New properties	23,038	4,683	6,066	8,008	4,281
Second-hand	135,659	35,948	39,743	41,824	18,144

Table 2: Percentiles of residential property purchase prices (EUR th)

Percentile	10th	20th	30th	40th	50th	60th	70th	80th	90th
2015	60	85	115	142	172	210	253	313	430
2016	65	95	130	160	193	232	277	340	465
2017	75	115	150	185	221	260	308	370	500
2018	84	129	165	199	235	275	323	386	515

Figure 1: Mortgage-financed share of residential property purchase, 2015 – 2018

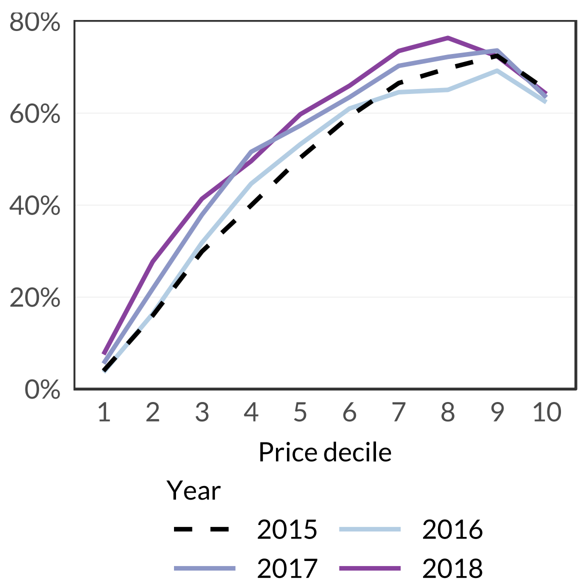


Figure 2: Residential property purchases by mortgage buyer type and non-mortgage status

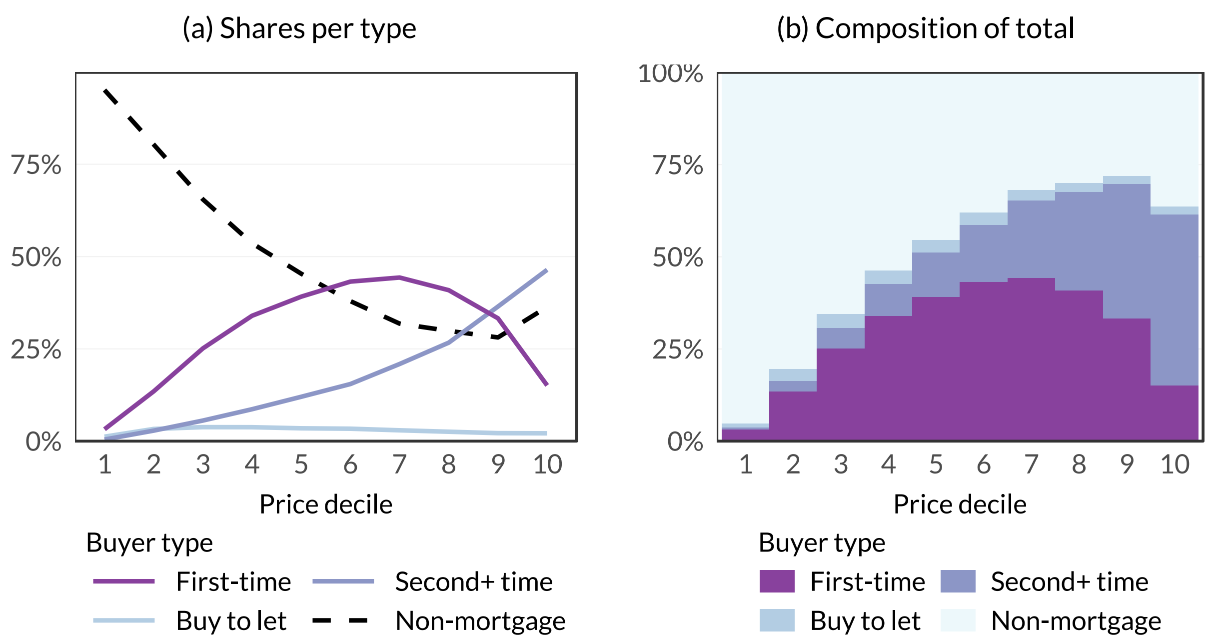
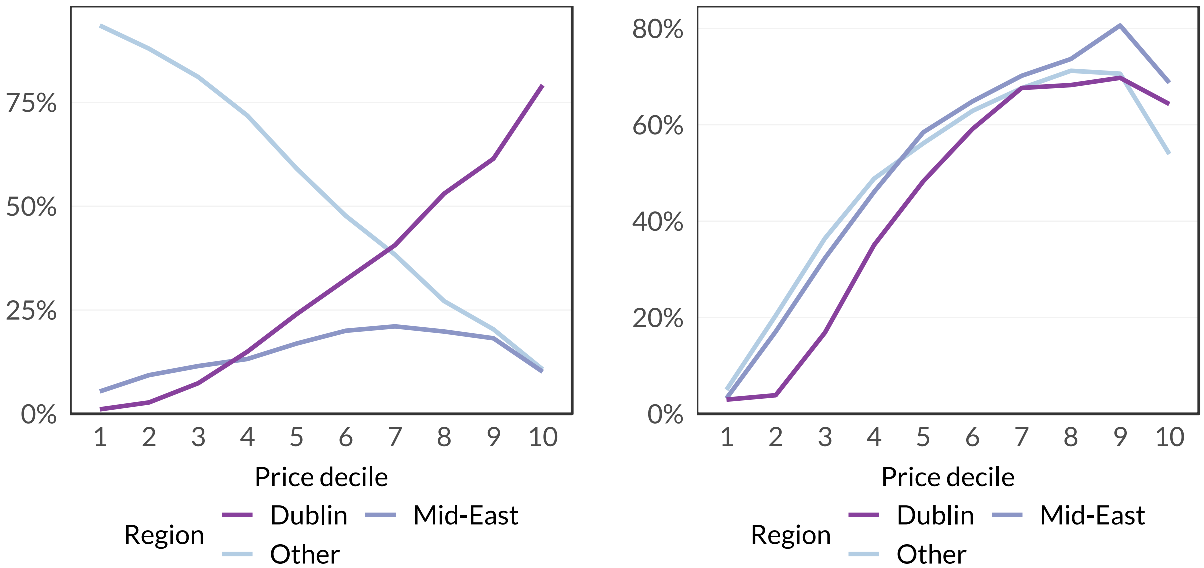


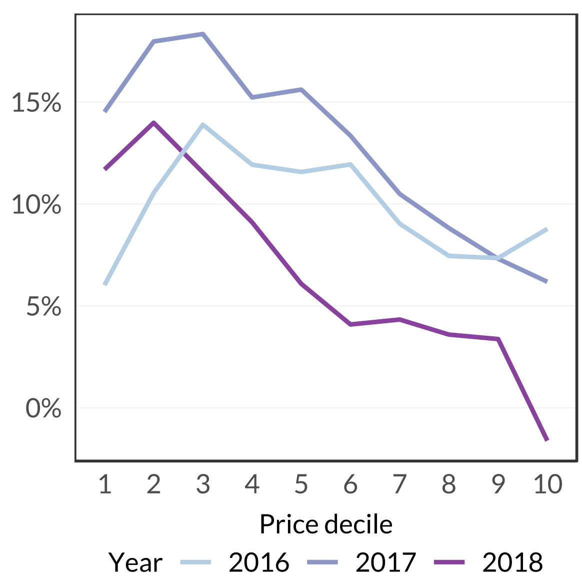
Figure 3: Residential property transactions by region

(a) Regional shares of all transactions (b) Mortgage-financed share of purchases



Note: “Mid-East” comprises counties Kildare, Louth, Meath and Wicklow.

Figure 4: Annual growth rates of average prices per decile

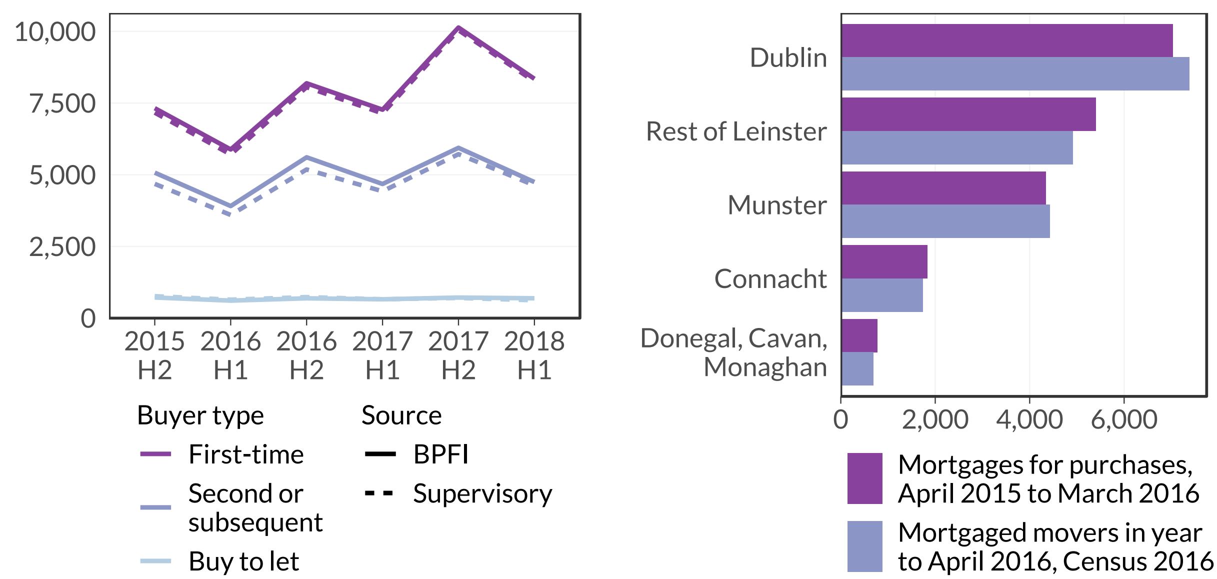


Note: 2018 H1 growth since 2017 H1.

Figure 5: Validation of mortgages for purchases data

(a) Time and buyer type

(b) Property location



Note: Mortgages for purchases and self-builds.

Note: Owner-occupiers only.