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The causal effect of house prices on mortgage demand and mortgage supply: Evidence from Switzerland [☆]



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ABSTRACT

We identify the causal effect of house prices on mortgage demand and supply in Switzerland by exploiting exogenous shocks to immigration and thereby to house prices. Detailed micro data on individual requests and offers allow to close down possible other channels. We find that 1% higher house prices imply 0.52% higher mortgage amounts. The full partial correlation of 0.78% suggests also positive feedback from mortgage volumes to house prices. While we find higher house prices to increase mortgage demand, banks respond if anything with fewer offers and higher rates, especially later in the boom and for highly leveraged households.

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1. Introduction

Recurrent real estate and mortgage market booms have shown that surging house prices and mortgage market expansions tend to coincide. This has been the case in the US subprime boom as well as in recent real estate booms in Spain, Ireland and other Eurozone economies. It also applies to more recent booms in amongst others Norway and Switzerland.¹ Yet the direction and channels of causality between house prices and mortgage markets have remained largely unclear.

We identify the causal effect of house prices on mortgage demand and supply. We combine two strategies to obtain variation in house prices that is exogenous to the

¹ For more examples, see IMF (2011) and Igan and Loungani (2012).

mortgage market. First, we instrument house prices with “Origin Push Immigration” (OPI). OPI is *that* part of immigration, which is triggered by push factors in immigrants’ countries of origin, rather than by pull factors at their destination. This type of instrumental-variable (IV) strategy, which is also known as “shift-share strategy” has previously been used to identify the effect of immigration on housing prices, first by Saiz (2007) and later by, amongst others, Fischer (2012), Gonzalez and Ortega (2013), and Accetturo et al. (2014). However, we are the first to exploit the implications of the immigration house price link to identify in turn the effect of house prices on the mortgage market. Second, we use not only year-by-month but also canton fixed effects and thus focus on variation between different neighborhoods located within the same labor market and public policy environment. This strengthens further the plausibility of our exclusion restriction. Furthermore, while previous shift share papers had to rely on aggregate data, we use micro data on individual mortgage requests and offers, and control for detailed applicant and object characteristics.

In addition to identifying the causal effect of house prices on the requested mortgage amounts, our setup also allows us to differentiate between the effect on mortgage demand and that on mortgage supply. This is because in our setup demand cannot be influenced by *request-specific* supply, which is set only afterward, while *aggregate supply* is controlled for by year by month as well as canton fixed effects. Potential direct effects of demand on request-specific supply by contrast is investigated by an augmented Simultaneous Equations Model in the [Online Appendix](#) and is not found to play a significant role after controlling for our extensive set of request characteristics.

We find that a 1% higher house price implies a 0.52% higher mortgage amount. The non-causal partial correlation between house prices and mortgage demand however amounts to 0.78%, suggesting also positive reverse causality from mortgage amounts to house prices. This points at a mutually reinforcing mechanism between real estate and mortgage market booms and busts. However, the coefficient size below unity implies that higher house prices lead to *lower* loan-to-value (LTV) ratios, thus confirming previous findings in Ono et al. (2014), FSA (2009) and SNB (2015). This reflects *inter alia* that the values used to compute LTV ratios tend to increase along with house prices. It helps to explain why studies on the effectiveness of mortgage market regulation, such as Kuttner and Shim (2013) find LTV limits to be less effective in slowing down mortgage growth than PTI (or Debt Service to Income, DSTI) limits. Furthermore, higher house prices are not found to induce lenders in our sample to expand mortgage supply: Instead, lenders make – if anything – *ceteris paribus* fewer offers and charge higher risk premiums the higher the house price. This cautious lending behavior is particularly pronounced in the second sub-period of our sample. During this period house prices have already gone through an extended period of growth and hence are more likely to be overvalued. The caution is also particularly pronounced for mortgage requests with high LTV ratios, but does not depend on the request’s payment to income (PTI) ratio. It is also more pronounced

for applicants requesting adjustable rather than fixed rate mortgages.²

The remainder of the paper is structured as follows: Section 2 first covers different theories of how real estate prices, mortgage demand and mortgage supply could be causally related, and then provides a brief summary of the as yet limited evidence on the topic. Following this, Section 3 introduces our data and Section 4 our empirical strategy. Section 5 presents the results, including a summary of the detailed robustness checks presented in our [Online Appendix](#). Section 6 concludes.

2. The link between house prices and mortgage volumes

2.1. Theory

We investigate the causal relationships behind the correlation between house prices and mortgage volumes for the case of Switzerland. [Fig. 1](#) illustrates this correlation by displaying the annual growth rates of respectively residential rents, apartment prices, single-family home (SFH) prices, and mortgage volumes for the years 1971–2013. While there are also idiosyncratic factors at play, the growth rates clearly appear correlated. As for timing, it would if anything appear that mortgage volumes slightly lag house prices, although any such observation must at this stage remain tentative given the small number of observations. To shed light on the potential causal relationship between house prices and mortgage volumes, the literature offers three major hypotheses. We sketch these in blue in [Fig. 2](#).

First, there may be a positive causal effect running from *house prices* to the mortgage market via *mortgage demand*: When house prices have grown faster than household financial wealth, households need to demand larger mortgages as they cannot finance the increased cost for a given size and quality of housing only out of their savings. In addition, amongst households looking at housing as an investment rather than solely as a consumption good, higher current house prices may furthermore trigger expectations of prices staying at current levels or increasing even more. Conditional on their balance sheets and regulatory requirements³, banks⁴ may satisfy increased mortgage demand, but only in return for higher risk premiums and hence higher mortgage rates. Higher mortgage demand does then result in higher equilibrium mortgage amounts, also absent an outward shift in the mortgage supply curve.

² Robustness checks show that results are similar when we use observations on all lender responses rather than just one observation per request and include in addition to all other controls also lender fixed effects.

³ See Section 3.1 on Swiss mortgage market regulation during the period studied.

⁴ In our empirical setup, some mortgages are offered by insurance companies. Our results do not hinge on whether or not we include insurers, since they hold only about 5% of the market (See [FINMA, 2014](#)). For simplicity, we shall nonetheless use the terms “banks” and “lenders” interchangeably. Further, we shall often write “house” for both houses and apartments.

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