Could Spain be less different? Exploring the effects of macroprudential policy on the house price cycle

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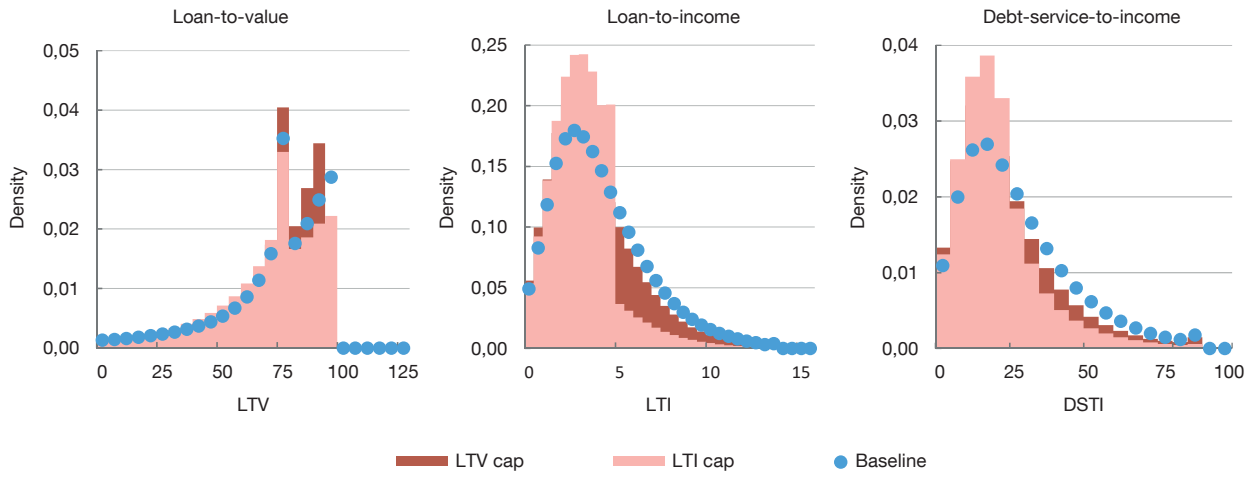
Housing prices are known to co-move with GDP, consumption, investment, hours worked, real wages and housing investment, hinting at the important role played by house price fluctuations within the business cycle (Leamer, 2015; Cerutti et al., 2017b). In fact, downturns in real housing prices have been shown to be valuable early warning signals of economic recessions (Haavio et al., 2014). In view of this, moderating house price fluctuations has become a key objective of macroprudential policy after the Global Financial Crisis (Cerutti et al., 2017a). Given the weight of the real estate sector in its economy, as well as the role this sector played during the Global Financial Crisis, Spain offers an excellent setting to examine the potential use of macroprudential policy to moderate the house price cycle. Moreover, house price fluctuations have been considerably stronger in Spain than in most other European countries, especially during the most recent boom-bust cycle around the Global Financial Crisis. In Carro (2022), we use an agent-based model of the Spanish housing market to explore the main drivers behind the large amplitude of the Spanish house price cycle, as well as to investigate the scope for macroprudential policy to reduce this amplitude.

MODELLING FRAMEWORK

Housing markets are characterised by a number of modelling challenges related to their highly heterogeneous nature. First, households interacting in housing markets are heterogeneous across multiple dimensions, including their income, wealth and preferences, which strongly influence their decisions. In addition, given its relevance in the cash flows of many households, housing can itself become a driver in creating further disparities. Moreover, when evaluating policy interventions, it would be difficult to determine the impact of a particular measure on the various

Figure 1
Impact of calibrated policies on risk metric distributions



NOTES: Comparison of model results for the baseline (no-policy) scenario, a hard loan-to-value limit of 94% and a soft loan-to-income limit of 4.77, allowing for 15% of mortgages to exceed this latter limit. Note that these limits are calibrated for the amplitude of the Spanish house price cycle to match that of the UK equivalent. Moreover, they would both be binding for about 20% of mortgages in Spain, according to data from Colegio de Registradores (loan-to-price) and European Data Warehouse for 2016.

segments of the housing market, such as renters, first-time buyers, home movers or buy-to-let investors, unless these groups are explicitly incorporated into the analysis. Second, housing is an extremely heterogeneous good, with houses differing in aspects such as their location, size, condition and dwelling type. As a result, houses are hard to assess and compare, and housing markets are rife with information asymmetries. These factors, together with high transaction costs and long investment horizons, make housing a relatively illiquid asset and allow for imbalances between supply and demand to persist for much longer than in markets for more homogeneous products. For instance, an excess in demand at a given location cannot be easily offset by an excess in supply at a faraway location.

Agent-based models are particularly well suited to meet these challenges and capture many of these features. In particular, we build upon an agent-based model of the housing market originally developed for the UK (Carro et al., 2022), which we adapt to the specificities of the Spanish housing market and fully recalibrate using a breadth of both macro- and micro-databases, including loan-level regulatory data. This model includes life cycle dynamics, large degrees of household heterogeneity across multiple dimensions (such as income, wealth, age and preferences), heuristic (boundedly rational) rules of behaviour and adaptive expectations. The model has three main classes of agents: (i) households, (ii) a bank, and (iii) a Central Bank. Households interact with each other thorough the sales and the rental markets by purchasing, selling, renting and letting out houses to each other (i.e., there is a dynamic buy-to-let sector). To buy houses, households can also engage with the bank by requesting a mortgage. In providing such mortgages, the bank applies its own internal lending standards in the form of loan-to-value (LTV), loan-to-income (LTI) and debt-service-to-income (DSTI) requirements. Finally, the Central Bank has the authority to further regulate those lending standards using borrower-based macroprudential policies, potentially imposing more restrictive limits. Crucially, the dynamics of the model are characterised by the emergence of fully endogenous house price cycles, derived from the actions and interactions of the agents and not requiring any external input of shocks.

RESULTS AND SIGNIFICANCE

In our analysis, we exploit the fact that this methodology has already been applied to the UK housing market. In fact, the UK is an ideal benchmark for our experiments, as it is characterised by cycles with a frequency and general shape similar to their Spanish equivalent, but milder. Moreover, the availability of data for model calibration is better in the UK than in many other European countries.

Noting the significantly smaller amplitude of the UK house price cycle as compared to the Spanish equivalent, we first exploit the availability of both calibrations to explore which aspects of the Spanish calibration are behind the increased amplitude of its house price cycle. To this end, we build hybrid parameterisations, that is, simulations mixing parameter values from our two available calibrations in order to assess the impact of specific parameters and mechanisms on the resulting cycles. In this way, we find that parameters and mechanisms related to lending standards and desired down-payments are key in generating the stronger Spanish cycles. Second, we use the model to calibrate both a hard LTV limit and a soft LTI limit (allowing for a small fraction of new mortgages over it) to smooth the Spanish house price cycle and match the amplitude of the UK equivalent. Interestingly, our calibrated limits are less restrictive than the corresponding UK distributions of lending standards would suggest.

Finally, we characterise the effects of these calibrated policies over the cycle. Our results indicate that both instruments reduce credit and price growth during the expansionary phase, as well as mitigate their decline during the contractionary phase. We also observe that policies targeting a given risk metric can also have an important impact on other risk metrics (see Figure 1). For instance, our calibrated LTI policy has a strong effect on the LTV distribution, even stronger than the LTV cap itself. As a further example, both policies have an impact on the (untargeted) DSTI distribution. Importantly, both instruments lead to a compositional shift in lending towards buy-to-let investing: with the LTV policy, credit shifts mostly from first-time buyers to buy-to-let investors, while with the LTI policy, credit shifts from both first-time buyers and home-movers

towards buy-to-let investors. This shift is due to the generally higher wealth and income of buy-to-let investors, who are thereby less constrained by these policies. Furthermore, both policies make buy-to-let investing more attractive by reducing purchase prices while increasing the demand for rental accommodation. From a policy perspective, it is of paramount importance that these distributional effects and spillovers are taken into account in the design and calibration of macroprudential policies.

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