Discussion

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It is a pleasure to be able to discuss such an interesting and important paper. We know from recent experience in the United States and other countries that housing markets can be the epicentre for systemic failures in national financial and banking sectors. However, we also know relatively little about the nature of different countries' mortgage markets. That these recent collapses occurred with little warning highlights the paucity of our knowledge in this area. This paper aims to help bridge this gap in data and understanding. The importance of this work derives from its relevance both to practising regulators and ivory-tower academics.

The paper itself focuses on the determinants of the size of national mortgage markets. Its primary contribution is empirical. There is very little prior research or data that facilitate useful cross-country comparisons of national housing finance systems, so global analysis is virtually non-existent. This paper should be seen as a part of the authors' long-run research program to remedy this shortcoming. A limitation of the present work is that the data represent a single cross-section for the year 2009, which restricts its use in more complex empirical analysis because causal identification is quite challenging with just a cross-section. Hence, the authors' ultimate goal certainly should be to create a true panel dataset so that empirical researchers can use variation over time within countries to test different hypotheses about what drives mortgage (and ultimately) housing markets.[1]

The goal of the analysis is to explain the size of national mortgage markets as a function of various fundamentals:

$$Mortgage\ Market\ Size_i = f(fundamentals_i), \tag{1}$$

where the subscript i indexes the 61 economies in the authors' sample. *Mortgage Market Size* is measured in two ways:

- the ratio of total mortgage debt to GDP (*Mortgage debt/GDP*); or

- the ratio of total mortgage debt to total private credit outstanding (*Mortgage debt/Private credit*).

The authors' conclusions are robust to the precise measure of market size.

Market fundamentals can be thought of as being in one of four categories. The first is *Legal Rights for Borrowers and Lenders*. The authors' data show that the strength of borrower and lender legal rights are not systematically higher in economies with higher per capita incomes. For example,

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1   In this sense, the study of mortgage markets across countries finds itself in a situation similar to that of the study of land-use restrictions across local housing markets. Cross-sectional databases have been constructed in that area too, but no true panels exist. In both cases, the topic of study is too important to wait for perfect data. Hence, we must make do with what data we have and continue to improve on its quality, as in this paper.

there is substantial variation across economies in this measure, with many countries in Europe (e.g. Greece, Italy and Portugal) having the same index number as Brazil and other Latin American countries.

The second category of fundamentals is based on *Credit Information*. It turns out that virtually all economies have similarly well-developed credit information systems according to their measure, as there is only scant variation in the index number for this variable across economies. The lack of variation in this variable should be kept in mind, as it will be relevant to our discussion of their regression results below.

The third category of fundamentals comes under the rubric *Ease of Registering Property*. Unlike *Credit Information*, but like *Legal Rights for Borrowers and Lenders*, there is substantial cross-section variation in the authors' evaluation of national property registration systems. It turns out that France is an outlier among developed countries, with a system that is as difficult and opaque as anywhere in Africa or the Middle East. Italy's system is of no higher quality than that found in the typical Latin American country. There are also a variety of high-quality systems in African, Middle Eastern and Latin American nations.

The fourth and final category of fundamentals is *Inflation Volatility*. This is measured by the degree of variation in inflation rates over time and is pretty uniform across economies, with the exception of a few outliers that have had large price growth spikes in recent decades.

The authors use these fundamentals to try to explain differences in national mortgage market size by estimating Equation (1). As noted, they have a single cross-section for 2009 on 61 economies and begin by estimating simple and straightforward ordinary least squares (OLS) regressions. The limitations of relying solely on a cross-section of data are well known. If there are omitted factors, especially those that change over time, that are correlated with an included trait, then the estimated coefficient on that trait will be biased due to specification error. Of course, this is why having panel data would be better, but that must be left to future work, as the authors had to engage in a near-herculean effort to create the larger and improved cross-section employed in this paper.

That said, I have two recommendations for improving the current model before a panel dataset becomes available. The first is to use rates of change as an explanatory variable in the subset of countries (typically more advanced and richer) for which the authors already have time series data. As we look back on the recent financial crisis, rapid and large changes in mortgage debt in Ireland and the United States should have been a signal to all of us that something was amiss in those places. More specifically in the framework of this paper, a large, rapid increase in scale would probably predict a market that is too large relative to fundamentals. The authors can only investigate this for a limited number of countries, so the degrees of freedom and statistical power might be low, but I think it would be interesting to see if this helps explain national mortgage market size.

The second recommendation I have is for the authors to try to develop a fifth fundamental variable that measures the stability and/or size of the national banking system. It strikes me as probable that countries with strong and sound financial regulatory systems for banks are likely to have mortgage markets that are appropriate to the fundamental economic needs of the nation. Perhaps this variable would add to the explanatory power of the paper's baseline regression.

This is not to say the reported analysis is not helpful. Quite the contrary is the case, as the findings generally make good sense to this reviewer. For example, the authors usefully look for heterogeneity in the effects of fundamentals by estimating their model on subsets of advanced and emerging market economies. The explanatory power of these fundamentals is greater for emerging markets, with an R^2 of 0.40 versus 0.28 for advanced economies. That is interesting, but one does not want to make too much of this particular difference, as there is more variation in the underlying explanatory variables among emerging markets. In fact, the only fundamental that helps predict mortgage market size among advanced economies is the *Ease of Registering Property* index. Recall that there is substantial variation in this measure even across European countries; it is very difficult to register property in France, but not in other core countries. Most advanced countries have relatively strong legal protections for lenders, so there is little variation in this fundamental variable. By definition, a variable with little or no variation cannot predict one with substantial variation. This certainly is not a call for the authors only to use explanatory variables with lots of variation. The data are the data, and the authors have a convincing reason for including a control for the *Ease of Registering Property*. Rather, my comment is intended to highlight for the reader (and policymakers in particular) that one should not interpret an insignificant coefficient as indicating that a given fundamental variable is not important or, more specifically, that one could (say) eliminate strong legal protections for lenders with no effect on mortgage size. This clearly is a key fundamental and weakening those rights would impair development of the mortgage market, as the results for emerging countries indicate.

For this subset of emerging economies, only the *Ease of Registering Property* index is not statistically significantly correlated with mortgage market size. The *Legal Rights for Borrowers and Lenders* index, *Credit Information* index and *Inflation Volatility* each help predict mortgage market scale in emerging economies. There is substantial variation across countries in these variables, so that the variables have a chance to explain the similarly large variation in national mortgage market sizes. And, it turns out that their impact is consistent with the prediction of Warnock and Warnock's (2008) model.

The current paper would benefit from a deeper explanation of what the coefficient magnitudes imply. In particular, it would be helpful if standardised marginal effects were reported for each fundamental, not just the raw coefficients. Another suggestion for potential improvement would be to add regional dummies to the main global specification. This would control for regional/continental fixed effects. I would also encourage the authors to experiment with some non-linear specifications. This seems particularly relevant for the *Inflation Volatility* variable, where the values are similar for most countries, but differ greatly for a few outliers. This could be germane for other variables if particularly high or particularly low index values for some fundamentals have differentially large effects on mortgage market development.

Discussions with the authors have raised a couple of further questions that I think are relevant for evaluating any housing finance system. First, there are big differences across countries in their commitments to having long-term, fixed-rate mortgages (e.g. 30-year loans in the United States) available for their citizens. What are the risks and benefits of including this feature in any type of mortgage finance system? Second, how should we think of moral hazard and government backstops in each type of system? Can we really get away from some type of catastrophe insurance? Would anyone believe the government would not intervene in the event of a major

housing collapse, regardless of the legal rules in place? How should we go about designing systems with such beliefs and expectations in mind?

I hope these thoughts are of use to the authors as they think about future work. We will all benefit from more research in this area by these authors.

Reference

Warnock VC and FE Warnock (2008), 'Markets and Housing Finance', *Journal of Housing Economics*, 17(3), pp 239–251.

2. General Discussion

The variables used to explain the size of a country's housing finance system in the cross-country model received considerable attention from participants. Several inquired about the effects of additional explanatory variables on the model's results.

One participant was interested in the effect of income inequality on the size of housing finance systems. As an example, the participant pointed out that Brazil has higher income inequality than Denmark and has a smaller housing finance system. Another participant wanted to see the effects of additional market variables such as the amount of currency in circulation, referring to the case of Italy where the housing finance system is small because its people have a high propensity to use cash for purchases and the model did not capture this channel. The example of Italy was used again by another participant to consider the effects of the legal structure on the size of housing finance systems. The participant suggested that Civil Law systems, such as Italy's, which are less reliant on precedent, could have longer average time between foreclosure and possession, which would affect the size and development of the mortgage market. Yet another participant requested information on the effect of the underground economy on the size of housing finance systems. The participant said even with good fundamental factors, such as legal protections, a country may have a small housing finance system because of unverifiable earnings from the underground economy. Accordingly, some of the explanatory variables may have less explanatory power relative to what would be expected.

The authors, Frank Warnock and Veronica Warnock, said they had considered a lot of these explanatory variables, having worked with these data for some time. They mentioned that a lack of time series data – making it difficult to create a panel – limited the scope for including these additional regressors. (The lack of panel data to assess the research question was a common lament among participants.) However, in previous work the effect of the informal economy for Latin American countries had been considered.

The prevalence of fixed versus variable rates for housing mortgage loans, and the differing effects these rate structures might have on the stability and size of housing finance systems, generated a lot of discussion. One participant argued that variable mortgage interest rates were more effective in stabilising financial conditions for the household sector following a financial shock; all borrowers get a timely reduction in their interest payments including those with low or negative

equity. Another participant suggested policymakers, when thinking about these systems, should consider the demand for maturity transformation in an economy. In economies with very young populations one would expect to have a high demand for long-term fixed annuity payments, while for relatively older populations the opposite would be expected. Finally, another participant suggested that a prevalence of fixed versus variable rates in an economy could be the result of policy decisions designed to improve affordability. For example, in the United States, a 30-year fixed rate, combined with tax covers, extends affordability into the tails of the income distribution to households with very little amortisation.

In regard to variables that were included in the model, there was some discussion about the insignificance of the *Credit Information* variable and whether inflation – capturing macroeconomic volatility – could have non-linear effects. *A priori* several participants thought the *Credit Information* variable would be a highly significant fundamental factor in determining the size of a country's housing finance system. Frank Warnock said the lack of significance was a data quality issue, with very little cross-country variation in the *Credit Information* index. He said they had worked in many of the economies that scored highly on this index and found it hard to reconcile these high scores with their experience on the ground. In response to the inquiry about non-linear inflation effects, one participant suggested normalising *Inflation Volatility* by taking the first difference of inflation for a given country and dividing it by inflation lagged one period. This would ensure the *Inflation Volatility* term was bounded between zero and one.

Following this discussion, one participant queried whether the demand for housing across different economies deserved more attention relative to the supply of housing, which the existing explanatory variables were interpreted as capturing. The participant indicated that they expected demand-side issues would be more important in advanced housing finance systems (not necessarily advanced economies) and questioned the usefulness of having 61 advanced *and* developing economies in the sample on this basis. The participant proffered two countries with relatively large housing finance systems, Denmark and the Netherlands, as an example. In these economies, the government provides incentives to borrow through an established system. The role of government is, therefore, important in stimulating the demand for housing debt in these economies. It was also mentioned by the participant that the historical legacy of the mortgage finance system was an important determinant of its current size. For example, Denmark has a long history of mortgage finance relative to other economies and this, in turn, generates a particular housing finance system outcome. While not addressing the demand-side incentives to take on mortgage debt, the authors said they had thought about how to include a variable to capture the incentive to pay down mortgage debt. For instance, the authors said the extent of mortgage interest tax deductibility in an economy was a candidate variable for the model, but that data limitations rendered it difficult to include.

Finally, one participant questioned whether the insights from the model were also applicable to a period in which real estate prices were declining. In response, the authors reiterated that the data they were using was only a cross-section and that to get at business cycle effects, panel data were required.