Discussant remarks on Filipa Sá, Pascal Towbin and Tomasz Wieladek's paper "Capital inflows, financial innovation and housing booms"

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1. Introduction

Since the global financial crisis of 2007–09, economists and policymakers have struggled to understand the causes of asset price booms and busts. The challenge is illustrated in Figure 1, which shows the path of real property prices from 2000 through 2010 for seven advanced economies (Austria, Canada, Denmark, Ireland, Norway, the United Kingdom and the United States). One question is why property prices in all seven of these countries (and many more besides) all rose and fell over roughly the same period. Was a common factor at work across countries, and if so, what was it? The second question is why the size of the boom differed across countries. What explains the fact that house prices doubled in the United Kingdom, but appreciated only slightly in Austria?

This paper presents an empirical analysis of these difficult questions, paying particular attention to the effects of interest rates, capital flows, and financial structure. A large number of papers have analysed the effects of each of these factors individually, but this is the first that I am aware of that examines all three in a single empirical framework.

2. Summary of the model

The analysis employs a state-of-the-art partially identified 12-variable panel vector autoregression (VAR) for 18 OECD countries. Monetary policy and capital flows are modelled as structural shocks, identified via sign restrictions. Specifically, the identification scheme assumes that monetary policy shocks have the standard macroeconomic effects: expansions increase consumption, investment and inflation and lead to a real depreciation. Similarly, capital inflows increase consumption and investment and lead to a real appreciation, while reducing the long-term interest rate.

The paper takes two complementary approaches to assessing the impact of financial structure. One is to split the sample according to the level of financial market development, measured by an IMF index of mortgage market sophistication. The other is to interact an index measuring the prevalence of mortgage securitisation with a subset of the VAR coefficients.

The authors' approach is eminently reasonable. The panel VAR method allows them to estimate an extremely rich model while imposing just enough structure to allow for a sensible economic interpretation. I would be hard-pressed to improve on their method, but I nonetheless have two reservations.

One is that while the identification scheme yields impulse responses with the desired signs, the dynamics are implausible. An expansionary monetary policy shock, for example, causes

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an immediate jump in the price level. This is in marked contrast to conventional monetary VARs, such as those reported in Christiano et al. (1999), in which the inflation response is quite sluggish, rising gradually over a period of one to two years.

A second point is that the identification strategy allows for the identification of only two structural shocks. This is both a strength and a weakness. The strength is that it minimises the assumptions needed to obtain results for the two structural shocks of interest, and indeed a very large number of restrictions would be required to fully identify a 12-variable system. But it is also a limitation to the extent that it does not allow the impact of other structural shocks to be estimated. The analysis is therefore silent on the other contributors to real estate price fluctuations.

3. The main findings

Like most VAR analyses, the paper's results are presented in terms of the impulse response functions and variance decompositions. The findings are reassuring: the estimated responses are statistically significant, and the signs are consistent with theoretical priors.

With regard to monetary policy shocks, the baseline model estimates show that a 25 basis point monetary policy shock causes a 0.3% change in house prices at a horizon of roughly two years, gradually diminishing after that. The variance decompositions indicate that monetary policy shocks account for 5.7% of house price variance at the three-year horizon.

The results also reveal a link between the current account balance and property prices. A one-standard-deviation current account shock causes a 0.6% change in house prices, and the shocks account for 13.7% of house price variance at the three-year horizon.

One important implication is that expansionary monetary policy must have played a minor role in the past decade's property price bubble, contrary to Taylor's (2009) assertion. Taking the paper's finding at face value, a huge 200 basis point expansionary shock would have led to only a 2.4% house price appreciation, far less than the observed double-digit increases. The small size of the interest rate effects are consistent with those reported by a number of other recent papers, including those of Jarociński and Smets (2008), Dokko et al. (2009), and Glaeser et al. (2010).

With a somewhat larger share of the variance decomposition, current account shocks may have played a somewhat more important role in the bubble, and the paper makes a valuable contribution in highlighting this channel. Even so, a 2.6-standard-deviation inflow (a one in 25 year event) would have resulted in an appreciation of only 1.6%.

The role of mortgage market sophistication is discernable but modest. In countries that score high on the IMF mortgage market development index, a 25 basis point monetary policy shock causes a roughly 0.5% change, compared with 0.2% for those with unsophisticated markets; the shares of house price variance attributable to monetary policy shocks at the three-year horizon are 7.1% and 4.3%, respectively. The difference for capital flow shocks is comparable: a peak response of 0.9% for countries with sophisticated mortgage markets, versus 0.6% for those with less developed markets, and variance contributions of 9.6% and 14.1%, respectively.

4. Interpreting the responses to monetary policy shocks

As noted in the paper's introduction, a number of theories are capable of explaining the response of property prices (and asset prices more generally) to interest rates. The most basic is the venerable and much-maligned user cost (UC) model. Some have suggested that

credit and risk-taking channels are also operative. All three models deliver an inverse relationship between the interest rate and the property price, which is qualitatively consistent with the paper's findings on the effects of monetary policy shocks.

Of course, one would also like to know whether the results were *quantitatively* consistent with these models' implications. A natural question to ask in this context is whether the standard UC model can explain the magnitude of the estimated interest rate response. If not, then one would need to appeal to some additional effect, like those implied by the credit and risk-taking channels.

The quantitative implications of the UC model are easy to work out, thanks to its direct link between the interest rate and the property price. The model is based on the assumption that people should be indifferent on the margin between renting and owning. The relationship is embodied in an equation linking the rent-to-price ratio, *R*/*P*, to the user cost,

$$\frac{R_t}{P_t} = UC_t = (i + \tau_t^P)(1 - \tau_t^Y) + \delta - \pi_t^e$$

where i is the relevant interest rate, τ^P is the property tax rate, τ^Y is the income tax rate, δ is the rate of physical depreciation, and π^e is the expected rate of property price appreciation. Naturally, given the imperfections and frictions in both the rental and owner-occupied markets, it is unrealistic to expect that this relationship would hold at every moment in time. It is nevertheless a useful benchmark for assessing the likely magnitude of the interest rate effects.

The basic UC equation can be differentiated to obtain the elasticity of the house price with respect to the interest rate holding rent constant,

$$\frac{dP}{di}\frac{i}{P} = -\frac{i(1-\tau^Y)}{(i+\tau^P)(1-\tau^Y)+\delta-\pi^e}$$

In the absence of taxes and depreciation and with π^e = 0, the elasticity is 1; for plausible values of τ^P, τ^Y and δ, the elasticity is roughly 0.75.

Armed with this relationship, it is straightforward to calculate the UC-implied contribution of low interest rates to the housing boom in the United States. As shown in Figure 2, the rent-to-price ratio fell by 25% from 2001 to 2005, mostly driven by the steep increase in house prices. Over the same period, the real UC fell from roughly 6% to 5%, a decline of one percentage point, or 18%. Using an elasticity of 0.75, the UC reduction should have led to a 13.5% drop in the rent-to-price ratio, roughly half of the observed decline. The UC model therefore goes a long way towards explaining rising property values during the boom period.

Relative to this benchmark, the paper's VAR model delivers a much smaller estimate of the interest rates' contribution. Specifically, given the link between long- and short-term interest rates, the VAR results suggest that roughly ten 25-basis-point expansionary monetary policy shocks would have been required to produce a one percentage point reduction in the long-term interest rate observed in the data. The total impact of these ten rate cuts on house prices would have been a mere 5%. This is much less than the appreciation implied by the UC model, and it comprises only a small fraction of the observed appreciation.

The fact to be explained, then, is not what can account for the positive effect of expansionary monetary policy on house prices; the conventional UC model is perfectly capable of explaining that relationship. Instead, the puzzle is why the response is so much *smaller* than would be implied by the UC framework. Since the credit and risk-taking channels would presumably accentuate the impact of monetary policy, incorporating these effects would only

deepen the mystery. What is needed instead is a theory to explain the *in*sensitivity of house prices to interest rates, relative to the UC benchmark.[2]

5. Interpreting the responses to capital flow shocks

One of the significant contributions of the paper is to highlight the possible role of capital flows (the current account balance) in driving asset price fluctuations. This has long been an issue in emerging markets, and the paper shows that similar forces have been at work in industrialised countries. In the case of the United States, Figure 3 clearly shows that the sharp post-2000 rise in property prices (the decline in the rent-to-price ratio) coincided with a widening current account deficit.

The pattern is evident in other countries as well. As shown in Figure 4, the link between capital flows and house prices appears strong in the United States, New Zealand, Ireland, and the United Kingdom, all of which ran persistent current account deficits over the relevant period. Similarly, Spain and Canada moved from surplus to deficit during the period as property prices escalated. Austria, whose current account went from deficit to surplus, experienced the lowest rate of house price appreciation. More puzzling is the observation that countries with persistent surpluses, such as Denmark and Norway, also experienced robust house price growth.

Discerning the economics underlying the response to capital flow shocks is more difficult than in the case of the monetary policy shocks, however. One reason is that house prices and capital flows are jointly determined in equilibrium, as functions of various other behavioural relationships and exogenous variables.

Specifically, the current account is usually modelled as the difference between investment and the sum of private and government saving. Net foreign saving also enters the picture, to the extent that it affects the interest rates faced by domestic consumers and businesses. What the paper labels a capital flow shock, therefore, may result from any one of a number of things: changes in government saving, changes in consumers' expectations or preferences, investment shocks, or exogenous shifts in the supply of net foreign saving. It is therefore hard to know exactly what is meant by a capital flow shock, and whether one should expect the response of house prices to be the same regardless of the source of the shock.

Moreover, the direction of causality between capital flows and property prices is unclear. A plausible alternative explanation of the observed co-movements has property prices driving capital flows, rather than the other way around. According to this view, positive property price shocks increased households' net worth, leading to a reduction in saving, and it was this decline in saving that led to growing current account deficits.

Of the likely sources of capital flow shocks, perhaps the most interesting from a policy perspective is the change in net foreign saving, which corresponds to Ben Bernanke's "global savings glut" idea. This hypothesis, which provides a plausible explanation for the observed global co-movement in property prices, implies a cross-country correlation in capital flow shocks. A worthwhile extension or alternative to the framework used in the paper would therefore incorporate a factor structure, as in the models of Del Negro and Otrok (2007) and Otrok and Terrones (2005).

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[2] Glaeser et al. (2010) provide one explanation of why the standard UC model overpredicts the impact of interest rates on house prices. Their hypothesis is that the option to refinance, combined with high labour mobility, reduces the effective duration of housing investment, rendering its price less interest-sensitive.

6. Conclusion

This is an excellent contribution to a growing literature that seeks to explain property price booms and busts in terms of macroeconomic fundamentals and financial structure. Using impressive econometric technique, the authors' results corroborate other studies' finding of a relatively small interest rate effect, while documenting an intriguing link between capital flows and property prices. The effects are larger in countries with more sophisticated mortgage markets, although the differences are perhaps less pronounced than one might have suspected. All told, monetary policy and capital flows account for no more than 25% of property price fluctuations in industrialised countries. The ineluctable conclusion is that while identifiable economic fundamentals are important factors, there is still a lot we do not know about the forces driving house price booms and busts.

Figure 1

Real Property Price Appreciation in Seven Advanced Economies

2000–2010

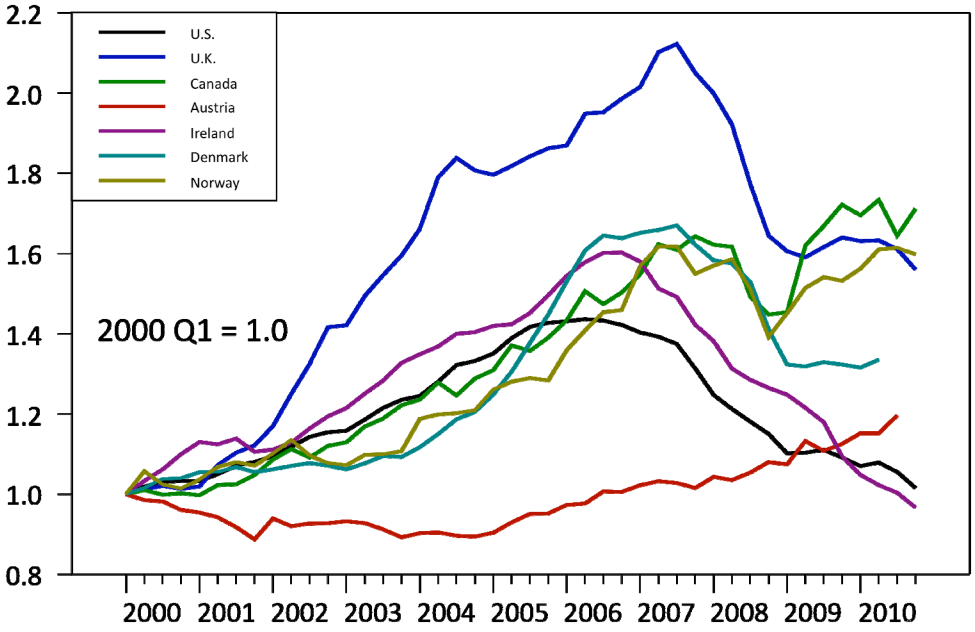


Figure 2

Rent-to-Price Ratio and User Cost in the U.S.

1985–2010

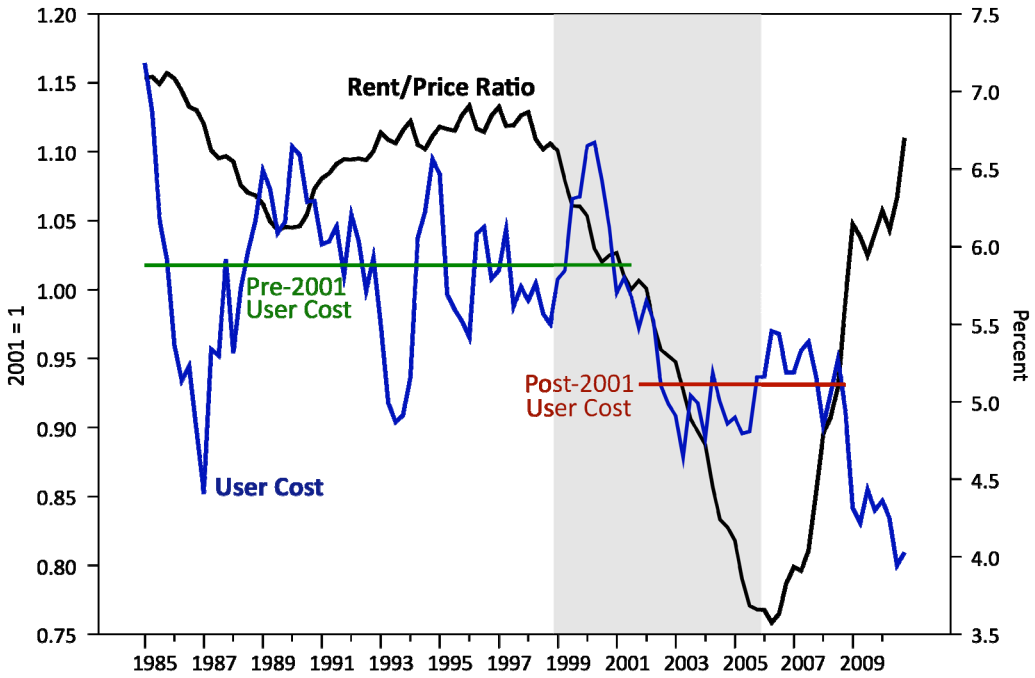


Figure 3

Current Account Balance and the Rent-Price Ratio in the U.S.

1985–2010

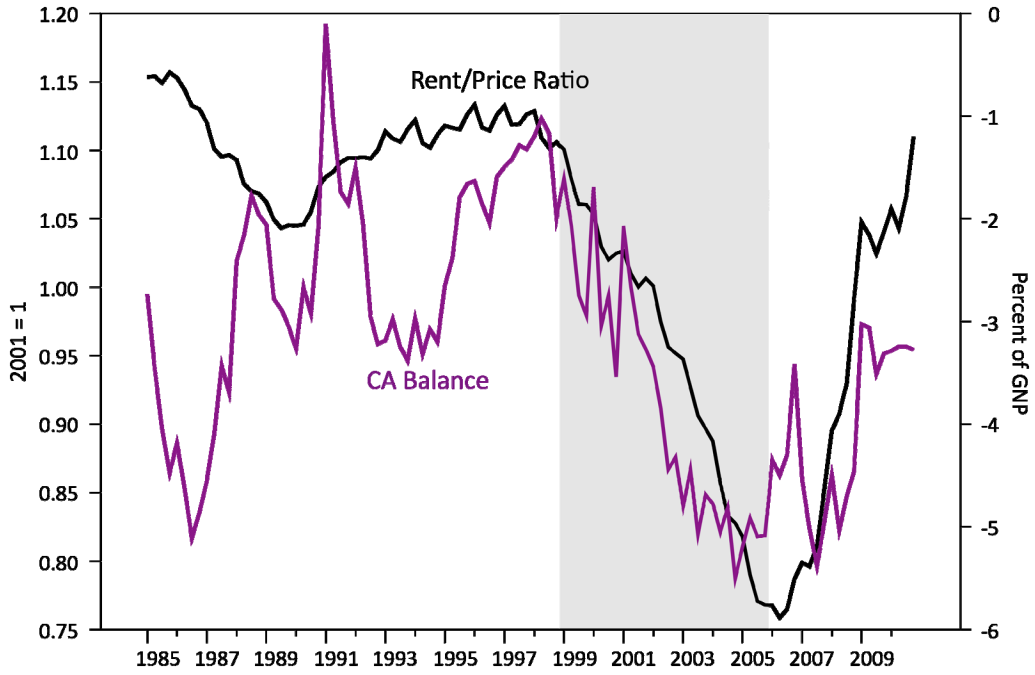
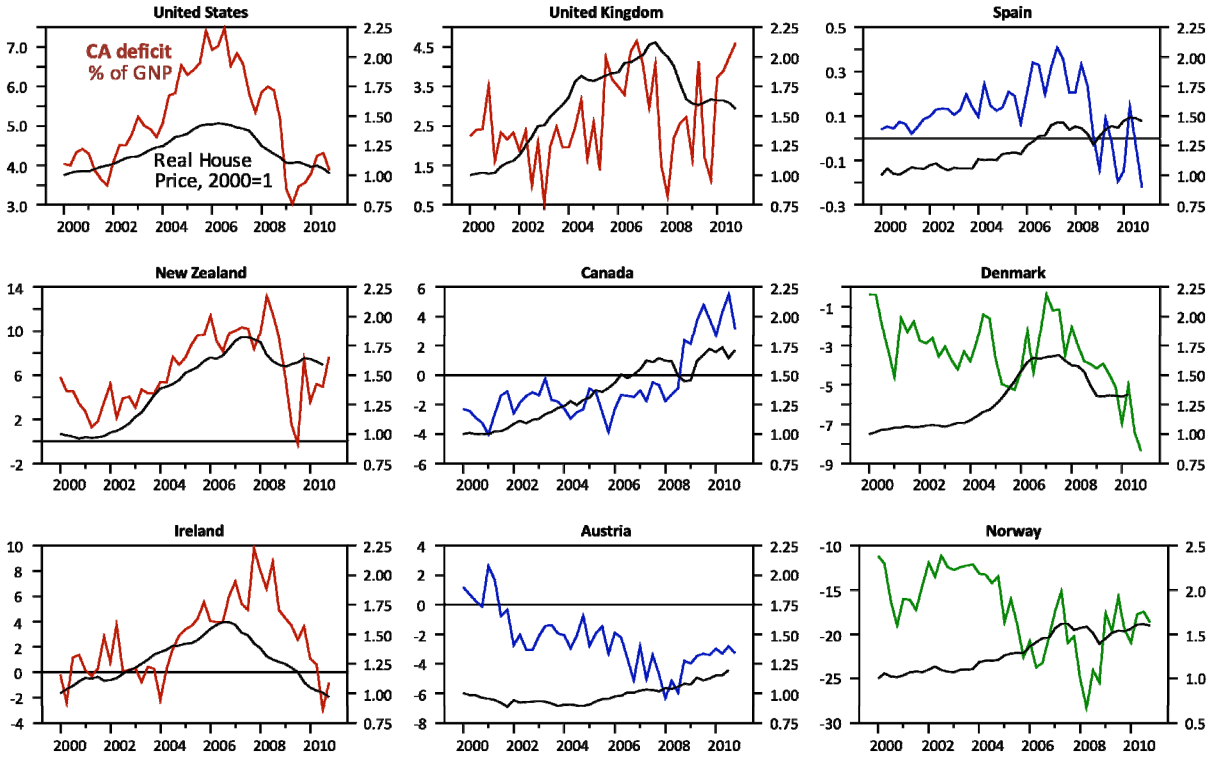


Figure 4

Current Account Balance and Property Prices in Nine Advanced Economies

2000–2010



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