A Model of Housing Boom and Bust in a Small Open Economy

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The recent financial turmoil in the United States has clearly demonstrated that an unexpected decline in house prices following a strong housing boom can destabilize the financial system, causing negative spillovers to the rest of the economy. Given the potentially significant impact of fluctuating house prices on the financial system, it is important for central banks to enhance their understanding of boom and bust cycles in the housing market.

This article summarizes Tomura (2008), which considers a possible relationship between boom and bust cycles in house prices and household expectations of income growth, using a small-open-economy model for the Canadian economy. The model highlights the development of household expectations during a period of high household income growth when households are uncertain about the period's duration. During the high-growth period, uncertainty prompts households to expect that their income growth will continue to be high in the next period with some probability. When the high-growth period ends, however, households correct their expectations. Since house prices reflect household expectations, a boom and bust cycle in house prices emerges. The amplitude of the cycle is found to be dependent on financial market conditions.

Zeira (1999) analyzes a similar scenario for stock market boom and bust cycles, using a partial-equilibrium model with an exogenous real interest rate. Tomura (2008) considers a macroeconomic model incorporating house prices and an endogenous domestic real interest rate, and analyzes the role of financial markets in housing-market dynamics. The model highlights an improvement in the terms of trade as the source of high household income growth, based on Canada's experience in the past decade.

THE MODEL

In the model, the domestic economy (Canada) trades with the rest of the world. The relative price of exports to imports (i.e., the terms of trade) is determined in world markets and is not influenced by the volume of trade that flows in and out of the domestic economy. This assumption reflects the real-world situation, in which the prices of Canadian exports and imports are largely determined by demand and supply in world markets. The model also assumes that the terms of trade improve for an unknown period of time, moving towards a higher but unknown level that will persist in the long run. This assumption is based on the steady improvement in Canada's terms of trade since 2000 and the observation that Canada's terms of trade have occasionally experienced permanent shifts since 1970. The model introduces uncertainty regarding the duration of the transition period, since it is difficult for households to predict exactly when the terms of trade will stabilize at their new long-run level.

An improvement in the terms of trade raises the trading value of the domestic economy's output, and the resulting rise in purchasing power for imported goods increases real household income. Hence, when the terms of trade improve towards a new long-run level, the growth of household income is temporarily accelerated.

In the domestic economy, firms produce goods by employing labour and capital, which are, respectively, supplied and owned by households. The products of domestic firms can be sold domestically or exported abroad. There are two types of households in the economy: homebuyers who finance their housing investments through mortgages, and those who make mortgage loans to the homebuyers. When homebuyers take mortgage loans, they make down payments to satisfy the loan-to-value ratio required by lenders. Homebuyers and lenders can be thought of as young and old households, respectively.

Households can lend and borrow in international financial markets at a given world real interest rate.[1] Thus, international

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1. The model simplifies the analysis by abstracting from the role of financial intermediaries in financial markets.

financial markets absorb excess credit supply and demand in the domestic financial market. Households incur a cost to transact in international financial markets. This cost represents various "frictions" that hamper smooth international financial transactions, such as country-specific interest premiums, the cost of complying with financial regulations, and transactions costs across borders.

MAIN RESULTS

There are two main results. First, in a period of high household income growth driven by improved terms of trade, households expect the high income growth to continue in the next period with some probability, since they do not know exactly when the period of high income growth will end. Current real house prices rise on these expectations, since households anticipate that demand for housing will rise with income. When the period of high income growth ends, however, households correct their expectations, and real house prices drop abruptly.

The second result concerns the role of financial markets in the formation of boom and bust cycles. During the period of high household income growth, the expected high future income lessens the need for households to save to support future consumption. If the cost of access to international financial markets is high, then the shortage in the supply of domestic credit raises the domestic real interest rate so strongly that it offsets the effect of expected high future house prices on current house prices, as illustrated by a simplified house-price equation:

$$\text{Current real house price} = \text{Imputed rent} + \frac{\text{Expected future real house price}}{1 + \text{Real interest rate}}.$$

This equation implies that if the real interest rate moves in concert with expected future house prices, then current house prices become insensitive to expected future house prices. In this case, real house prices rise during the period of high household income growth, since income growth increases housing demand and thus imputed rent, but the correction of household expectations at the end of the high-growth period does not cause a fall in real house prices.

On the other hand, if the cost of access to international financial markets is low, then capital inflows from international financial markets offset the shortage in domestic credit supply. Fluctuations in the domestic real interest rate are consequently attenuated, and current real house prices become sensitive to expected future real house prices. At the same time, the stabilized real interest rate lets household mortgages grow strongly during the housing boom. Mortgage growth becomes even stronger when the loan-to-value ratio in the residential mortgage market is high, since higher loan-to-value ratios allow borrowers to increase their loans when

house prices rise. The strong mortgage growth fuels the housing boom while, at the same time, the financial position of households becomes more fragile as leverage increases. This development exacerbates the housing bust, since more housing collateral must be liquidated to service larger mortgage repayments when house prices drop.

With realistic parameter values, the model does not fully explain the typical magnitude of housing-market boom and bust cycles. Thus, the mechanism described above is complementary to other possible contributors to boom and bust cycles in the housing market.

CONCLUSIONS

Using a macroeconomic model of a small open economy, the author analyzes a possible linkage between household expectations and housing-market dynamics when the duration of a period of high household income growth is uncertain. The model suggests that financial market conditions that determine the financing cost of mortgage loans and, hence, mortgage growth, play an important role in the linkage. The policy implication of the model is that monitoring joint developments in the real interest rate and in household expectations during housing booms is important in assessing the risk of future housing-market crashes caused by corrections in household expectations.

REFERENCES

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