



The price responsiveness of housing supply in OECD countries



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ABSTRACT

The responsiveness of housing supply to changes in prices bears important implications for the evolution of housing prices and the speed of adjustment of housing markets. Based on a stock-flow model of the housing market estimated within an error correction framework, this paper estimates the long-run price elasticity of new housing supply in 21 OECD countries. Estimates suggest that the responsiveness of housing supply to price changes varies substantially across countries. It is relatively more flexible in North America and some Nordic countries, while it is more rigid in continental European countries and in the United Kingdom. The responsiveness of housing supply depends not only on national geographical and urban characteristics but also on policies, such as land use and planning regulations.

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1. Introduction

The responsiveness of housing supply to changes in prices is a crucial factor in the functioning of housing markets. It determines the extent to which the housing market responds to demand shocks with increased construction or higher prices. This has potential implications for the evolution of key housing market outcomes such as housing prices and affordability. For instance, existing evidence suggests that in supply-constrained markets, most of the adjustment occurs in the price of housing rather than in expanding housing supply (Glaeser et al., 2008; Gyourko, 2009). Other evidence suggests that regions with high supply responsiveness have relatively small price rises following demand shocks (e.g. Grimes and Aitken, 2006). Housing price “bubbles” are more common and last longer in areas where supply is inelastic Glaeser et al. (2008). Supply conditions also matter for house price volatility and aggregate economic

stability. An unresponsive housing supply can increase the sensitivity of house prices to demand shocks and, thus, influence private consumption patterns and residential investment. For instance, in the short to medium term, an increase in housing demand will translate into lower increases in real house prices in areas with more responsive housing supply. However, the flip side is that in flexible-supply areas, housing investment adjusts more rapidly to greater changes in demand contributing to more cyclical swings in economic growth, as witnessed by recent developments. A quantification of the responsiveness of housing supply with respect to prices can, therefore, shed light on the trend evolution and volatility of house prices in OECD countries. It can also provide valuable information for housing policy reforms aimed at dampening housing price volatility and increasing macroeconomic resilience to shocks.

Despite its importance for the analysis of housing markets and policy, very little cross-country empirical evidence exists on the responsiveness of supply with respect to prices, partly reflecting data constraints. This paper aims to fill this gap, by estimating the long-run price elasticity of new housing supply for 21 OECD countries for which data

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are available. The analysis is based on a stock-flow model of the housing market. The price-elasticity of new housing supply is estimated separately for each country over the period from the early 1980s to mid-2000s, as the price coefficient on a long-run supply equation, which is jointly estimated with a long-run price equation in an error correction framework.¹ This empirical approach has the advantage of being simple enough, so that comparable estimates can be obtained for a large number of OECD countries, and be grounded on sound theoretical foundations. Ample evidence suggests that housing markets only adjust slowly to changes in market conditions due to, among other factors, product heterogeneity and costly search and transaction costs. The error correction framework employed in this paper takes into account such slow adjustment of housing markets.

The empirical results suggest that housing responsiveness varies substantially across countries, with potential consequences for the speed of adjustment of housing markets. New housing supply tends to be relatively flexible in North America and some Nordic countries, while it is more rigid in continental European countries and in the United Kingdom. For instance, long-run supply elasticities in the United States, Canada, Sweden and Denmark are above unity, implying that in response to a demand shock, housing output will increase relatively more than prices. On the other hand, the responsiveness of housing supply tends to be quite low in countries such as Switzerland, the Netherlands, Austria or Italy. These estimates are broadly in line with casual and early evidence (e.g. Swank et al., 2002). The responsiveness of housing supply depends not only on national geographical and urban characteristics but also on policies, such as land use, planning and rental regulations. While the link is hard to establish empirically due to data limitations, we present some suggestive evidence that cumbersome land use and planning regulations across OECD countries are associated with a less responsive housing supply in the long-run.

The remainder of the paper is organised as follows. Section 2 presents the theoretical framework used to analyse the housing sector. Section 3, describes the approach to estimate the price-elasticity of new housing supply and the data. Section 4 presents the empirical results and compares the estimates of the responsiveness of housing supply with those of other studies. Section 5 discusses potential drivers of differences in the responsiveness of housing supply across countries. Section 6 concludes and discusses policy options to enhance the responsiveness of housing supply.

2. A model of the housing sector

This section presents the conceptual framework underlying the estimation of the long-run price elasticity of new housing supply. The empirical approach builds on a stock-flow model of the housing sector to estimate the elasticity

of new housing supply with respect to price. This model has long been used in the literature as the main theoretical framework to describe the housing sector (see Di Pasquale and Wheaton (1994) for a review). It has the key advantage of considering the dual role of housing as a capital investment and consumption good, as well as to distinguish between the stock of housing and the flow of housing investment. One important feature of the housing market is that the housing stock adjusts slowly to changes in demand: housing investment is lumpy as building takes time and depreciation of the housing stock is slow. Thus, housing markets can clear rapidly only if prices react strongly to tensions between demand and supply. However, the heterogeneity of housing generates search and transaction costs which make it difficult for households to react swiftly to price signals (Di Pasquale and Wheaton, 1994). Hence, stock equilibrium is achieved only in the long-run.

In the long-run, two important drivers will influence housing demand (Meen, 2002). First, expected or permanent income and developments in the age and structure of the population will determine the quantity of housing demanded. Second, the user cost of holding the housing asset, which is in turn influenced by interest rates, taxation and expected capital gains of owning the house also matters for demand. Housing demand can be expressed as a function of exogenous factors such as, income, demographic characteristics and the user cost of housing (summarised in X_1), and the real price level of housing (P). In the long run, the demand for housing (D) determines the equilibrium price that will clear the stock of housing (S), as given by the following equation:

$$D(X_1, P) = S = \int_0^T dS \quad (1)$$

On the supply side, the stock of housing slowly depreciates over time, at a depreciation rate δ , and expands gradually with new residential investment (I) as given by the differential Eq. (2):

$$dS = I(X_2, P) - \delta S \quad (2)$$

The stock equilibrium demand, given by Eq. (1) leads to long-run adjustments in the rate of growth of the housing stock through investment in new construction. Residential investment is, in turn, a function of cost shifters, such as costs of production in terms of land, labour and materials, and housing policies summarised in the vector X_2 , as well as real house prices. Because house prices affect the incentives to build new housing and/or maintain the existing stock of housing they have an effect on residential investment.

Inverting the demand function (1) (assuming a log-linear relationship between the variables) and adding an error term ε_t^p , the observed price, p_t can be expressed as a function of the equilibrium price p_t^* (determined by the housing stock and demand shifters):

$$p_t = \alpha_0 - \alpha_1 s_t + \alpha_3 X_1 + \varepsilon_t^p = p_t^* + \varepsilon_t^p \quad (3)$$

where all the variables are expressed in logs (and denoted in small letters) and the subscript t denotes time. Similarly, long-run residential investment can be expressed as

¹ The analysis is macro in nature, essentially treating each country as a single housing market. Although in reality housing markets are typically local or regional, country-level estimates give a sense of differences in the overall responsiveness of housing supply across countries.

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