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Supply restrictions, subprime lending and regional US house prices☆

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ABSTRACT

With regard to the recent US house price cycle, we analyze how the interaction between housing supply restrictions, mortgage credit constraints and a price-to-price feedback loop affects house price volatility. Considering 247 Metropolitan Statistical Areas, we estimate a simultaneous boom-bust system for house prices, housing supply and subprime lending. The model accounts for regional differences in supply elasticities that are determined by local variations in topographical and regulatory supply restrictions. Our results suggest that tighter supply restrictions lead to both a larger house price boom and bust, and that this is due to supply restricted areas being significantly more exposed to a financial accelerator effect and a price-to-price expectation mechanism. We further find that the presence of endogenous price acceleration mechanisms contribute to dilute the positive relationship between the total quantity response and the supply elasticity during a housing boom.

1. Introduction

In most industrialized countries, the past decades have demonstrated a crucial role of national house price cycles in transmitting shocks to the real economy (Ferreira et al., 2010; Levitin and Wachter, 2013). However, there are large discrepancies in house price dynamics also within a particular country, and national house price cycles are often driven by developments in certain regional markets (Capozza et al., 2004; Glaeser et al., 2008; Malpezzi and Wachter, 2005). For instance, while house prices increased by more than 160% in some coastal areas of Florida and California from 2000 to 2006, they increased by less than 20% in inland open space areas of the Midwest. Against this background, we consider 247 heterogeneous US housing markets and analyze whether differences in supply restrictions, subprime lending and price acceleration mechanisms can explain the diverse price patterns observed throughout the 2000s.

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A branch of the literature attributes the regional variations to heterogeneous supply side restrictions (see e.g. Malpezzi (1996), Green et al. (2005), Gyourko et al. (2008), Saiz (2010) and Glaeser (2009)). In several areas located in Florida and California, housing construction is geographically restricted by the coast line or mountains etc., while inland areas face less such restrictions. Further, some local governments try to influence building activity through their regulatory framework. Against this background, Glaeser et al. (2008) develop a theoretical model to demonstrate how differences in supply side restrictions are expected to affect price and quantity dynamics through a boom-bust cycle. Their model offers two main predictions. First, during a demand-driven housing boom, supply restricted areas primarily react by increasing house prices, while unrestricted areas absorb most of the shock through higher construction activity. Secondly, assuming supply is rigid downwards, a corresponding reduction in demand during the subsequent bust period will have a negative but equally sized impact on house prices in supply-restricted and - unrestricted areas.

Using MSA level data for the 1982–1996 US house price cycle, Glaeser et al. (2008) find that more supply-inelastic areas witnessed greater house price booms, while they do not find any robust relation between the drop in house prices during the bust and supply elasticity. This is in contrast with the results in Huang and Tang (2012), who show that house prices dropped significantly more in supply-inelastic areas during the bust period of the late 2000s.

The conflicting results in the literature might indicate that other price-stimulating mechanisms gained importance during the house price cycle of the 2000s. If price increases lead to expectations of further price increases, or to a relaxation of credit constraints, this can have a strong amplifying effect on demand (Aoki et al., 2004; Bernanke and Gertler, 1989; Glaeser et al., 2008; Iacoviello, 2005; Kiyotaki and Moore, 1997). In this paper, we demonstrate how the inclusion of such acceleration mechanisms in a model similar to Glaeser et al. (2008) change the predictions considerably. First, more supply-restricted areas are expected to experience an even stronger house price boom. Second, the stronger price increase has a positive effect on supply, diminishing the difference in the quantity response between restricted and unrestricted areas. Since both forces have a negative impact on house prices during a bust, this provides a plausible explanation as to why supply-restricted areas are observed to have experienced larger price drops during the recent housing bust.

To analyze the empirical relevance of these theoretical conjectures, we consider a simultaneous equation system for the 2000–2006 boom period. The system includes a price, a quantity and a credit relationship. The financial accelerator is captured by an endogenous feedback effect between house prices and subprime lending. We analyze how the effects of the financial accelerator deviate across areas depending on the supply elasticity. The latter is accounted for by area-specific supply elasticities depending on both topographical and regulatory supply restrictions. We also explore the relevance of a price-to-price feedback loop, by assuming that price expectations are formed adaptively, which is motivated by results in Abraham and Hendershott (1996), Shiller (2008), Case et al. (2012) and Jurgilas and Lansing (2013).

The contributions of our econometric analysis are twofold. First, our model has the advantage that it allows us to study not only the price dynamics, but also the quantity and subprime responses to, e.g., a positive housing demand shock. Second, it allows us to identify how the financial accelerator and adaptive expectations affect regional house price dynamics, and how the price, quantity and subprime responses depend on supply side restrictions.

Our econometric results confirm the main conjectures of the theoretical model. First, we find that there was both a significantly stronger financial accelerator and price-to-price feedback loop in more supply-restricted areas during the recent boom period. Second, even though these areas experience a relatively low quantity response for a given price increase, the stronger endogenous price acceleration contributes to a large increase in construction activity. In fact, our results suggest that the acceleration mechanisms contribute to diluting the relation between supply restrictions and the total quantity increase. Since housing supply is rigid downwards, this also offers a sensible explanation as to why more restricted areas were hit harder during the recent housing bust (Huang and Tang, 2012).

The financial and expectations accelerators are found to reinforce each other, with the expectations accelerator working through the financial accelerator. The financial innovations of the late 1990s - especially the introduction of subprime mortgages - may have strengthened these acceleration effects through the recent house price cycle, which provides an explanation to the diverging results found in Glaeser et al. (2008) and Huang and Tang (2012). Our results also suggest that regulatory restrictions are more important than geographical restrictions in explaining regional housing market differences. This implies that when deciding to regulate housing supply, policy makers should bear in mind how this – in combination with geographical restrictions and deregulation of financial markets – may affect the dynamics of the housing market through a boom-bust cycle.

Controlling for, among others, differences in income levels, population density, poverty rates and foreclosure laws does not materially change our results.

The paper proceeds as follows. The next section provides a theoretical motivation for the empirical analysis. In Section 3, we present our econometric models, the empirical hypotheses and describe the data that are utilized in the econometric analysis. Section 4 presents and discusses the empirical results. In Section 5, we explore the robustness of our findings, while the final section concludes the paper.

2. Theoretical motivation

2.1. A baseline supply-demand framework

Following Glaeser et al. (2008), we consider an economy consisting of several heterogeneous housing markets with different supply elasticities. Assuming that all areas initially are hit by a positive and similar sized exogenous