Drawing inferences about housing supply elasticity from house price responses to income shocks ☆

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Abstract

The purpose of this paper is to provide information about the price elasticity of the supply of housing. I examine the relationship between the average price of single-family housing and the amount of personal income. A two-equation vector error correction system is estimated using a panel data set consisting of 76 MSAs from 1980 to 1998. The results suggest an elastic long-run supply function but a relatively slow pace of adjustment to long-run equilibrium. Hence a major demand shock can be expected to impact housing prices for several years following the shock. Differences in the responsiveness among subgroups of MSAs are examined and found to be generally minor.
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1. Introduction

The answers to a variety of questions about public policies toward housing revolve around one's view about the supply adjustment process. For example, the impact of a switch to a flat tax or a consumption tax from the current income tax system upon the asset price of owner-occupied housing is a subject of some debate. Such reform would reduce the subsidies embedded in the federal income tax system and likely reduce the demand for owner-occupied housing and its asset price.[1] The extent of the ultimate decline depends

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[1] Bruce and Holtz-Eakin [7] and Green et al. [15] discuss these issues and the role of the supply elasticity in a round of discussions of tax reform. Hendershott et al. [16] and Ling [19] do the same for the tax reform debates of the 1980s.

upon two key behavioral parameters—the price elasticity of demand and the long-run price elasticity of supply. The literature generally places the price elasticity of the demand for owner-occupied housing near minus unity (Rosen [29]); unfortunately, a broad consensus about the supply elasticity of housing does not exist. The purpose of this paper is to provide new information regarding:

- The long-run supply elasticity of housing.
- The speed of supply adjustment to the steady state.
- The short-run dynamics in the housing price path.

The approach used here is based on a reduced form equation for housing price derived from a supply and demand model of the housing market, in which income represents the demand shift variable. The distinguishing feature of this study is the vector error correction (VEC) approach. This method enables one to investigate housing market dynamics directly, while imposing little structure. A critical part of the model is the cointegrating relationship between prices and the amount of personal income. This equation may be interpreted as the reduced form equation for the asset price of housing and, as such, it represents the long-run equilibrium condition expected to hold between the level of prices and the amount of personal income. This relationship depends critically on the demand and long-run supply curves. That is, evidence of a long-run positive relationship between house prices and income suggests the long-run supply curve is less than perfectly elastic. The reduced form supply and demand model discussed below enable the computation of a range of possible supply elasticities with some assumptions regarding price and income elasticities of demand.

The VEC model consists of equations for price and income growth. The model is based on errors from the estimation of the cointegrating relationship, as well as lagged price and income changes. Impulse response functions are utilized to examine the impact on housing prices of an unanticipated shock to income over a period of ten years. The impulse response function for the system is particularly insightful because it takes into account the likely interaction between prices and income not captured by a traditional reduced form equation.[2]

The estimates of the VEC and, in particular, the coefficient on the residuals from the cointegrating equation provide insights about the speed at which housing prices adjust to their long-run equilibrium after a shock to income. Since housing prices are dependent upon other variables, metropolitan area fixed effects are included in both the cointegrating equation and the VEC model to control for the myriad of other factors that impact housing prices at the local level.

The unit of observation is the metropolitan statistical area (MSA). Annual data from 76 MSAs for the period 1980 to 1998 are included. Housing price indexes are produced

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[2] For example, Blackley and Follain [5] and others estimate structural models of the housing market and treat MSA level income as an exogenous variable; however, income may, in fact, be endogenous if the mobility of people and jobs and wage rates are responsive to the level of housing prices. In this sense, both income and housing prices are endogenous. A vector autoregression can capture such a relationship better than the traditional structural model.