Housing Supply Restrictions Across the United States

Relaxed building regulations

can help labor flow and

local economic growth.

RAVEN E. SAKS

LABOR MOBILITY IS the dominant mechanism through which local areas adjust to changes in the economic environment. When an area experiences a positive shock to local demand, firms respond by hiring more workers, and some of these new workers are attracted from other geographic locations. The construction industry plays a key role in this adjustment process by creating the housing and infrastructure needed to accommodate this inflow of labor. Residential development allows a city to expand and new workers to be hired, paving the way for economic growth. Conversely, if the pace of housing construction lags changes in local demand, the supply of labor will

be constrained. Consequently, the economic success of an area is linked to the ability of the construction industry and developers to accommodate changes in local economic conditions.

The importance of local economic factors is evident from a simple comparison of economic performance across American metropolitan areas. For example, employment in the Austin metropolitan area grew at an average rate of more than 5 percent per year during the past two decades, while metropolitan New York employment grew at an average of less than 1 percent per year. The extent of this geographic heterogeneity becomes even more evident when one examines the distribution of metropolitan area employment growth rates from 1980 to 2000. After decomposing these growth rates into contributions from national, regional, and local employment growth, only about 20 percent of the overall variance is related to nationwide employment changes. Regional shocks explain another 16 percent, while the remaining 64 percent is metro-specific, reflecting local economic and political forces.

The large degree of variation in economic performance across metropolitan areas suggests that development responds more easily in some areas than in others. To measure this local responsiveness, I estimate the elasticity of housing supply for more than 100 metropolitan areas. These estimates reveal a large degree of variation across areas, mirroring the geographic heterogeneity in economic performance. The responsiveness of the housing supply is related to the severity of local land-use and housing supply regulations. Thus, by limiting the ability of developers to build new housing, regulations slow down the efficient flow of labor and limit local economic growth.

HOUSING SUPPLY

The responsiveness of residential construction can be characterized by the elasticity of housing supply, which is the percent change in the housing stock that occurs in response to an increase in housing prices. Accordingly, an area that quickly adds new units as demand increases has a high elasticity. In contrast, an area with many housing market regulations cannot respond rapidly to changes in economic conditions, and therefore has a low supply elasticity. Not only does the elasticity of housing supply influence the quantity of new construction, but its effects can also be seen in housing prices. In areas that respond quickly to changes in economic conditions, an increase in demand will lead to only small changes in housing prices. However, when new construction does not respond easily, an increase in housing demand will not produce an increase in the

housing stock, but rather higher housing prices. Therefore, the elasticity of housing supply can be assessed by examining the responsiveness of housing prices and quantities to changes in housing demand.

In order to estimate these supply responses, it is necessary to identify changes in local housing demand. I identify these shocks by forecasting changes in local employment based on the industrial composition of an area. Predicted labor demand in each area is calculated as the weighted average of national employment growth rates by industry, where the weight given to each industry is equal to the share of that industry in total metropolitan area employment. This labor demand variable measures the growth in employment that would occur if all firms grew at a rate equal to national employment growth in its industry. Because these forecasts are based on national employment changes, they will reflect changes in housing demand without being influenced by local differences in housing supply. Consequently, these shocks provide a useful instrument to assess the elasticity of housing supply.

In order to calculate the elasticity of housing supply, I estimate the effect of these labor demand shocks on changes in the housing stock and housing prices for each metropolitan area. Building permits for new residential construction are used to estimate annual changes in the housing stock. Assuming that permits issued dur-

ing a given year are incorporated into the housing stock by the following year, the total size of the housing stock is equal to the number of units that existed the previous year plus the number of permits issued in that year, minus losses to the housing stock. I subtract an annual adjustment factor so that the total quantities match the 1980, 1990 and 2000 Census counts to reflect the housing stock loss for the area.

Housing prices are measured using the Office of Federal Housing Enterprise Oversight repeat-sales price index for each MSA deflated by the Personal Consumption Expenditure deflator. This index uses data on the sales prices of individual homes, and calculates price changes using homes that are sold multiple times. These price changes are aggregated to obtain a measure of housing price inflation for the entire metropolitan area. Because the index is based on repeated observations of the same home, changes in the quality of the housing stock over time will impact the results only if houses are renovated or depreciate significantly. These indexes are available from 1980 to 2001 for 131 metropolitan areas.

DEMAND SHOCKS

In areas with a highly elastic housing supply, shocks to housing demand will lead to large increases in the quantity of housing

Figure 1: Responses of Residential Construction and Housing Prices to Demand Shocks by Metropolitan Area
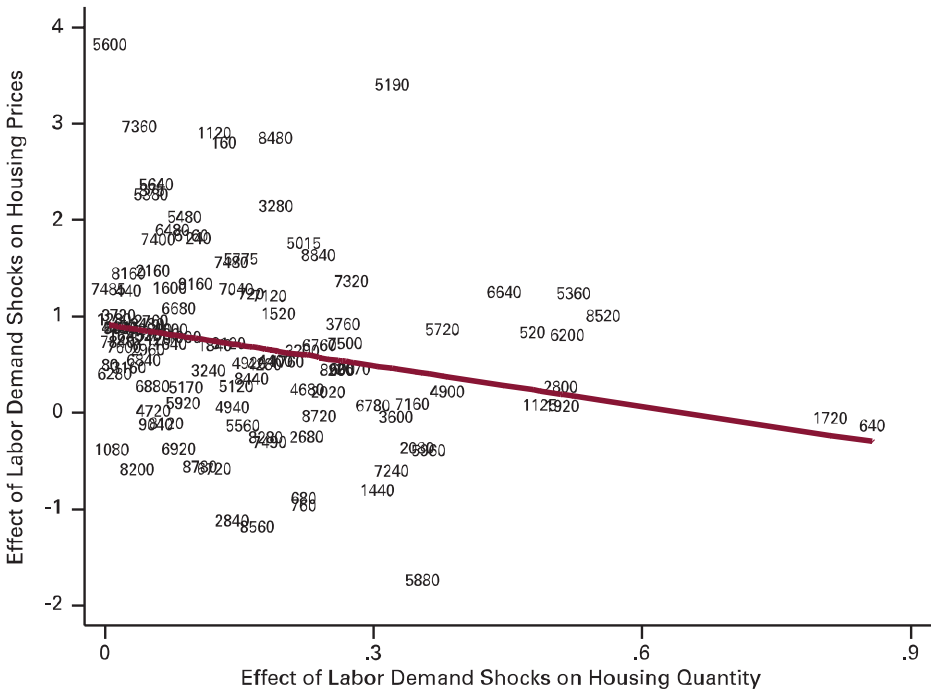
and small price increases. On the other hand, in areas that are supply-constrained, equal shocks will generate only small changes in the housing stock and large price increases. To illustrate this tradeoff, simple regression analysis shows the effects of the labor demand shocks on the housing market in each metropolitan area. The coefficients representing the effect on the housing stock in each location are plotted on the x-axis of Figure 1. The similarly estimated effects of the housing demand shocks on changes in prices are plotted on the y-axis of this figure. It is apparent that there is a wide degree of heterogeneity

across metropolitan areas. The effect of a 1 percent increase in labor demand on the housing stock ranges from 0 percent to 1.2 percent, while the effect on prices ranges from -2.0 percent to +4.0 percent.

Metropolitan areas with a higher housing supply elasticity appear in the lower right-hand corner of Figure 1. In these places, a change in labor demand is associated with a relatively large change in the housing stock and relatively low housing price inflation. In contrast, areas in the upper left-hand portion of Figure 1 have experienced smaller quantity responses, but larger price increases. Thus, the hous-

Table I: Effects of Demand Shocks on Housing Prices and Quantities

Effect on Prices	Effect on Quantities	Supply Elasticity	Name
		Most Elastic Areas	
-0.20	0.857	-4.29	Austin-San Marcos, TX
-0.12	0.810	-6.69	Colorado Springs, CO
0.95	0.557	0.59	Tucson, AZ
1.18	0.524	0.44	Nashville, TN
0.75	0.517	0.69	Phoenix-Mesa, AZ
0.01	0.511	68.1	Dallas, TX
0.21	0.509	2.44	Fort Worth-Arlington, TX
0.01	0.486	34.1	Boulder-Longmont, CO
0.77	0.478	0.62	Atlanta, GA
1.20	0.446	0.37	Raleigh-Durham-Chapel Hill, NC
		Most Inelastic Areas	
3.76	0.006	0.002	New York, NJ-NY
2.91	0.039	0.013	San Francisco, CA
2.85	0.122	0.043	Boston, MA
2.79	0.191	0.068	Trenton, NJ
2.74	0.133	0.048	Albany-Schenectady-Troy, NY
2.31	0.058	0.025	Newark, NJ
2.25	0.053	0.024	Bergen-Passaic, NJ
2.21	0.052	0.024	Nassau-Suffolk, NY
2.09	0.192	0.092	Hartford, CT
1.98	0.089	0.045	New Haven-Meriden, CT

ing supply in these areas is more inelastic. A list of the ten most elastic, and inelastic, metropolitan areas is displayed in Table I. The most constrained areas are New York, San Francisco and Boston, while areas that are relatively responsive include Tucson and Nashville. These results are not surprising, given anecdotal accounts of housing market regulations in these areas. To summarize the responses of prices and quantities in a single measure, Table I also shows estimates of the elasticity of housing supply for each area. This elasticity, which reflects the percent change in the housing stock relative to the percent change in prices, is the ratio of the two regression coefficients.

Although differences across areas are primarily related to local factors, a significant regional pattern is apparent. New construction is most responsive in the South, where the average elasticity is 0.56. Most areas in the Midwest are also relatively elastic, with a region-wide average of 0.25, while the housing supply in the Northeast is much more constrained, with an average elasticity of 0.07. The West's region-wide average of

0.24 masks a considerable variability, with Santa Cruz (0.01) being very inelastic, and Sacramento (0.43) being much less constrained.

GEOGRAPHIC DIFFERENCES

Why are some areas so much more supply-constrained than others? In a free market, increases in housing demand should provide an incentive for firms to build more housing, irrespective of geographic location. Since no developers would choose to forego potential profits, an unresponsive housing supply is a sign of external barriers. Examples of such barriers include zoning laws, building codes, height and lot-size restrictions, environmental regulations, and growth controls. Due to the wide variety in the types and severity of these regulations, it is difficult

to make a systematic comparison across locations. Despite this difficulty, a few researchers have characterized the degree of regulation in a select number of metropolitan areas by surveying local governments and developers. Table II reports regression coefficients of the relationship between the elasticity of housing supply and this survey evidence. In order to make these coefficients comparable, each survey measure is transformed into an index of supply regulation, with 0 being the least regulation, and 1 being the most.

The first variable in the table comes from the 1989 Linneman and Summers Wharton Urban Decentralization project, which surveyed local government regulating patterns. The survey addressed several aspects of housing supply regulation, including the time required for zoning permits to be approved, the fraction of permits approved, and the amount of ade-

Table II: Correlations between the Elasticity of Housing Supply and Measures of Government Regulation

Independent variable:	OLS Reg. Coef.		# Obs.
	No controls	Controlling for land supply	
Wharton Index	-2.01**	-1.76**	42
	(.83)	(.78)	
AIP Index	-1.51**	-1.11*	38
	(.62)	(.63)	
Suburban Land Availability	-1.53	-.87	31
	(.98)	(.89)	

Note: Standard errors in parentheses. Each entry of the table represents a separate regression expressing the log of the elasticity of housing supply as a function of the variable named in the row. The second column includes the fraction of land area covered by water as a proxy for the supply of land. All independent variables are transformed to range between 0 and 1, with higher values indicating more regulation. ** indicates significance at the 5 percent level, and * indicates significance at the 10 percent level.

quate infrastructure available for residential construction. Using factor analysis, the responses to four separate survey questions were combined into a single index. The second variable measures housing regulations at the state level from a survey conducted by the American Institute of Planners in 1976. The third variable is the fraction of suburban land that has been made unavailable for development through government regulations. This measure pertains to the period 1975 to 1978, and comes from a survey of Regional Councils of Governments. The correlation of each of these surveys with the elasticity of housing supply reveals that greater regulation is associated with a less responsive housing supply. Moreover, the magnitudes of these relationships are quite large. For example, a one standard deviation increase in the Wharton Index implies a 44 percent lower responsiveness of the housing supply. Therefore, regulations appear to be an important determinant of geographic differences in the elasticity of housing supply.

An alternative explanation for geographic variation in the elasticity of housing supply is that environmental differences make land more easily available in some areas than others. If land availability is the main determinant of the elasticity of housing supply, then areas with a lower elasticity should have more housing units crowded into a smaller amount of space. Indeed, many of the low-elasticity locations (54 percent of the areas with an elasticity below 0.1) have a relatively high density. However, many equally inelastic areas display a much lower housing density. Examples of low density, inelastic areas include Seattle and Santa Barbara. In these places, government regulations are the most likely source of limited residential construction. To investigate the importance of environmental constraints, the second column of the table shows regression analyses that incorporate the fraction of the local area covered by water (a proxy for land supply limitations). The negative relationship between the supply elasticity and government regulations remains, showing that government-induced supply restrictions are important even in the presence of natural barriers to construction. Therefore, the relative ranking of the supply elasticity parameters across metropolitan areas is a meaningful representation of the degree of local housing market regulation.

CONCLUSIONS

In areas where housing supply regulations seriously restrict new residential construction, the ability of firms to expand in response to changes in economic conditions is constrained. The importance of this effect is seen in Figure 2, which shows

the relationship between the elasticity of housing supply and net migration between 1980 and 2000. Areas with a lower elasticity of housing supply experienced much less migration during the same period. A one standard deviation decrease in the elasticity of housing supply corresponds to an 11 percent lower migration rate over the past two decades. This substantial effect on the labor supply has important implications for economic growth. Figure 3 plots the supply elasticity in each area versus average employment growth between 1980 and 2000. This positive relationship indicates

that areas with a more elastic housing supply have experienced higher growth rates than constrained areas. For example, compared with a metropolitan area at the 75th percentile (0.36) of supply responsiveness, an area with a supply elasticity at the 25th percentile (0.04) has experienced nearly one percentage point lower employment growth per year. To put this differential in perspective, average metropolitan area employment growth rates during this period ranged from -0.5 percent to 6.0 percent, with a standard deviation of 1.1. Therefore, differences in the elasticity of housing supply

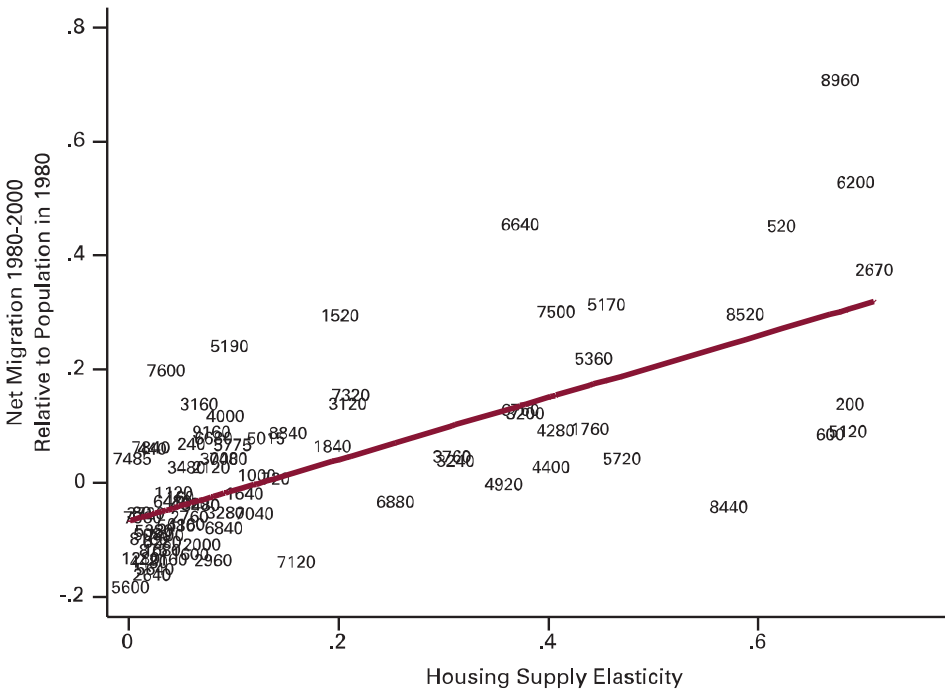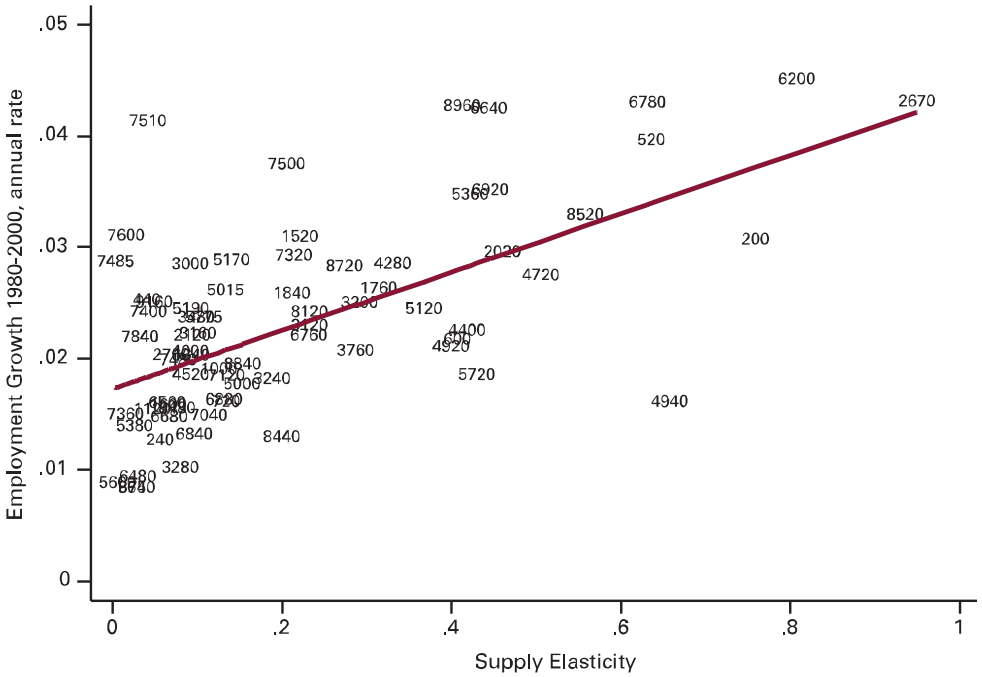**Figure 2:** The Elasticity of Housing Supply and Net Migration by Metropolitan Area

Figure 3: The Elasticity of Housing Supply and Employment Growth by Metropolitan Area

imply significant differences in employment growth rates across areas.

The effects of the housing supply on employment growth suggest why some areas have grown much more rapidly than others: local housing market regulations. The impact of the local regulatory environment on the housing market is clear. By reforming policies that restrict the housing supply, local governments can improve the ability of the development and construction industries to respond to changes in economic conditions and satisfy increases in housing demand. Only when these restrictions are relaxed can the supply of labor flow more competitively, improving local economic performance.