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METROPOLITAN-SPECIFIC ESTIMATES OF THE PRICE ELASTICITY OF SUPPLY OF HOUSING, AND THEIR SOURCES

By

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Stephen K. Mayo passed away suddenly on Thanksgiving Day, 1999. Formerly Principal Economist at the World Bank, at the time of his death Dr. Mayo was a Senior Fellow at the Lincoln Institute of Land Policy, Cambridge, Massachusetts. We owe Steve a great debt for his contributions to this paper and to our entire field.

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Introduction

Many reviews of housing economics (and most of the papers on the subject) have noted that, relative to many other aspects of market behavior, housing supply is under-studied. Surveys by Quigley (1979), Olsen (1987) and Smith, Rosen and Fallis (1988), to give but three examples, make this point. The market for research is in turn responding; for example see the recent special issue of the *Journal of Real Estate Finance and Economics* devoted to housing supply (Rosenthal, 1999), and especially the review by DiPasquale (1999). Despite these advances, the literature is best described as thin, especially relative to the acknowledged importance of the topic; and despite some recent advances there is no firm consensus on the nature of housing supply. A good example is the recent literature on the influence of the federal tax code on housing (Cappoza, Green and Hendershott (1996, 1999), Gravelle (1996), Holz-Eakin (1996)). CGH view housing as a good that is inelastically supplied, while Gravelle and Holz-Eakin view housing as an elastically supplied good. These studies highlight, first, that fundamental supply parameters underpin important policy issues, and second, that there is not yet consensus on these parameters.

One characteristic of housing supply that makes housing unusual is that the short-to-medium run supply curve for housing embeds a fundamental asymmetry, and can probably best be viewed as kinked. When housing demand falls, the market cannot easily adjust the supply of housing downward (because housing is so durable). On the other hand, absent constraints on land supply, the market should be able to largely absorb increases in demand via supply. Of course, it has been the case recently that the strong national market for new construction has led to material and labor shortages that have, in turn, driven up prices of materials and labor. That suggests that housing supply is not perfectly elastic in the face of increased demand, at least in the short run. Still, we would expect that in the absence of land-supply constraints, the speed of adjustment (in the DiPasquale-Wheaton (1994) sense) of markets to upward shifts in demand is faster than it is to downward shifts in demand.

An assumption of imperfect elasticity is supported by (for example) Blackley (1999), Kearl (1979), Schwab (1983), Topel and Rosen (1988) and Poterba (1991), who find that at the national level, the price elasticity of supply is between 1.5 and 4. In a paper that ties econometric modeling to urban theory, Mayer and Somerville (1999) on the national level find housing supply to be even last elastic than their predecessors. On the other hand, Muth (1960), Follain (1979), and Malpezzi and Maclennan (1996) find much higher elasticities, with point estimates as high as 20.

Using data for most of this century, Malpezzi and Maclennan present evidence that at least some of the differences between studies is likely due to differences in price behavior during the different sub-periods each author studied, and that the long run in housing markets may be long indeed. But another lesson of that paper, and of Malpezzi and Mayo (1997), is that there are significant differences in supply elasticities across countries; and that these differences seem to be correlated with the stringency of the regulatory framework in place for land and housing development.

What is true across countries may also be true across cities, especially in a country like the United States, with significant local variation in land use and other regulatory practices. Recent papers such as Goodman (1998) and earlier literature such as Struyk (1977) argue forcefully that supply conditions vary from place to place within the country.

Despite the plausibility of metropolitan differences in supply responsiveness, to our knowledge, except for recent work by Mayer and Somerville, little has been done to examine such variation directly. This paper is about estimating separate elasticities for individual metropolitan areas, and explaining the source of differences in housing supply elasticities across U.S. MSAs. We posit that supply elasticity variances due to materials will not vary much by MSA (because materials are supplied nationally). In a similar vein, variances in the supply elasticity due to labor market conditions might vary a bit more. But our prior is that differences in supply elasticities will stem mainly from differences in urban form and urban land use regulation.[1]

Our paper proceeds as follows. We begin with a discussion of models that show how urban form can influence supply elasticities. Finding a simple correlation between housing supply and the level of land use regulation would be of interest, but analysis that also takes account of urban form should be more precise and convincing. After discussing this model we present our strategy for empirical implementation and discuss the characteristics of our data. Our general empirical strategy is to estimate individual supply elasticities for each of 44 metropolitan areas using time series data, and then explain cross-metropolitan differences by controlling for differences in urban form and in land use regulation, as well as other variables suggested by the model. We then present our results and draw some conclusions.

Some Implications from the Capozza-Helsley and Mayer and Somerville Models

We begin with a model that was developed by Mayer and Somerville (1999) as an extension of Capozza and Helsely (1989). We closely follow their exposition.

House rents r_h depend on location rents, the opportunity cost of land, and structure value. Location rents are a function of city size b (the distance from the core to the city border), transport costs k and distance d from the center of the city. Opportunity cost reflects lot size q and agricultural land rent $r_{a.}$ Finally, then rental value of the structure capital is the product of the capital cost I and the structure cost $c_{h.}$ Thus at time T rents are:

[1] It would not be surprising if materials and labor differences were quite large in Hawaii and Alaska, where the transportation costs involved might easily segment them from the rest of the national market. However, they are not included in our particular dataset.

$$r_h = r_a q + ic_h + k(b_T - d). \tag{1}$$

New development occurs at the border, where d equals b_T . House prices p are simply the discounted cash flow of these house rents. Following Capozza and Helsely (1989), and rearranging as suggested by Somerville and Mayer (1999), it can be shown that

$$b_t = (i-g)\left(\frac{p(\bar{u},t) - c_h}{k} - \frac{r_a q}{ki} + \frac{\bar{u}}{i}\right) \tag{2}$$

The $\bar{u}$ represents a fixed location inside the city, and g is the growth rate of the boundary.

The Capozza and Helsley (1989) and Somerville and Mayer (1999) models imply that under the assumptions outlined above, in a competitive equilibrium, the following condition will hold:

$$\dot{b} = \frac{(i-g)}{k}\dot{p} \tag{3}$$

where a dot reflects the time derivative. This is very close to the housing supply equation that characterizes a competitive equilibrium, except that

$$b = \phi\sqrt{n} \tag{4}$$

where φ is a factor of proportionality that is decreasing in density and n is the number of housing units. Taking derivatives on both sides of (4), we have

$$\frac{db}{dt} = \frac{\phi}{2\sqrt{n}}\frac{dn}{dt} \tag{5}$$

substituting, we therefore have

$$\dot{n} = \frac{2\sqrt{n}}{\phi}\frac{(i-g)}{k}\dot{p} \tag{6}$$

To transform this equation into an elasticity, we rewrite it as

$$\frac{\dot{n}}{n} = \frac{2}{\phi\sqrt{n}}\frac{(i-g)}{k}p\frac{\dot{p}}{p} \tag{7}$$

so that in a competitive market

$$\eta = \frac{2}{\phi\sqrt{n}} \frac{(i-g)}{k} p \tag{8}$$

where η is the price elasticity of housing supply. An implication of this expression is that even in a perfectly competitive market, supply may not be perfectly elastic. This is particularly important when we consider a place such as New York City, where long commuting times imply the supply is quite inelastic. Also note the following: as the population rises, so too supply elasticity falls. As interest rates and prices rise, so does elasticity. As the growth rate rises, elasticity falls, and as density rises, elasticity falls. Thus even in the absence of regulatory constraints (and for the matter, geographical constraints), we may expect to see substantial differences in supply elasticities across cities. Simply correlating measures of regulatory barriers to development with supply elasticity is not sufficient to determine whether it is regulation that lowers that elasticity.

We embellish the model a bit to make it somewhat more realistic. The user cost model tells us more about the determinants of the discount rate, specifically that it is really the after-tax rate that determines the relationship between stocks and flows. Adding income and property taxes to the model, we now have:

$$\eta = \frac{2}{\phi\sqrt{n}} \frac{(i+\tau_p)(1-\tau_y)-g}{k} p \tag{9}$$

This reflects two important characteristics of the U.S. housing market: that one of the major costs of owning is the payment of property taxes, which are usually *ad valorem* taxes, and may therefore be expressed as a rate, and that returns to owner occupied housing go untaxed.[2]

In order to determine whether regulations influence supply behavior after taking into account marketplace differences across cities, we pursue the following estimation strategy. We first estimate supply elasticities for 44 cities. We do this by using time series data to estimate the equation

$$\hat{n} = \alpha + \Gamma\hat{p} \tag{10}$$

where the hat notation indicates percentage changes. Estimates of coefficient Γ are therefore direct estimates of supply elasticities η.

In the second stage of the analysis, we use these estimated elasticities as dependent variables. Following the model above, we seek to explain variation in elasticities as a function of travel time, density, price, the after tax interest rate less the growth rate, the after-income-tax property tax rate, and population. In addition, we examine whether the stringency of the regulatory environment affects η. Should we find

[2] The fact that imputed rent goes untaxed is effectively the same thing as making the dividend on owner's equity tax deductible, and of course mortgage interest is also not deductible.

a regulatory effect after controlling for all the other characteristics suggested by our extension of the Mayer-Somerville model, we will have strong evidence of if and by how much regulation impedes supply responses.

Data and Empirical Implementation

We have complete data for 44 Metropolitan Statistical Areas (MSAs), which are listed in Table 1, over 18 years (1979-96). The data are annual. We therefore run 44 first stage regressions following equation (10) to recover supply elasticities for the 44 MSAs. The left-hand variable in each of these regressions is the number of housing units for which building permits were issued, multiplied by 2.5, divided by population. This transformation is a proxy for percentage change in the housing stock. The building permit data comes from the C-40 series of the U.S. Census; the population data also comes from the Census. The proxy has two deficiencies: it does not take into account removals, and it assumes that household sizes are constant across MSAs. The first of these problems is difficult to remedy; the latter problem is probably innocuous, but will be remedied in a later version of the paper.

The right-hand side of our estimate of (10) is the first difference in natural logs of the Fannie Mae repeat sales index for the MSA. The Fannie Mae Index, like all repeat sales indexes, has the benefits of controlling for both house quality and location, and so is consistent with the price change modeled in Mayer and Somerville.

We estimate two sets of regressions: one with a contemporaneous price change, and the other with price changes lagged once. Contemporaneous price changes might be determined simultaneously with housing stock changes, and therefore regressions with contemporaneous price changes as explanatory variables might produce biased coefficients. We therefore also perform regressions with lagged changes (which are obviously not simultaneous) to determine whether simultaneity is, in fact, a problem. If we can use them, we prefer the regressions with simultaneous changes, because we have a small number of degrees of freedom to work with, and lagged price changes use up a degree of freedom.

After we obtain housing supply elasticities for the 44 cities, we perform a cross-sectional regression where the estimated elasticities are the dependent variable. For explanatory variables in this regression, we follow (9), and use MSA population in 1990, the average property tax rate in 1990, the average marginal tax rate in 1990, the population growth rate from 1980 to 1990, average commuting time in 1990, population density in 1990, the house price level in 1990, and a surrogate variable for land use regulation. We use 1990 data because (1) they are available and (2) it is reasonably close to the center point of our time series. We now explain the variables in more detail.

For MSA population, we use the 1990 PMSA population from the U.S. Census.

For the average property tax rate, we do our own calculations using the Public Use Microsamples of the 1990 Census. Specifically, for each household, we divide the self-reported property tax payment by the self-reported house price. We then take the average of these ratios for each metropolitan area to come up with an average MSA property tax rate.

For the average marginal tax rate, we again use the 1990 PUMS. For each household, we impute taxable income from the households' reports of household income, marital status, and number of dependents. Part of the imputation of taxable income includes the use of the standard deduction: this gives us the maximum level of potential taxable income regardless of the availability of deductions. We then apply the appropriate marginal tax rates from federal and state tax tables to our imputed taxable income measure. For each MSA, we then take the average marginal tax rate of all the households in the sample.

Note that we do not include interest rates *per se* as an explanatory variable. Before-tax interest rates have very little variation across MSAs. After-tax interest rates, on the other hand, do vary, because state income tax codes vary, and because nominal incomes are highly variable across states. Because the variation in after-tax interest rates stems from variations in tax rates across MSAs, we use average marginal tax rate directly as our explanatory variable.

For average commuting time, we simply take the reported average for the MSA from the 1990 U.S. Census.

For density, we consider in turn three different measures, because there are several ways density can be measured, each with its advantages and disadvantages. The first, and the most commonly used, is to calculate the average density of the metropolitan area. We calculate this straightforwardly from 1990 Census data on MSA population and area. Malpezzi and Guo point out shortcomings of this measure, some due to the fact that MSAs are constructed of county data. Consider, for example, two metropolitan areas with equal average densities as measured. Suppose one comprises a compact city surrounded by a large rural area (contained within the MSA), while the other is settled at a more uniform density. The former would be "denser" in the Capozza-Helsley sense, but average density would not differentiate between them.

One alternative is to use the intercept term from an estimation of the standard negative exponential function (Mills 1972). Malpezzi and Guo (1999) estimate population density gradients for several hundred MSAs using 1990 tract-level data, and we use those results here. In a monocentric world with the same transport costs in different MSAs, e.g. as diagrammed by Capozza-Helsley, this intercept would be a sufficient statistic for urban form. But of course transport costs differ, and cities are at best more-or-less monocentric.

Our third measure is also taken from Malpezzi and Guo. For each metropolitan area, they construct the following measure. Calculate the density of each Census tract in turn. Then rank tracts by density; and report the density of the tract containing the median person. This statistic gives us an intuitively appealing measure of the density experienced by a "typical" MSA resident; it distinguishes between compact-cities-with-rural-areas and uniformly dense MSAs; and it does not depend on any particularly strong assumptions about, e.g. transport costs.

We take house price levels from the 1990 Census. In this draft we use unadjusted median house values; in the next draft we will use constant quality price indexes from Malpezzi, Chun and Green (1998).

Finally, to measure the level of land use regulation, we rely on an index of metropolitan regulation from Malpezzi (1996). Using survey data described in Linneman *et al.* (1990), Malpezzi calculated the unweighted sum of seven variables describing the regulatory environment and collected for 56 MSAs. These comprised answers to survey questions regarding, for example the approval time (zoning and subdivision) for different kinds of residential projects, the percent of zoning changes approved, and the like. A higher score means a more stringent regulatory environment. The lowest possible score is 7, and the highest 35.

Stage I Results: MSA Specific Price Elasticities

Tables 2 and 3 contain supply elasticities for 45 American MSAs. Table 2 has the supply elasticities based upon contemporaneous price changes; Table 3 has elasticities based upon lagged changes. In the contemporaneous case, the coefficient representing the supply elasticity is different from zero at the 95 percent level of confidence in 30 of 45 cases; in the lagged case, it is different from zero in 23 cases.

We note that the following cities have estimated supply elasticities of greater than 10 under both specifications: Dallas, Atlanta, Phoenix, Charlotte, Columbus, Kansas City, Indianapolis, Tampa-St. Petersburg, Grand Rapids, and Houston. This is rather reassuring, because most of these fall into the category of what many consider to be "sprawl cities."

On the other hand, cities with supply elasticities of less than 3 under both specifications include San Francisco, San Jose, Boston, Albany, Boston, New Orleans, Pittsburgh, and Honolulu—cities that are either hemmed in geographically, compact, or not growing.[3]

Two peculiarities stand out in the data, one of which we can explain, the other of which we cannot. First, Portland has a surprisingly high supply elasticity in light of its reputation as a "slow-growth" community with a development boundary. But because

[3] Because we omit a measure of depreciation, we do not observe shrinking housing stock in stagnant cities with falling prices. Thus we cannot pick up what might be a very real supply elasticity. An attempt to rectify this by adding a dummy variable for places where real house prices fell still did not enable us to identify high supply elasticities in shrinking cities.

our data ends at 1996, before Portland's development boundary was substantially binding, it is perhaps not surprising that its supply elasticity might be best be described as typical for a U.S. city.

Second, in Table 2, Orlando stands out as having the lowest (indeed negative!) elasticity of any of our cities. From what we know of Orlando, this does not make a lot of sense. It is possible that errors remain in our data, and we shall recheck this result in a later version of this paper.

Stage II Results: Sources of Differences in Elasticities

Figure 1 shows the correlation between regulatory climate and supply elasticity. All stringently regulated cities (high values of the regulatory index) have low supply elasticities. On the other hand, while all cities with high elasticities have more relaxed regulatory environments, there are also many cities with less stringent land use and development regulations, but low estimated supply elasticities. An examination of the latter cases shows that they are generally slow growth cities (or cities that have lost population), and therefore appear to have a constant housing stock in the face of falling house prices. This is the asymmetry in supply response we referred to in the introduction: given housing's durability, markets are more responsive in one direction than another.

Table 4 presents six specifications of the determinants of elasticity. We use the lagged price model as the source of our elasticity estimates. In light of the percent-change form of equation (11), it is natural to write the estimation equation in natural logarithms. We have a few negative point estimates of elasticity, so we take the natural logarithm of our estimates plus one. For comparison's sake, we also do a straightforward linear regression.

The linear regression specifications are in columns (1)-(3); the logarithmic specifications are in (4)-(6). Standard errors are below the coefficient estimates. Based upon the implied t-statistics, the logarithmic specification gives us sharper parameter estimates, as we might expect.

The result in columns (4)-(6) suggest the following: that population levels matter, that population change matters, that density matters, that house price levels matter, and that the regulatory climate matters in terms of determining supply elasticity. Alas, if we return to (11), we find that the only thing that matter in the direction predicted by theory is density. We also find that greater land use regulation produces lower levels of supply elasticity, a none-too-surprising result.

As yet some of our results are puzzling. We can explain away the fact that population growth appears to move elasticity in the wrong direction by noting that our elasticity estimates for slow growth cities are almost surely wrong. But the signs on population and price levels might suggest that simpler urban models such as Capozza-

Helsley and Mayer-Somerville do not represent urban housing market dynamics sufficiently well. This could well be because of simultaneity issues: when communities grow fast, they obviously are accommodating such growth, and so must be supply elastic relative to slower-growth communities, even if their elasticity slows with time. Because we only have a cross-section of cities for investigating the differences in elasticity, we may not be in a position to identify the relationship between population, population growth, and elasticity.

Concluding Comments

In this paper we have estimated supply elasticities for 44 U.S. metropolitan areas, following a model grounded in a theory of urban form suggested by the work of Capozza and Helsley (1989), and Mayer and Somerville (1999).

We found, as expected, that estimates of the price elasticity of supply of housing varied substantially from place to place. Metropolitan areas that were heavily regulated, according to the measure developed in Malpezzi (1996), always exhibited low elasticities. Metropolitan areas that are lightly regulated exhibit a wide range of behavior: lightly regulated-fast growth communities tend to exhibit high price elasticities; estimates for lightly regulated slow-growth communities are often quite low. Our method doesn't differentiate well between high and low elasticities when there is little demand.

But while regulation and density (urban form) work largely as expected in explaining variation in elasticities, other variables such as MSA growth rates and city size do not match the predictions of the model, likely because of simultaneity issues.

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Table 1
MSAs Analyzed

Akron	Memphis
Albany-Schenectady-Troy	Miami
Atlanta	Milwaukee
Baltimore	Minneapolis
Birmingham	New Orleans
Boston	Oklahoma City
Buffalo	Orlando
Charlotte-Gastonia-Rock Hill	Philadelphia
Chicago	Phoenix
Cincinnati	Pittsburgh
Columbus	Portland, OR
Dallas	Providence
Denver	Rochester, NY
Detroit	St. Louis
Fort Lauderdale-Hollywood-Pompano Beach	Salt Lake City
Grand Rapids	San Antonio
Hartford	San Diego
Honolulu	San Francisco
Houston	San Jose
Indianapolis	Syracuse
Kansas City	Tampa-St. Petersburg
Los Angeles	Toledo
	Tulsa

Table 2
Housing Supply Elasticities Based Upon Contemporaneous Price Change

MSA	**Supply Elasticity**	**Significance**
Dallas	38.6	*
Atlanta	28.8	*
Phoenix	25.9	*
Charlotte	21.8	**
Columbus	17.8	**
Kansas City	15.0	**
Indianapolis	14.0	**
Tampa-St.Petersburg	13.9	
Grand Rapids	12.8	**
San Diego	12.5	*
Houston	11.1	
Baltimore	9.8	**
Memphis	9.7	*
Cincinnati	9.0	**
Oklahoma City	9.0	
St. Louis	8.1	**
Fort Lauderdale	8.0	
Tulsa	7.8	
Portland	7.5	**
San Antonio	7.3	
Birmingham	6.2	*
Denver	6.2	
Los Angeles	5.9	**
Minneapolis	5.9	
Detroit	5.8	**
Akron	5.6	**
Rochester	4.5	**
Milwaukee	4.4	**
Syracuse	4.4	**
Philadelphia	4.3	**
Hartford	4.2	**
Salt Lake City	4.1	
Chicago	4.0	*
Miami	3.2	
Buffalo	2.7	*
Providence	2.4	**
San Francisco	2.4	
San Jose	2.3	*
Albany	2.1	*
Boston	1.7	**
New Orleans	0.9	
Pittsburgh	0.9	*
Honolulu	0.7	
Toledo	-0.3	
Orlando	-6.3	

Table 3
Housing Supply Elasticities Based Upon Lagged Price Change

MSA	Elasticity	Significance
Dallas	29.9	
Tampa-St.	27.4	
Phoenix	21.7	
Atlanta	21.6	*
Charlotte	17.0	*
Oklahoma City	13.7	*
Columbus	13.5	**
Houston	12.8	
Denver	11.4	
Indianapolis	11.0	**
Kansas City	11.0	**
Grand Rap	10.8	**
Cincinnati	8.25	**
Tulsa	8.25	
San Antonio	8.23	
Portland	7.14	**
St. Louis	6.89	**
Akron	6.64	**
Memphis	5.63	
Baltimore	5.52	
Birmingham	5.33	**
San Diego	5.33	
Rochester	5.25	**
Syracuse	5.01	**
Detroit	4.74	**
Salt Lake City	4.69	
Orlando	4.50	
Milwaukee	4.45	**
Minneapolis	4.21	
Los Angeles	3.73	*
Philadelphia	3.09	**
Hartford	2.85	**
Buffalo	2.84	**
Chicago	2.48	
Fort Lauderdale	2.23	
Providence	2.10	**
Boston	1.77	**
Albany	1.55	
Pittsburgh	1.43	**
Toledo	0.836	
San Jose	0.33	
San Francisco	0.14	
New Orleans	0.06	
Honolulu	-0.1	
Miami	-0.3	

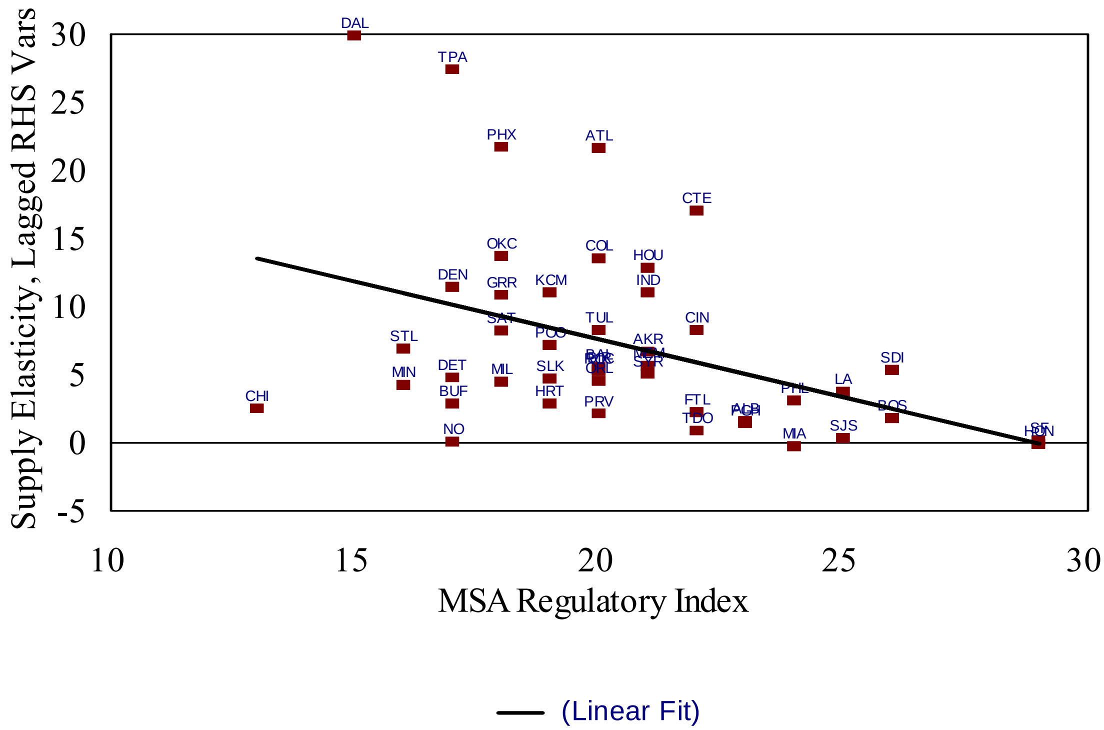
Table 4

Supply Elasticity Explained

	1	2	3	4	5	6
Dependent Variable	**Γ**	**Γ**	**Γ**	**Ln(Γ+1)**	**Ln(Γ+1)**	**Ln(Γ+1)**
Intercept	**8.78 (16.3)**	**10.54 (16.6)**	**40.2 (21.2)**	**16.7 (5.3)**	**15.5 (7.5)**	**15.6 (5.8)**
Property Tax Rate	**-005 (0.2)**	**-0.3 (0.2)**	**-0.04 (0.2)**			
Median Commuting time	**0.22 (0.3)**	**0.18 (0.3)**	**0.356 (0.3)**			
Median Density	**-0.002 (-0.002)**					
Average Density		**-0.1 (0.007)**				
Intercept of SUM			**-5.17 (2.21)**			**-0.645 (0.3)**
Regulatory Dummy	**-059 (0.33)**	**-0.65 (0.35)**	**-0.67 (0.32)**	**-0.07 (0.03)**	**-0.08 (0.04)**	**-0.08 (0.03)**
Median house Price (000)	**-0009 (0.02)**	**-.010 (.020)**	**-.013 (.023)**			
Population	**0.000 (0.000)**	**.000 (.000)**	**0.00 (0.00)**			
Change in Population	**34.7 (8.3)**	**31.0 (9.3)**	**29.3 (8.5)**	**3.07 (0.9)**	**2.73 (1.1)**	**2.63 (1.0)**
Average Marginal Tax Rate	**7.08 (42)**	**8.83 (43.0)**	**17.0 (38.8)**			
Log Property Tax				**-0.389 (0.2)**	**-0.340 (0.3)**	**-0.29 (0.3)**
Log Commute				**-1.40 (1.4)**	**-1.24 (1.5)**	**-0.783 (1.5)**
Log Median Density				**-0.547 (0.2)**		
Log Average Density					**-0.306 (0.2)**	
Log Population				**0.540 (0.2)**	**0.473 (0.3)**	**0.534 (0.2)**
Log House Price				**-0.848 (0.3)**	**-0.904 (0.5)**	**-0.814 (0.4)**
Log Marginal Tax Rate				**0.943 (0.9)**	**0.979 (1.0)**	**1.27 (0.9)**
R^2	**.539**	**.530**	**.572**	**.702**	**.659**	**.686**
N	**45**	**45**	**45**	**44**	**44**	**44**

(Standard errors in parentheses)

Housing Supply Elasticities
and Development Regulation



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