Do Constraints on Suburban Growth Increase Urban Growth: The Case of Connecticut

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[Abstract]

Ideally, smart growth should seek to focus population growth in urban areas and divert extensive development of suburban areas. Connecticut suburbs have had higher growth rates in population this decade than nearby urban areas. In addition, Connecticut smart growth programs have been known to lack coordination and focus across state, regional and local levels. To test any correlation between population growth in urban areas and smart growth policy, we examine the supply elasticity of building permits from surrounding suburbs by the responsiveness of building permits to changes in house prices. We find that in cities house prices rising in surrounding suburbs, growth in state population causes a significant increase in city population.

I. *Introduction*

Some of the largest cities in the nation, including Washington D.C., Milwaukee, St. Louis and Cincinnati saw a population increase in the 2000s, the first such increase in a decade for almost 60 years in some cases (Ingram, 2009). This revitalization of urban centers has various environmental and social benefits such as higher densities, lower energy costs and shorter commutes. Newman and Kennedy (1989) determined that cities have less car use as they become more densely populated. This reduces travel time, air pollution and increases mass transit use. Moreover, energy efficiency increases as the distance between the power source and the end user decreases (EIA, 2008). With more dense cities, power has less distance to travel, and so energy is conserved as cities become more densely populated. Thus, revitalizing urban centers can make cities more efficient, a reason for optimism as cities in the U.S. begin to grow again.

However, not all US cities have experienced a renaissance. In Connecticut, the cities of Danbury, Meriden, Norwalk and Stamford showed significant population growth while Bridgeport, Bristol, Hartford, New Britain, New Haven and Waterbury showed declines over the period from 2000-2008. This increasing suburbanization in Connecticut has led to open space loss, increased air and water pollution and higher energy use (smartgrowth.org). By one count about 1,800 acres of Connecticut farmland is lost each year (smartgrowth.org). Worse yet, continued development of land lengthens commutes and requires expensive investments in roads and infrastructure. According to the Harvard Design School, Connecticut's economic competitiveness is jeopardized by highway congestion, housing affordability and challenges to the state's environment (Regional Planning Agency, 2002). If these quality of life measures continue to deteriorate, prospects for long-term growth will likely diminish.

Smart growth techniques promise to help reverse this trend and preserve open space by restricting the expansion of surrounding suburban areas. However, there are few systematic studies that test the effectiveness of smart growth. This study will test whether cities grow when suburban areas around cities restrict the number of building permits for single family homes as their housing prices rise. As such, this constitutes a test of the smart growth principle that government should seek to channel growth into areas that are already developed. We find that for cities that have rising suburban house prices, growth in state population causes a significant increase in city population. If we further disaggregate the data set and consider cities that have rising suburban house prices and reductions in the number of building permits issued, growth in state population still causes a significant increase in city population. However, if we consider cities that have rising suburban house prices and increases in the number of building permits issued, growth in state population still causes a significant decrease in city population.

II. *Smart Growth*

A. *Connecticut Smart Growth*

Smart growth is not implemented by a single entity in Connecticut. Rather, responsibility is divided between the Connecticut Conference of Municipalities (CCM) and the state government. The CCM is charged with enabling "cities and towns to do together what they cannot do as well by themselves" (ccm-ct.org). Nearly all of the municipalities/towns are represented in this conference (144 of 169). The CCM seeks to advance smart growth via a "Smart Growth Task Force". The task force consists of one representative from 29 major municipalities (some cities, such as Danbury, are not represented). To define smart growth, members of the CCM along with the task force, developed policy goals. These goals include, maximizing infrastructure, coordinating among state, regional and local authorities, increasing the quality of public education, raising community participation and reducing the burden of property tax. While these suggestions may integral to smart growth success, such successes cannot be achieved without implementation.

The burden of implementation, however, falls on the state government, which defines smart growth as "economic, social and environmental development that promotes, through financial and other incentives, economic competitiveness in the state while preserving, decision-making and evaluation between and among all levels of government and the communities and the constituents they serve" (Connecticut General Assembly). In addition, the same act designates the Continuing Legislative Committee on State Planning and Development responsible for many tasks, including studying the application of smart growth principles and recommending improvements (Connecticut General Assembly). The state has set a goal of preserving 21% of its land as open space (Regional Planning Agency). While there certainly needs to be some type of planning or oversight, recommendations do not provide any results when a focused implementing force is absent. New Jersey's smart growth has such implementation forces and, as a result, has found more substantial results than its neighbor.

B. New Jersey Smart Growth

In contrast to Connecticut, responsibility for implementing smart growth is concentrated in the Office of Smart Growth. The office is responsible for carrying out the State Development and Redevelopment Plan, which includes the protection of environment mixed with boosting urban decline, along with a comprehensive long term planning (Dept of Community Affairs, 2010). Additionally, the Office of Smart Growth is responsible for designating Smart growth areas. The purpose of smart growth is defined in the state as to "conserve the natural resources, revitalize urban centers, protect quality of environment and provide needed housing and adequate public service" (NJ State & Redevelopment Plan, 2001).

This focus on revitalizing urban areas is specific to New Jersey. Connecticut policy on smart growth does not focuson spurring development (or redevelopment) in urban areas. In addition, New Jersey provides incentives to municipalities and counties that take measures to make the environment more livable and efficient. For the most part, these grants have been used to preserve land in suburban areas and for redevelopment in urban areas (McCarthy, 2002). From 1995-2000, New Jersey open space expenditures were approximately $452 per housing unit (Vandegrift and Lahr, 2011). In Connecticut, meanwhile only about $66 per housing unit has been spent from 2000-2008 (CT.gov). New Jersey also developed a Rehabilitation Sub code that makes the act of building less lucrative. Building owners renovating their building now have to update the entire building to meet regulations, whereas previously it was sufficient for the new structures to meet the requirements. Also, if a project for a certain building will affect the utilities of another development, the developer must pay for the resulting inconveniencies (McCarthy, 2002).

The New Jersey legislation exemplifies the marriage of state and local planning that is necessary to reap the benefits of smart growth measures. In Connecticut, meanwhile, land use decisions are made locally while the state creates abstract development plans every 10 years (Regional Planning Agency). There are no state requirements for regional plans to coincide with local plans (Regional Planning Agency). The Conserve and Development Policies Plan involves the development decisions of the state, but are not integrated with the divisions of the state while not describing land usage in suburb. A severe disconnect between state and local legislatures provides for relatively ineffective smart growth measures in Connecticut.

III. *Background*

The existing economic literature on the effectiveness of smart growth per se is relatively sparse and it tends to rely on case studies. Nevertheless, there is a relatively large literature on the effects of open space and growth constraints. For instance, Ingram (2009) compares four non-smart growth-using states against four smart growth-using states. He concludes that while the principles of smart growth were never really achieved by the users the states that adopted smart growth were more successful in achieving their main priorities. These main priorities usually centered on either raising urban population and renewing a state's major cities, or preserving open space through land use legislation.

Much of research regarding open space centers on the impact of various types of open space (Vandegrift and Lahr, 2011). The literature generally assesses the impact of open space by calculating the extent to which house prices change in the presence of open space. In essence, a residential property is viewed as a bundle of amenities and house prices rise with the number of amenities. For instance, Bolitzer and Netusil (2000) along with Anderson and West (2006) find that the value of open space decreases for housing units further away from the open space. That is, open space causes larger increases in house prices for houses close to the open space. Anderson and West also find, consistent with Alonso's monocentric city model, that the effect of proximity to open space on property values declines with distance from the central business district.

Of course, decisions to preserve open space do not occur in a vacuum. Using data from Connecticut, Bates and Santerre (2001) find that the demand for open space is highly sensitive to changes in income but relatively insensitive to changes in the price of open space. They also find that population pressures do not affect the amount of open space per capita but higher municipal populations do. This may occur because older, denser municipalities often do not have much undeveloped land.

In a similar vein, Lewis (2008) finds that conservation of open space is highly correlated with parcel size and that conserving open space does not increase the rate of population growth in developed areas, especially not immediately. He finds that the relationship between the residential area and open space (as either substitutes or complements) in the land value function impacts how much open space conservation agreements will succeed driving development away from protected areas. Bockstael (2004) finds that open space conservation often drives up residential prices but not open space prices (thus making it more likely for open space to be developed).

Other analyses suggest that attempts to prevent sprawl are downright harmful. Nechyba (2004) shows that bounding urban growth can sometimes merely raise house prices within the area. As house prices rise, low-income urban households are squeezed and economic inequality increases. This effect may be particularly harmful to cities if cities need high-income households in order to grow. Indeed, some research suggests that demographic changes precede financial improvements (Wyly, 1999). Wyly (1999) studies the urban population movement across the U.S. during the period from 1980 to 1990 and concludes people will relocate to realize the economic benefits from moving to an urban area but are unwilling to become an ethnic minority.

This unwillingness is potentially costly as Glaesar (2006) finds that increased diversity increases urban growth. He claims that people practicing a variety of cultures and occupations will lead to a more efficient economic environment, as there are more goods and services provided in cities. In addition, denser cities tend to exhibit more racial segregation. However, suburbanization alleviates the segregation problem. On this basis, Glaeser argues that cities are not always the social centers, and that attempts to prevent sprawl and suppress suburban population growth may result in a lost opportunity for civic engagement.

Of course, a series of additional factors, including crime and the quality of public schools are also likely to impact the quality of our urban centers. House prices are one way to measure the quality of life in urban centers. Gibbons (2004) finds that an increase in property damage crimes (such as graffiti) reduces house prices slightly (a one tenth standard deviation increase results in a 1% decrease in price). Burglaries and other violent crimes do not have as high a correlation, perhaps because of its spontaneity Gibbons notes.

An extensive literature examines the link between school quality and house prices. Because amenities are typically capitalized into house prices, we may value the amenities by gauging their impact on house prices. To determine the effect of primary and secondary school quality on house price, recent studies include a large set of neighborhood controls (Weimer and Wolkoff, 2001), examine changes in the school district bounds (Reback, 2005), or examining the relation between changes in school quality and changes in house prices (Downes and Zabel, 2002). Figlio (2004) records that report card grades have an independent effect from test scores, and both are positively correlated with house prices. He also discovers, however, that the effect of the grades diminishes over time, as a certain standard is established and expected for a given residential area. While the measure of school quality is typically a standardized test, the nature of these tests varies across locations. Purchase of a house in a particular municipality confers the right to enroll all school-age children in the household in the local primary or secondary school. By law, all municipalities must provide all residents access to a primary and secondary school. All that differs across municipalities is the quality of the schools.

Smart growth tactics can be useful at times and not very beneficial at other times, and circumstances usually play a large role. A few different factors need to be considered when studying the Connecticut case. For instance, demographics have been shown to play a large role Additionally, educational factors as well as house prices (being raised due to open space preservation) have been mentioned in previous studies as playing a large role in urban population movements. These factors are not always associated with smart growth policies, but as previous studies show, might need to be considered when trying to find a reason for a failure to increase urban population.

IV. *Model Formulation and Data Collection*

As stated above, we will test whether a decrease in issued building permits in suburban areas surrounding a city causes an increase in urban population. To examine urban population growth, we will analyze the ten most populated cities in Connecticut for the years 2001 to 2008. Each of these cities was established before 1900. Consequently, each contains a relatively dense urbanized core. According to our theory, restrictions on housing supply in the suburbs should increase population in the city. We measure restrictions on housing supply by computing the ratio of the percentage change in building permits to the percentage change in house prices for the suburban areas that surround each Connecticut city. Any municipality with 5 miles of the city is considered a suburb. We weight the house prices for each suburban community using population and simply add the number of building permits across municipalities/towns for each year. To focus on the way that population is distributed within the state, we control for state population growth.

To control for conditions in the city that may affect population growth we use city violent crime rates and test scores for the city high schools from the Connecticut Academic Performance

Test. The CAPT is administered yearly to 10^{th} grade students, measuring proficiencies in math, reading, writing and science. For our purposes, we will consider only reading and math scores, and the percentage of students who reached the goal range, on average, between reading and math. Thus, we estimate the following model using a fixed effects procedure:

(1) City Pop Growth $_{it} = \alpha_i + \beta_1$SupplyElast$_{it}$ + β_2TestScore$_{it}$+ β_{3i}CrimeRate$_{it}$ + State Pop Growth$_t$ +ε_{it}

Population growth can be associated with two negative supply elasticity situations and two positive supply elasticity instances. Supply elasticity is negative when building permits rise and house prices decline or building permits decline while house prices rise. Positive supply elasticity results from rising building permits and house prices or declining building permits and house prices. For our purposes, the most important case is the one in which suburban officials react to higher house prices by cutting the number of building permits.

The population data is drawn from the Census Bureau website. Crime data is from the uniform crime reports. Data for building permits and house prices is from the Connecticut Department of Economic and Community Development (ct.gov/ecd). Finally, test scores are gathered from ctreports.com, using eMetric solutions to compile the results for years and cities needed (CMT Data Interaction).

V. *Results*

The population growth trends in Connecticut by urban center and by year from 2001-2008 are shown in Table 1. From 2001 to 2003, the cities saw aggregate growth with the greatest jump in 2001. A decline in population growth began in 2004 with a decline of .24%.

From that year through 2007, the declining growth rate diminished to .006% in 2007. The growth rate picked up again in 2008, ending the trend with a .23% growth in population. Table 2 shows population growth rates by city from 2000-2008. Six out of the ten cities saw a decrease in the population growth rate over this time period. Bridgeport (.28%), Bristol (.14%) and New Britain (.18%) saw the largest decrease in growth rate while Hartford, New Haven and Waterbury also saw negative growth rates. Danbury and Stanford saw significant increase in growth rates at .72% and .23%, respectively.

Table 3 reports initial regression results from the model. The dependent variable is the percentage change in population growth in the cities. The most important of the independent variables is the supply elasticity of building permits in the suburbs. Information on this variable will indicate how the supply of building permits and average house prices in suburbs effect population growth in cities. Column (1) includes a regression on all 80 observations. Percent change in Connecticut population is the only significant variable other than the constant coefficient, demonstrating that a one percent increase in the state's population will increase urban center population by .68%. Supply elasticity is not significant.

Negative supply elasticity is important when town officials restrict building permits in response to rising house prices, or when a restriction on permits limits supply and results in rising house prices. In high-growth suburban areas, we expect that permits and house prices may rise simultaneously. Most of the high growth areas in Connecticut are suburbs. Column (2) of Table 3 includes only those observations where average house prices in the suburbs are rising. State population growth is significant and so is crime rate, at the 10% and 1% levels respectively. A one percent increase in crime per 100,000 city residents will decrease city population by .4%. The model itself is highly significant, but more importantly, supply elasticity is insignificant. If simultaneous growth was occurring between the suburbs and cities, we could have expected to see a positive correlation between population growth in the cities and supply elasticity, but nothing significant exists. Column (3) tests the opposite effect, when average house prices in the suburbs are declining. Percentage change in state population has a significant effect as it does in column (1), and the model is almost significant at the 10% level. Supply elasticity is not significant however, so no inferences can be made regarding our theory of cutting building permits and forcing population growth into the cities.

Table 4 takes the additional step of restricting observations on the basis of supply elasticity. Column (1) tests the scenario in which building permits are decreased with house prices rising. Only the test score variable is significant, and merely at the 10% level and suggests that if the number of students reaching the test goal increased by 1%, city population would increase by .004%. The model is highly significant, but with a sample size of 24, no inferences can truly be made. Column (2), on the other hand, tests the scenario in which building permits are increased while house prices rise. The percentage change in test scores is significant at the 10% level. However, it has the wrong sign. The coefficient suggests that if the number of students reaching the goal scored increased by 1%, city population would decrease by about .03%. Most importantly, supply elasticity once again fails to reach significance even at the 10% level. This result fails to demonstrate simultaneous growth among cities and suburbs.

Table 5 includes a lagged variable for house price (lagged one year) in the supply elasticity calculation. We change the calculation in this way to capture the fact that municipal officials may take some time to respond to rising house prices with a decrease (or an increase) in the number of building permits. Column (1) of Table 5 includes all observations in which the house price rose the year before. In the model, the percentage change in state population is significant at the 5% level, suggesting an increase of 1% in the state's population increases the population in the cities by almost half a percentage point, a smaller estimate than in previous models. The model is not significant and more importantly, the supply elasticity of permits is not significant once again. Column (2) contains observations where house prices rose in the year before and the number of building permits decreased. In this scenario, town officials have responded to rising house prices by reducing the number of permits. Supply elasticity of permits is significant at the 1% level. For a 1% increase in suburban house prices for the year t-1 coupled with a 1% reduction in suburban building permits, population growth decreases in the city by .006 percentage points. The coefficient is small, but it is highly significant and the opposite of what we would expect. In addition, a 1% increase in state population growth causes a .57% increase in city population. This suggests that when suburbs restrict building permits when suburban house prices rise, cities gain population when the state is growing.

Finally, Column (3) considers rising house prices from the previous year and an increased number of building permits. In this scenario, town officials responded to rising house prices by increasing (or simply not restricting) the amount of building permits. This circumstance is a characteristic of high growth areas. While there are only 14 observations in this scenario, all variables are highly significant. The model implies that for a 1% increase in building permits coupled with a 1% increase in house prices in the year t-1, population in the cities increases by .001 percentage points. Also interesting is a highly significant negative relationship between population growth in the state compared to that of the urban centers. For a one percent increase in state population growth, population in cities decreases by .66%. This is precisely the opposite effect that occurs above. It suggests that when suburbs do not restrict building permits when suburban house prices rise, cities lose population even when the state is growing. One way to account for this counterintuitive result is that city residents leave in large numbers when suburban growth is not constrained and immigrants from outside the state (or country) move to the city. The outmigration of Connecticut natives from the city swamps the immigration of non-natives to the city.

Thus, while our results are not what we expect for the supply elasticity variable, the state population growth variable provides strong support for smart growth. Cities gain a large share of the state population growth when the suburbs surrounding the cities are growing and they reduce the number of building permits for single family homes.

VI. *Conclusion*

The results from this paper offer some evidence of smart growth principles at work in Connecticut. If we examine only the cities that have rising suburban house prices, growth in state population causes a significant increase in city population. If we further disaggregate the data set and consider cities that have rising suburban house prices and reductions in the number of building permits issued, growth in state population still causes a significant increase in city population. However, if we consider cities that have rising suburban house prices and increases in the number of building permits issued, growth in state population still causes a significant decrease in city population.

This effect occurs despite the modest and generally uncoordinated effort aimed at revitalizing at Connecticut cities.   Nevertheless, the study has limitations. First, the sample sizes created from the restrictions used (on house prices and supply elasticity) limited the amount of useful statistical evidence. Ideally, we would wish to see house prices rise in nearly every period across every urban region. Unfortunately, house prices rose in only 43 observations and decreased in the other 37.

Table 1. Growth in population per year across all cities

Variable	Year	Obs	Mean	Std. Dev
PCT_CH_pop	2001	10	0.0034576	0.0062098
PCT_CH_pop	2002	10	0.0011898	0.0027659
PCT_CH_pop	2003	10	0.0025145	0.0035335
PCT_CH_pop	2004	10	-0.0024641	0.0026566
PCT_CH_pop	2005	10	-0.0001525	0.0048324
PCT_CH_pop	2006	10	-0.0001877	0.0046692
PCT_CH_pop	2007	10	-0.0000632	0.0018372
PCT_CH_pop	2008	10	0.0023133	0.004108

PCT_CH_pop = (pop [_n] - pop[_n-1])/ ((pop[_n-1] + pop[_n])/2)

Table 2. Growth in population for each city from 2000 to 2008

Variable	City	Obs	Mean	Std. Dev
PCT_CH_pop	Bridgeport	8	-0.0028221	0.0031852
PCT_CH_pop	Bristol	8	-0.0014445	0.0019920
PCT_CH_pop	Danbury	8	0.0071923	0.0056255
PCT_CH_pop	Hartford	8	-0.0000579	0.0018868
PCT_CH_pop	Meriden	8	0.0020100	0.0023913
PCT_CH_pop	New Britain	8	-0.0018439	0.0037638
PCT_CH_pop	New Haven	8	-0.0001091	0.0019410
PCT_CH_pop	Norwalk	8	0.0003521	0.0021247
PCT_CH_pop	Stamford	8	0.0023479	0.0066580
PCT_CH_pop	Waterbury	8	-0.000273	0.002293

PCT_CH_pop = (pop[_n] - pop[_n-1])/ ((pop[_n-1] + pop[_n])/2)

Table 3. Fixed-effects regression results for population growth in CT cities (Full Model)

	(1)	(2)	(3)
Variable	All obs	If PCT_CH_Hprice > 0	If PCT_CH_Hprice < 0
Constant	-0.0015449*	-.0018025	-0.0008704
	(0.0007853)	(.0011788)	(0.0009671)
supp_elast	0.0000509	0.002271	0.0000277
	(0.0000549)	(0.0001389)	(0.000059)
pct_ch_CTpop	0.6834103**	0.7568159*	0.6105414*
	(0.2251311)	(0.3416211)	(0.3078717)
pct_ch_crime	-0.0013883	-0.0044208***	0.0009644
	(0.0016884)	(0.0012252)	(0.0031967)
pct_ch_avtest	-0.0003308	-0.000318	-0.0008153
	(0.0035168)	(0.0045289)	(0.0043145)
	n=80	n=43	n=37
	r2=.1363	r2=.1237	r2=.1611
	CS=10	CS=10	CS=10
	F=4.79	F=18.2	F=2.69
	Pr>F=.0239	Pr>F=.0002	Pr>F=.1005

Dependent variable (Y): Change in population per year

PCT_CH_POP: (population[n] – population [n-1])/ (population [n-1])
t-stats: *** significant at .01, ** significant at .05, * = significant at .10
robust standard errors in parentheses
a Supply Elasticity = (percent change in permits)/ (percent change in house price)
a1 Percent change in permits = (permits [n] – permits [n-1])/((permits[n-1]+permits[n])/2)
a2 Percent change in House price = (weighted house price[n] – weighted house price [n-1])/ ((weighted house price[n-1] + weighted house price [n])/ 2)
Year = 2000-2008
Pct_ch_crime: (crime[n] – crime[n-1])/ crime[n-1]
Pct_ch_avtest: (avtest[n] – avtest[n-1])/ avtest[n-1]

Table 4. Fixed-effects regression results for population growth in CT cities (Full Model)

	(1)	(2)
Variable	If supp_elast <0 & PCT_CH_Hprice >0	If supp_elast >0 & PCT_CH_Hprice >0
Constant	-.0045425	-.005162**
	(.0045617)	(.0018563)
supp_elast	-0.004793	0.0005482
	(0.0008826)	(0.0003723)
pct_ch_CTpop	1.105384	1.87846***
	(1.00556)	(0.3420681)
pct_ch_crime	-0.0046199	-0.0039407
	(0.0047118)	(0.004823)
pct_ch_avtest	0.0047983*	-0.0306385*
	(0.0022149)	(0.0166495)
	n=24	n=19
	r2=.2458	r2=.1292
	CS=10	CS=10
	F=27.03	F=4840.94
	Pr>F=.0000	Pr>F=.0000

Dependent variable (Y): Change in population per year

PCT_CH_POP: (population[n] – population [n-1])/ (population [n-1])
t-stats: *** significant at .01, ** significant at .05, * = significant at .10
robust standard errors in parentheses
a Supply Elasticity = (percent change in permits)/ (percent change in house price)

a1 Percent change in permits = (permits [n] – permits [n-1])/((permits[n-1]+permits[n])/2)

a2 Percent change in House price = (weighted house price[n] – weighted house price [n-1])/ ((weighted house price[n-1] + weighted house price [n])/ 2)

Year = 2000-2008
Pct_ch_crime: (crime[n] – crime[n-1])/ crime[n-1]
Pct_ch_avtest: (avtest[n] – avtest[n-1])/ avtest[n-1]

Table 5. Fixed-effects regression results for population growth in CT cities lagged one year

	(1)	(2)	(3)
Variable	If pct_ch_hprice_lag >0	If SUPP_ELAST_1 <0 & pct_ch_hprice_lag >0	If SUPP_ELAST_1 >0 & pct_ch_hprice_lag >0
Constant	-0.001011	-0.0011598	0.0019999***
	(0.0006948)	(0.000486)	(0.000136)
SUPP_ELAST_1	-0.00000414	0.0000607***	0.0009201***
	(0.000011)	(0.000011)	(0.000042)
pct_ch_CTpop	0.4904773**	0.5776852***	-0.6631939***
	(0.180473)	(0.164212)	(0.026107)
pct_ch_crime_lag	0.0007556	0.0015224	0.0050756***
	(0.001778)	(0.002018)	(0.000393)
pct_ch_avtest_lag	-0.0022624	-0.0039487*	-0.0303046***
	(0.003068)	(0.001943)	(0.000136)
	n=42	n=28	n=14
	r2=.0928	r2=.0146	r2=.0390
	CS=10	CS=10	CS=10
	F=2.57	F=11.65	F= 446.52
	Pr>F=.1106	Pr>F=.0013	Pr>F= .0000

Dependent variable (Y): Change in population per year
t-stats: *** significant at .01, ** significant at .05, * = significant at .10
robust standard errors in parentheses
b Supply Elasticity Lagged = (percent change in permits)/ (percent change in house price[n-1])
b1 Percent change in house prices [n-1] = (hprice [n-1] – hprice[n-2])/((hprice[n-2]+hprice[n-1])/2)
Year = 2000-2008
Pct_ch_crime: (crime[n] – crime[n-1])/ crime[n-1]
Pct_ch_avtest: (avtest[n] – avtest[n-1])/ avtest[n-1]

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