

The Suburban Housing Market: The Effects of City and Suburban Job Growth

*Richard Voith**

How does the location of new jobs in a metropolitan area affect the suburban housing market? Economists expect job growth to increase the demand for housing, and furthermore, they expect the increase in demand to be greater in communities near the new jobs than in more distant ones. Moreover, growth in jobs with higher wages should increase the demand for housing more than growth in jobs with lower wages. Increases in housing demand, in turn, put upward pressure on house prices and

construction rates. The market response to an increase in housing demand, however, will depend on how easily the supply can adjust to shifts in demand. Because of differences in proximity, wages, and housing supply, city employment growth may have dramatically different effects from suburban growth on house prices and construction rates across suburban communities. These housing market effects provide a window through which we can evaluate the overall economic contributions of city and suburban job growth as well as insights into who benefits from city and suburban job growth.

*Dick Voith is an economic advisor in the Research Department of the Philadelphia Fed.

JOB GROWTH AT EMPLOYMENT CENTERS AND ON THE URBAN FRINGE

Job growth in a metropolitan area may be widely dispersed geographically, or it may occur in clusters. In its most extreme form, dispersed development is accommodated by widening the boundaries of the urbanized area rather than by increasing the density or number of jobs in areas already developed.¹ Job growth in clusters, on the other hand, results in more intensive use of space in existing employment centers. Development at employment centers occurs both in the suburbs and in the city. We will refer to widely dispersed job growth that occurs primarily on the urban fringe as decentralized job growth and growth in clusters as centralized growth.

With decentralized development, agricultural land is converted to commercial uses, and the demand for houses near the urban fringe increases. Because a great deal of open land is available, increases in housing demand are met by the construction of new houses. Price increases for existing houses are limited by the cost of new construction. In economists' terms, housing supply is elastic on the urban fringe—shifts in demand cause small changes in price but large changes in the rate of construction. (See *Prices, Construction Rates, and the Elasticity of Supply*.) While decentralized job growth tends to increase construction rates on the urban fringe, it may have little effect on either prices or construction in neighborhoods away from the fringe because the number of jobs accessible to these communities is essentially unchanged. Finally, if decentralized growth occurs at the expense of jobs in existing employment

centers, it may reduce the demand for housing near these centers. This would tend to reduce housing prices and, to a lesser extent, the number of houses in these areas.

Centralized job growth, on the other hand, increases the demand for housing in communities with easy access to the employment center. Because these neighborhoods tend to be densely developed, it is difficult to construct new housing. Housing supply in these communities is inelastic—increases in demand tend to drive house prices up, with little or no impact on construction. Centralized employment growth, in theory, should have price impacts that decline with distance from the center. Distant communities may even experience a decline in demand if centralized job growth is a result of shifts in employment from the urban fringe to employment centers.

Basic models of urban economies highlight the role of centralized production and the importance of proximity to these employment centers for property values.² The earliest models assumed that all production occurred in the center of the area and everyone commuted to the central area to work. Workers seeking to avoid high commuting costs bid up prices near the employment center so that the value of land fell as distance from the center increased.

Rather than maintaining the unrealistic assumption that all production occurs in the center, more recent models consider both centralized and decentralized employment.³ A basic assumption of many of these models is that firms locate near one another because doing so has economic advantages: workers are more

¹Metropolitan areas generally consist of one or more counties. Within the boundaries of the metropolitan areas, there are usually one or more central cities, suburbs surrounding the central cities, and land used for agriculture beyond the suburbs. Taken together, the central cities and the suburbs constitute the urbanized area, and the agricultural land adjacent to the urbanized area is the **urban fringe**.

²See the articles by Edwin Mills and Richard Muth for a discussion of equilibrium models of monocentric urban economies, that is, economies in which there is a single focal point where production occurs.

³The papers by Arthur Sullivan, Jan Brueckner, and Michelle White are good examples of monocentric urban models with decentralized employment.

Prices, Construction Rates, and the Elasticity of Supply

Markets adjust to achieve equilibrium in two ways: by changing the price of goods traded and by changing the quantity of goods traded. Given a shift in housing demand, the extent to which the adjustment will be accomplished by price changes or by new house construction will depend on the elasticity of supply. Economists define the elasticity of supply as the percentage change in quantity divided by the percentage change in price. If the change in price is greater than the change in quantity, supply is said to be inelastic (Figure A); if the change in quantity is greater than the change in price, supply is said to be elastic (Figure B).

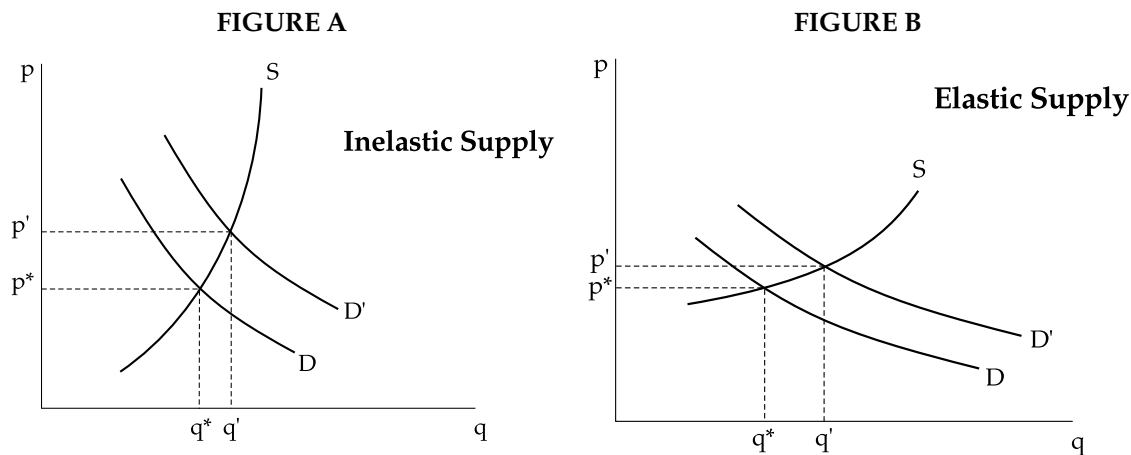


Figure A shows the equilibrium price, p^* , and quantity, q^* , with demand curve D and supply curve S . A shift in demand from D to D' results in a shift in quantities to q' . The supply curve is almost vertical, indicating that an increase in price changes quantity supplied very little; hence, supply is inelastic. Thus the new equilibrium is achieved with a greater shift in price than in quantity. If supply were perfectly inelastic, the quantity supplied would not change at all with a change in demand, and all adjustments would be achieved by changing prices. Inelastic supply corresponds to the housing market conditions in older, densely developed neighborhoods.

Figure B shows a similar diagram, but this time with a flatter supply curve. In this case, the shift in demand results in a much greater shift in quantity than in price. The flatter supply curve indicates that small changes in price induce large changes in quantity; hence, supply is elastic. If the supply curve were perfectly flat, shifts in demand would not affect price; only quantity would change. Elastic supply corresponds to housing market conditions in communities on the urban fringe.

productive in areas where a lot of economic activity occurs. Economists call these advantages “agglomeration economies.” While agglomeration economies induce many firms to concentrate in commercial centers, other firms still choose decentralized locations.⁴ Noncentrally located firms offer lower wages, but some workers choose to work at these firms

because their commuting costs are lower. These expanded models, which provide a rationale for both centralized and decentralized employ-

⁴It is likely that firms choosing central locations are ones that can benefit the most from agglomeration economies, while those choosing decentralized locations are in businesses that do not benefit from agglomeration.

ment, still predict that land prices decline with distance from employment centers.

There is a long tradition of estimating the relationship between housing prices and distance to high-productivity employment centers.⁵ Changes in this relationship are of interest because they provide insight into the change in the benefits of agglomeration over time.⁶ There is little analysis, however, of the consequences of shifts in production between centralized and decentralized locations. Such analysis could provide insight into who benefits and by how much from the change in land values associated with centralized or decentralized job growth.

Homeowners and developers may have divergent interests in the pattern of job growth. Employment growth in existing centers, such as the central business district (CBD), is likely to enhance the value of existing houses near job centers. Decentralized growth at the urban fringe is likely to result in shifts of agricultural land to residential use, but it will have little or no impact on the price of existing houses. De-

velopers and owners of agricultural land are thus the primary beneficiaries of the demand shift associated with decentralized growth.

Centralized and decentralized employment growth also have a potentially different impact on the total value of land. To the extent that centralized employment is more productive than decentralized employment, it will have a larger impact on total land value. Of course, the distribution of jobs is a result of choices by individual firms, which can best decide where their workers are most productive. In a perfectly competitive market with no spillovers, the location decisions of individual firms should result in the most efficient total production and ultimately the highest total value for residential land. But the basic notion of agglomeration economies is that an individual firm's choice of location affects other firms.⁷ One firm's decision to move out of the CBD has negative consequences for the remaining firms, which lose some of the benefits of concentration. The firm choosing to leave does not have to pay the costs imposed on other firms. Thus, private incentives may result in an inefficiently rapid pace of decentralization and lead to less efficient production and lower total land value.

⁵See the articles by Paul Waddell, Brian Berry, and Irving Hoch; E. Heikkila and colleagues; and John McDonald and Daniel McMillen for analyses of land value gradients in a polycentric context. In a monocentric setting, there is mixed evidence on the relationship between land values and distance from the central business district. Analyses by M. Cropper and Peter Gordon; the article by E. Heikkila and colleagues; and my 1991 article find either a positive or insignificant relationship between land prices and distance. Other studies, such as the one by Rena Sivitanidou in 1996 and my 1993 article, find the expected negative relationship. See the article by J. Jackson for a review of earlier studies.

⁶While the relationship between land prices and distance should reflect the value of agglomeration, researchers have generally focused on the relationship between population density and distance to evaluate the relative importance of basic economic factors such as technology and income compared with urban problems such as crime to the process of decentralization. See the article by Edwin Mills and Peter Mieszkowski for a review of this literature.

EMPLOYMENT GROWTH AND HOUSING IN GREATER PHILADELPHIA

In a recent paper I estimated the effects of city and suburban job growth on the housing market in Montgomery County, Pennsylvania, in the Philadelphia suburbs.⁸ In my study, suburban employment growth included job growth

⁷Agglomeration economies are like a local public good—everyone choosing to locate in the community benefits from it. Standard microeconomic theory suggests that the competitive market will result in an inefficiently low level of local public goods.

⁸My 1996 paper provides a complete description of the analysis.

in Montgomery County and three neighboring suburban counties, and city employment growth included only that in the city of Philadelphia (Figure 1). While city and suburban job growth do not exactly correspond to centralized and decentralized job growth, we expect that the impact of city growth should be more like that of centralized growth.⁹ To the extent that suburban job growth is widely dispersed and occurs substantially on the urban fringe, we expect the effects of suburban growth to be more like those of decentralized growth.

The data for the study include more than 88,000 sales of single-family detached houses from 1972-95. Detailed information, such as sale price, year of sale, characteristics, size, and location, is available for each house. Since the data set also includes information on virtually all houses in Montgomery County, their construction date, and their census tract, we can deter-

mine the rate of new construction annually for each census tract and the average real appreciation and construction rates over the sample period (Figures 2a and 2b).¹⁰ The figures show that prices and construction rates vary a great deal over time. This variation in appreciation

¹⁰The data come from the 1988, 1994, and 1995 tax-assessment files of Montgomery County. The appreciation rates are based on 1990 constant dollars.

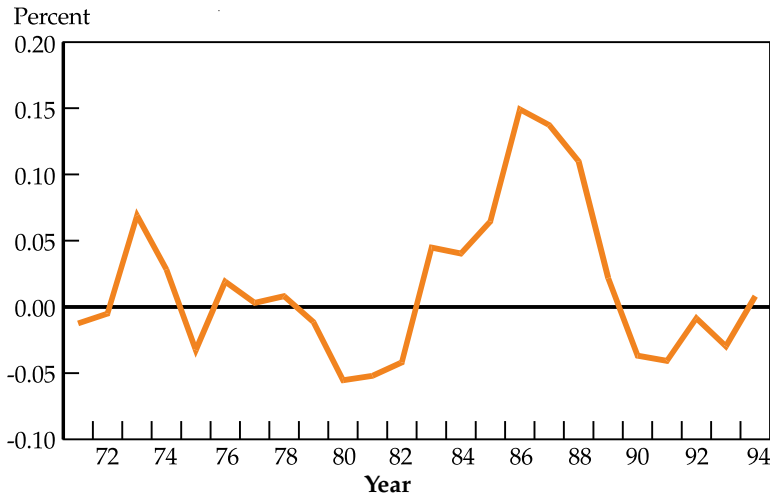
FIGURE 1
Philadelphia and the Pennsylvania Suburbs



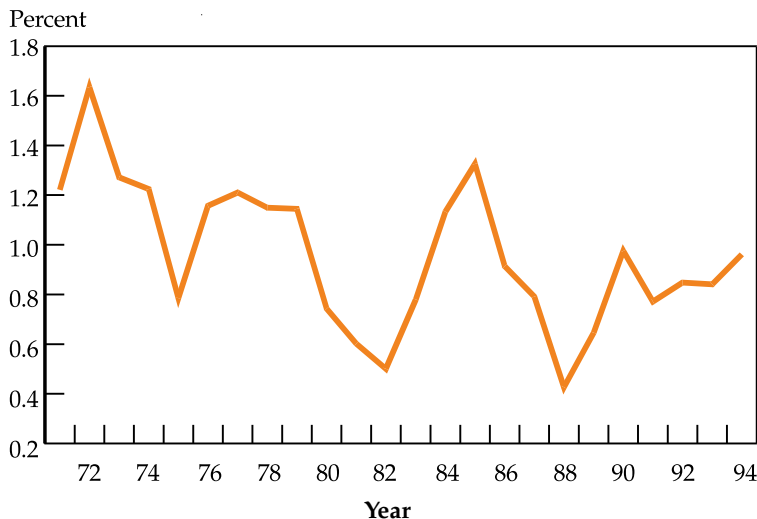
⁹ Because of the high density of both employment and population throughout the city of Philadelphia, all city job growth is thought of as centralized growth, which increases the intensity of land use in the existing communities. This is not necessarily true for all central cities in the United States, since some central cities have significant amounts of agricultural land within their boundaries.

FIGURE 2
**Montgomery County
 Single-Family Detached Houses**

A. Price Appreciation



B. Growth in Housing Stock



and construction rates is, in part, related to employment growth. Moreover, appreciation and construction rates vary greatly across communities, and these differences are linked to the patterns of employment growth. There are substantial differences in the movements of city and suburban job growth (Figure 3). While suburban growth rates are almost always larger than city growth rates (city growth rates are predominantly negative), the difference in city and suburban growth rates varies substantially over extended periods.

To evaluate the effect of city and suburban employment growth on suburban house prices and construction rates, we constructed a statistical model to take into account as many factors affecting house prices as possible, including the characteristics of the house such as its age, number of rooms, and number of bathrooms, as well as the size of its lot, its location, and the neighborhood.¹¹ After controlling for these influences on price, we evaluated the effects of city and suburban employment on price and whether the effects differ systematically with accessibility to the city. Similar

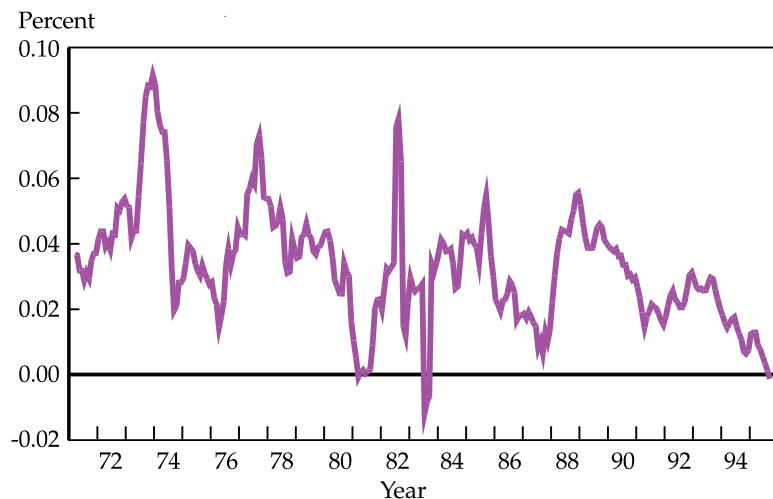
analyses were undertaken with regard to factors that affect construction rates.

Employment Growth and House Prices. Our statistical models of house prices suggest that city and suburban growth have very different effects on the suburban housing market, and the effects vary dramatically across suburban communities. Our simplest model, which is designed to capture the overall effect of city and suburban employment growth on house prices, reveals that city employment growth has a positive effect on

suburban house prices. Our estimates indicate that an increase in city job growth of 1 percentage point raises average suburban house values slightly more than \$1000.¹² Suburban employment growth, on the other hand, has virtually no effect on average house prices. The estimated average effects, however, mask large differences in effects across communities.

More complex statistical models allow the effects of city and suburban employment growth to vary depending on the community's

FIGURE 3
Employment Growth:
Suburban Rate Minus City Rate
(3-Month Moving Average)



accessibility to the city, either by commuter train or by highway. For every 1 percentage point of growth in city employment, communities with commuter rail service enjoy an increase in house values that is more than \$1500 greater than communities without train service.¹³ (The reverse is true as well: when city employment shrinks 1 percentage point, the value of these houses falls.)

The differential effects of accessibility and employment are even more pronounced when we look at highway commuting times.¹⁴ The effects of an increase of 1 percentage point in

¹¹A common technique used in housing economics is hedonic regression. In this type of analysis, housing prices are regressed on housing and neighborhood traits. The estimated coefficients represent the "price" of individual housing traits such as number of rooms, number of bathrooms, and so forth. Housing traits and their estimated prices explain much of the variation in house prices.

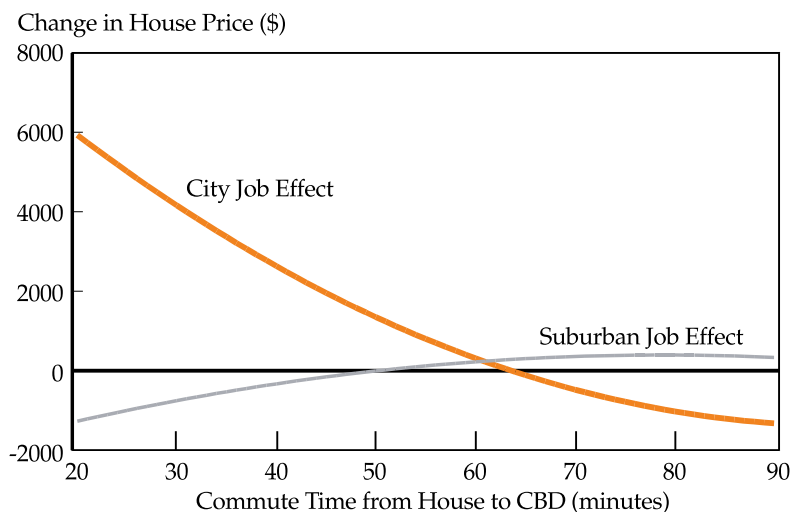
¹²This estimate is based on Table 3, column 3, of my 1996 article. Based on transactions in the period from 1990-95, the average house price was \$166,900, which implies that a 1 percentage point increase in city growth increases average suburban house values about 0.6 percent.

¹³These estimates are based on the model shown in Table 4, column 1, of my 1996 article.

¹⁴Again, these estimates are based on the model shown in Table 4, column 1, of my 1996 article. The effects are for a typical house in an average neighborhood. Because 42 percent of houses are in communities with train service, these effects include 42 percent of the estimated effect of employment growth on house values in communities with train service.

FIGURE 4
City and Suburban Job Growth and House Prices*

The effects vary by distance from the CBD.



*The city effects are for a 1-percentage-point increase in city job growth, holding suburban employment growth constant. Similarly, the suburban effects are for a 1-percentage-point increase in suburban employment, holding city job growth constant.

either city or suburban employment growth vary with commuting time to the CBD (Figure 4). The vertical axis of Figure 4 shows the effect on prices, and the horizontal axis gives the distance from the CBD. For the communities closest to the CBD—about a 20-minute commute—a rise in city employment growth of 1 percentage point increases house values more than \$5900. The same amount of growth reduces house values in the most distant communities about \$1300. Thus, the difference in the impact of city job growth on house prices across communities is about \$7200.

The negative effect of city job growth on more distant communities implies that employment growth must be correlated with other factors that affect the relative attractiveness of the city and suburbs. Note that for city employment

growth to have a negative effect on distant suburbs, people must be choosing to live closer to the CBD for reasons other than commuting. Perhaps city employment growth is correlated with improved, regionally valued amenities located in the city, which induce more people to choose locations that are closer in.¹⁵

The effects of suburban job growth on house prices are relatively small. For a rise of 1 percentage point in suburban growth, communities near the city suffer price declines in the range of \$1300, and prices in distant communities increase a scant \$300. The difference across communities is a relatively small \$1600. The price decline

in communities near the city may reflect other factors that both lower the attractiveness of the city and increase job growth in the suburbs. This explanation is supported by the finding that suburban job growth has no differential impact on communities with or without train service to the CBD.¹⁶

In summary, our estimates imply that—at

¹⁵The estimates give the effects of city growth, holding the rate of suburban growth constant. Thus city employment reduces house values in distant suburbs even though city growth does not change the rate of suburban growth.

¹⁶It is not surprising that suburban growth has no differential effect on communities with or without train service, since train service adds little to accessibility to suburban jobs.

least in the Philadelphia area—city employment growth has a significant, positive impact on suburban house prices while suburban employment growth, on average, does not. City employment growth has a strong differential effect on suburban house prices in communities with train service while suburban employment growth does not. While both city and suburban employment growth affect communities differently according to their distance from the CBD, the effects are much larger for city than for suburban employment growth. In general, these findings are consistent with the idea that the supply of housing is inelastic in older communities near the city and elastic near the urban fringe.

Employment Growth and Housing Construction. Markets adjust to changes in demand by shifting not only prices but also quantity. Quantity adjustments in response to new job creation are affected by other factors such as the availability of land (density) and mortgage interest rates. Therefore, we take into consideration the effects of density and mortgage interest rates in estimating the effects of job growth on housing construction.¹⁷ Density is a good measure of the potential that a community has for new residential development. Communities with high density should have low construction rates because little open space is available for new construction.¹⁸ Mortgage interest rates affect both the cost of financing construction for developers and the cost of financing purchases by home buyers.

On average, the annual rate of construction

¹⁷In our statistical model, density has a very large negative impact on construction rates. Mortgage rates also have a negative, statistically significant effect.

¹⁸In a given year, an average of 42 percent of all census tracts have no new construction. The fact that observed construction rates are frequently zero necessitates the use of the Tobit procedure to estimate the construction models.

for new, single-family detached housing in Montgomery County is about 1 percent of the total housing stock. City and suburban employment growth have opposite effects on countywide construction rates. We estimate that an increase of 1 percentage point in city job growth reduces the construction rate a little more than 0.1 percent.¹⁹ That is, the average annual construction rate falls from 1 percent to about 0.9 percent. Suburban growth increases the average construction rate by a similar magnitude: an increase of 1 percentage point in suburban job growth raised the construction rate to almost 1.09 percent.

As with price effects, there are large differences in the effects of job growth on construction rates among suburban locations.²⁰ The impact of city employment growth on suburban construction rates is an increase of 0.03 percent in communities within a 20-minute commute, but in the most distant communities, city employment growth reduces construction 0.27 percent (Figure 5). Thus, a healthy city economy reduces the relative attractiveness of the most distant communities. The effects of suburban job growth also differ by location. An increase of 1 percentage point in suburban employment growth raises the construction rate in distant communities 0.21 percent but has little effect on close-in communities. This suggests that new suburban jobs are truly decentralized; that is, they occur primarily at the fringe of the metropolitan area.

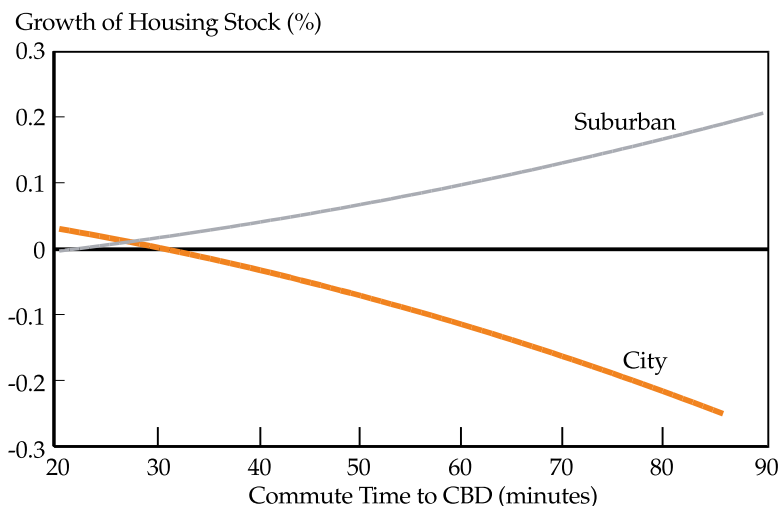
SHOULD WE CARE ABOUT THE GEOGRAPHY OF JOB GROWTH?

There are two broad reasons why we should care where growth occurs: economic efficiency

¹⁹All estimates in this section are based on Table 6, column 1, in my 1996 article.

²⁰Unlike the case with price effects, there were no differential effects across communities with and without train service for either city or suburban employment growth.

FIGURE 5
**City and Suburban Job Growth and
 the Rate of House Construction***
 The effects vary by distance from the CBD.



*The city effects are for a 1-percentage-point increase in city job growth, holding suburban employment growth constant. Similarly, the suburban effects are for a 1-percentage-point increase in suburban employment, holding city job growth constant.

and distribution of economic impacts. Questions about efficiency focus on which type of employment growth generates the greatest output for the region. Questions about distribution, on the other hand, focus on who benefits from city and suburban employment growth. When evaluating the efficiency and distributional issues associated with city and suburban job growth, we need to combine the findings from the price and quantity sides of the housing market to determine the total impact.

Efficiency. When the average productivity in a metropolitan area is high, people and firms

²¹Of course, there are many other factors that affect people's choice of where to live, but for similarly attractive metro areas, higher productivity should increase land value.

will be willing to pay more to locate there.²¹ Therefore, one way to evaluate the overall efficiency of city and suburban growth is to compute which form of growth contributes more to the total value of land. The data in our study were limited to one suburban county, so we cannot evaluate the effect of job growth on the overall Philadelphia metropolitan area. But we can evaluate the effects of city and suburban job growth on the total value of residential land in Montgomery County.²²

There are two elements in the calculation of the impact on residential land value from any job growth: the change in values for existing

houses and the change in property value associated with the construction of new houses.²³ First, consider the effects of city employment growth. The house-price models imply that an increase of 1 percentage point in city employ-

²²This analysis is further limited to the effects on the value of single-family detached dwellings.

²³Calculating the change in residential land values resulting from new construction is complicated by the fact that, ideally, we would like to know the difference between the value of land before and after new construction. We do not have a good measure of the value of vacant land or of the value of land after construction. We assume that the value of vacant land is zero and the value of newly developed land is equal to the average tract price, including housing. Thus, our estimate of the impact on land value represents an upper bound.

ment growth raises the aggregate value of residential property 0.58 percent.²⁴ Recall that an increase of 1 percentage point in city job growth reduces the rate of construction 0.1 percent, that is, the rate of construction falls from 1 percent of the total housing stock per year to 0.9 percent per year. This translates into a decrease in value of 0.1 percent from what the county would have experienced otherwise. The net impact of city job growth, therefore, is an increase in residential value of 0.48 percent. The positive effect on price far outweighs the negative impact of city job growth on suburban construction. Next, consider the effects of suburban job growth on residential values. Suburban growth has virtually no impact on prices, but it does have a positive impact of 0.09 percent on construction. Thus, the effect of employment growth on construction causes suburban growth to have an overall positive impact on residential value, but the magnitude of the overall impact is about one-fifth the impact of city job growth.

If there are no differences in productivity between centralized and decentralized growth, the impacts of city and suburban growth should be similar in magnitude, so the above difference in the total impact implies that centralized employment tends to be more productive than decentralized employment. This immediately raises the question of why suburban employment is growing while city employment is declining, and this question has essentially two possible answers. First, there may be negative spillovers from the decentralization of jobs. The choice by individual firms to leave the city may have negative effects on the remaining firms, which in turn may induce additional firms to leave. As we discussed earlier, this process may lead to an inefficiently rapid pace of decentrali-

zation. Second, the higher compensation for jobs in Philadelphia may no longer reflect the true productivity differential between city and suburban employment, and thus we are simply in a transitional state in which relative wages between the city and suburbs are still adjusting. Because wages have not completely adjusted, jobs are moving out of the city. Of course, this second explanation can be a result of either technological forces favoring decentralized production or an inefficient loss of agglomeration economies.

Distribution. While the differences in the impact of city and suburban job growth on the total value of residential real estate are significant, the differences across communities are even more dramatic. These differences are illustrated by the estimated effects of city and suburban job growth for two Montgomery County communities: Narberth and Salford. Narberth is a small, old, relatively dense community that lies 24 minutes by highway from the Philadelphia CBD. It also has train service. Salford is a community nearer the urban fringe, with low population density and no train service, and getting to the Philadelphia CBD entails a 77-minute commute.

We estimate that an increase of 1 percentage point in city job growth will increase the value of residences in Narberth 3.15 percent, but house values in Narberth will suffer a decrease of 0.47 percent when suburban job growth increases 1 percentage point.²⁵ If we use an average house price of \$196,300 in Narberth, job growth of 1 percentage point in the city would increase the value of a house \$6180; similar job growth in the suburbs would reduce its value \$920.²⁶ On the other hand, house values in

²⁴See my 1996 article for details of this calculation. These calculations assume that the new construction is valued at the mean value of houses in the county.

²⁵These estimates include the value of both price and construction impacts.

²⁶The average sales price is based on transactions occurring in the period 1990-95.

Salford would suffer a decline of 1.38 percent if city jobs grow 1 percentage point but would gain 0.39 percent from similar suburban growth. Since the average house value in Salford was \$133,300, these estimates translate into a loss of \$1840 from city growth and a gain of \$520 from suburban growth. The finding that job growth can negatively affect total value in distant communities—city growth has a negative effect on Salford, and suburban growth has a negative effect on Narberth—indicates that employment growth in a community tends to make communities more attractive for reasons other than simply the availability of jobs. For example, communities experiencing job growth may be in a better position to provide quality education, security, and other amenities to their residents.

SUMMARY

While our analysis of the relationship between the housing market and employment growth indicates that employment growth increases the value of real estate assets, all suburban residents do not share equally in the increase. Older, developed suburbs and suburban fringe communities do not have common interests, at least in terms of the patterns of economic growth and their effect on the housing market. Decentralized job growth increases the value of land on the urban fringe, and owners of agricultural land and developers are the prime beneficiaries. Centralized job growth, on the other hand, enhances property values in existing communities, and unfortunately, a decline in centralized jobs reduces the value of these properties.

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