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THE ECONOMICS OF COMMUTING IN A HIGHER COST WORLD



Also:
**The World Business
Cycle: Is It Here To Stay?**

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Federal Reserve Bank of Philadelphia
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THE ECONOMICS OF COMMUTING IN A HIGHER COST WORLD

Nonna A. Noto

... Where people live and work depends on the costs of housing and commutation. Energy policy, if it affects these costs, will have an impact on regional development.

THE WORLD BUSINESS CYCLE: IS IT HERE TO STAY?

Nariman Behraves

... The 1973 recession hit the industrialized nations at about the same time, but that's not a sign that business cycles around the world have fallen into step.

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The Economics of Commuting in a Higher Cost World

By Nonna A. Noto*

Every workday morning, 50 million Americans climb into their cars and head for jobs in offices and factories. Commuting, chiefly by car, became a way of life after World War II—so much so that it and its costs sometimes were taken for granted. Now, however, commuting patterns and the residential dispersion patterns that go with them are being reevaluated. One reason is the higher cost of petroleum-based energy and the desire to conserve it. The mayor of one of America's largest cities recently pointed out that if the average length of home-to-work trips were reduced only one mile each way, total travel per year would be reduced by 25 billion vehicle miles—a saving of 1 million barrels of oil per week.¹

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¹Thomas Bradley, "America's Cities," in John J. Mulhern, ed., *The Future of American Cities* (Philadelphia: Federal Reserve Bank of Philadelphia, 1976), p. 6.

Another reason for reexamining commutation is the effect it has had on large cities. As access to suburbs has become easier, city dwellers have left thousands of residences in the urban centers as well as the roads, utilities, and sewage systems already in place. Their departure has contributed to loss of cohesive neighborhoods, a transportation system unbalanced by rush-hour traffic, and a host of other undesirable developments on the urban scene.

These conditions have led policymakers and other public figures to call for measures to change the present patterns of commutation. The proposals have ranged all the way from improving mass transit to rehabilitating urban homes and taxing petroleum at a rate that would make the operation of gas-guzzlers prohibitively expensive for most people. These commutation patterns, however, are not accidental. They didn't just happen, for no reason at all. Instead, they came about because people made decisions about where to live and where to work. And

those decisions were based in part upon the cost of both housing and transportation. Thus an understanding of the economic forces that have determined the cost structure of homesites and worksites in the past may help us understand what the future may hold for our cities, suburbs, and regions.

COMMUTING COSTS AFFECT WHERE PEOPLE LIVE

Commuting—the regular journey from home to work and back again—makes it possible for people to live and work in the communities of their choice, even if those communities are at a distance from one another. That's the benefit of commuting. But commuting has costs, in both money and time. And at some point the prospective homebuyer has to trade off the benefits against the costs.

Costs of Commuting: Money and Time. The principal direct costs associated with commuting are out-of-pocket money costs and travel time. For example, bridge and

highway tolls, car operating costs, and parking fees—the main monetary costs associated with commuting by car—are determined primarily by the mileage traveled and the kind of vehicle used. They would be the same for any individual making the same trip with the same kind of vehicle.

Although the time spent commuting can be measured with a device as impersonal as a clock, the value of that time depends on how much it would be worth to an individual to spend his time doing something else. Thus the value of commuting time is an individual matter and is likely to vary with income, family size, sex, and age (Box 1).

People do not value their commuting time as highly as their time on the job.² Perhaps

²Estimates suggest that people value their commuting time at about 40 percent of their wage rate. See Gary Becker, "A Theory of the Allocation of Time," *The Economic Journal* 75 (1965), pp. 493-517; Michael E. Beesley, "The Value of Time Spent in Traveling: Some New Evidence," *Economica* 23 (1965), pp. 174-185.

BOX 1

WOMEN AND COMMUTING

Sex seems to make a difference in commuting. Women, on average, live closer to their work than men. Part of the reason may be that women's wages are lower than men's* while the value of their time spent in the household is higher. With relatively lower wages, women have less of an income incentive to undertake a long commute. And the family may prefer having them home earlier to having the extra income they might gain by longer commutes.

Many working women either are single or have few children at home. As members of small households with low demand for housing space, they have less incentive to undertake a long commute to save on housing costs. If, in addition, a woman works near another member of her household, she and the other member—with higher combined commuting costs than the single-earner family—would tend to live closer to the common workplace. Finally, women are less likely than men to own or drive a car. Consequently, their commutations may be limited to routes and distances accessible by walking or serviced by mass transit.

Lower benefits and higher costs point toward a shorter commute for women. Thus accessibility to affordable residences may be especially important to businesses that depend heavily upon female workers.†

*Nationwide in 1976, median hourly earnings for women were only \$2.90 compared with \$4.67 for men. U.S. Department of Labor, Bureau of Labor Statistics, "Weekly and Hourly Earnings Data from the Current Population Survey," Special Labor Force Report 195, 1977, p. 9.

†For further discussion of the relationship between household characteristics and commuting patterns see John F. Kain, "The Journey-to-Work as a Determinant of Residential Location," *Regional Science Association Papers* 9 (1962), pp. 146-147; and "A Contribution to the Urban Transportation Debate: An Econometric Model of Urban Residential and Travel Behavior," *Review of Economics and Statistics* 46 (1964), pp. 62-63.

this is because it is not easy to substitute nonwork time for work and wages, or because working is more unpleasant than commuting, or because commuting incorporates leisure activities such as listening to the radio and enjoying the scenery. Still, people do place sufficient value on their time to be willing to pay tolls for faster trips. And thus it seems that the time spent traveling is an important cost to many commuters.

Longer Commutes, Lower Land Prices.

With these substantial costs involved, why are people willing to commute long distances and long hours? There's no single answer to this question, because different people have different reasons for commuting. For some it may be the attraction of clean air and a garden plot. For others it may be proximity to schools and other institutions.

But for many people, the chief reason for undertaking a long commute may be to get more for their housing dollar. This housing dollar buys a structure, a neighborhood, and land. The price of land is lower at greater distances from the business centers, because individuals or firms must absorb higher transportation costs to reach the business centers from more distant locations. And where land prices are lower, so are prices per square foot of housing of a given grade. Thus lower land cost is the key to lower suburban housing prices.

The price of land, in turn, influences the density of construction. Nearer the business center, where land values are higher, each dwelling unit will tend to use less land, and housing will tend to be built upward rather than outward. A larger percentage of the dwelling units will be in high-rise apartments or attached rowhouses. At greater distances from the hub, land values are lower and so houses tend to come with bigger lots. A larger percentage of the housing units will be duplexes, small multi-unit complexes, or fully detached single-family

dwelling.³ Residential development in metropolitan Philadelphia, for example, follows this pattern—a decrease in the density of residential construction with increasing distance from Center City (Figure 1).

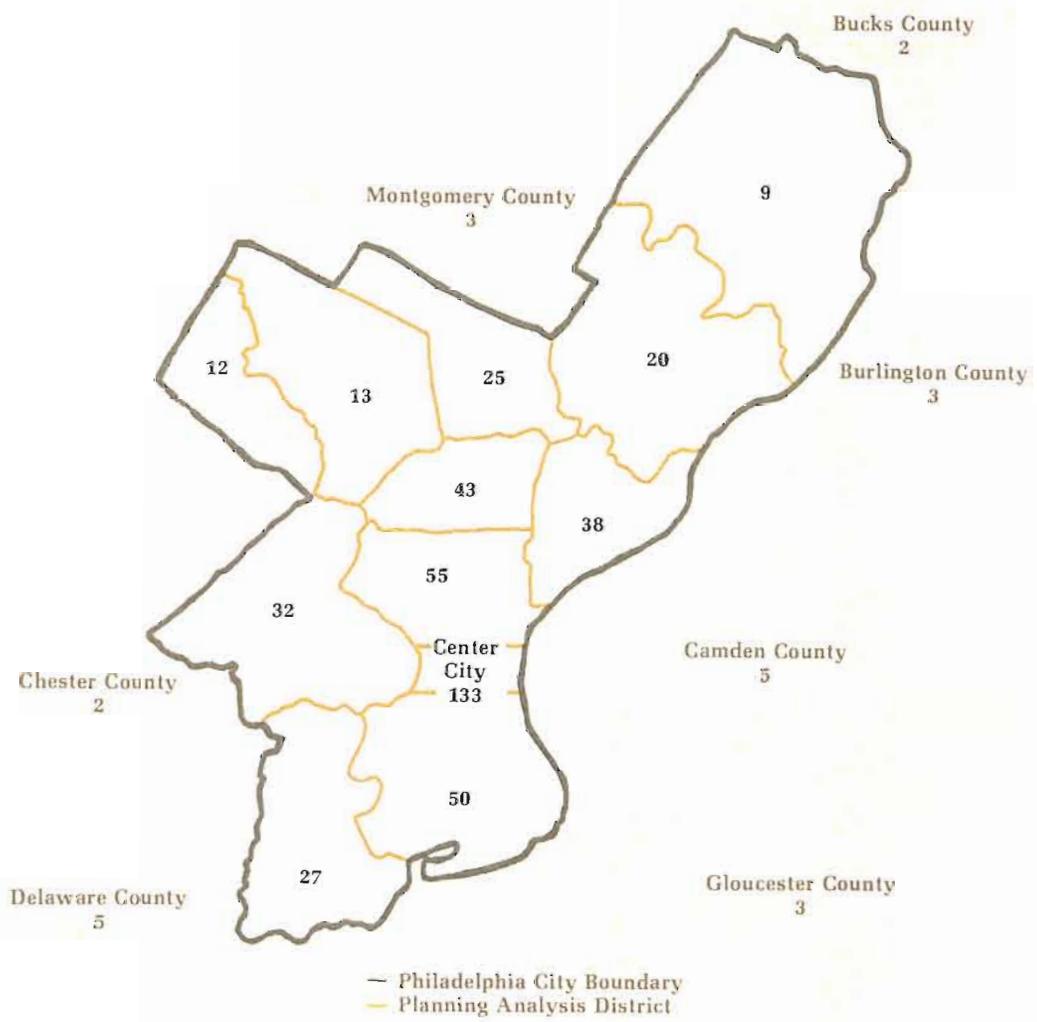
Thus the cost of commuting—or, alternatively, the benefit of accessibility—is reflected in the pattern of land values. These values tend to be lower the farther commuters travel from concentrations of economic activity. And these lower land values are mirrored in decreasing density of residential construction as roads lead outward from the skyscrapers of the central city to the farms of the distant suburbs.

The Tradeoff: A Long Commute vs. High Housing Costs. In choosing residential locations, then, many consumers trade off commuting costs against housing prices. A central location saves on commuting but costs more per unit of housing, while an outlying location saves on housing but costs more in commuting.

Who is more likely to commute the greater distance? People who want large lots and big houses are more likely to, because the total saving on housing will be larger the more land and housing space purchased. Thus a household with several children is a better candidate to choose an outlying location than a young single worker. And an outlying location is likely to offer a greater house saving incentive to a high-income family that intends to purchase a large property than to a low-income family that wants at most a two-bedroom apartment. But because the value of time is related to income, the high-income individual is likely

³For further discussion of the transportation cost-land value tradeoff see William Alonso, *Location and Land Use* (Cambridge: Harvard University Press, 1964); Edwin S. Mills, "An Aggregate Model of Resource Allocation in a Metropolitan Area," *American Economic Review* 57 (1967), pp. 197-221; Richard F. Muth, *Cities and Housing* (Chicago: University of Chicago Press, 1969); and Lowdon Wingo, *Transportation and Urban Land* (Washington: Resources for the Future, 1961).

FIGURE 1
HOUSING DENSITY FALLS WITH
INCREASING DISTANCE
FROM CENTER CITY PHILADELPHIA
(Housing Units per Residential Acre, 1970)



SOURCES: Philadelphia City Planning Commission; U.S. Department of Commerce, Bureau of the Census; Delaware Valley Regional Planning Commission.

to be torn between the attraction of a central location that conserves commuting time and an outlying location that offers a large house and yard at considerable savings. Behind this choice lies the tradeoff of higher housing costs against higher commuting costs.

Thus commuting costs affect where we live—directly, in transportation outlays, and indirectly, by their impact on the price of land. And because commuting imposes costs on employers, those costs also affect where we work.

COMMUTING COSTS AFFECT WHERE PEOPLE WORK

Commuting costs and housing costs can influence the location of businesses as well as of residences because these costs affect wages. The wages employers must offer to attract labor to a given location reflect, in part, what their employees must pay to get to work and what they must pay for housing. Because of the variation in the price of housing in different parts of the metropolitan area and because the transportation network makes some locations more accessible than others, workers may find it more costly to work at some sites than at others. As a consequence, they may be willing to take jobs at some locations only if the wages employers offer there are enough higher than wages elsewhere to compensate for the higher housing and commuting costs. Employers, in turn, may find that their labor costs differ at different sites in the same metropolitan area.

Labor Costs Rise and Fall With Housing Costs . . . Just as workers may require higher wages if commuting costs are high, they may be willing to settle for lower wages if their cost of living is reduced by having low-priced housing in the vicinity of the worksite. And in many cases, despite the tendency for land values to be lower at greater distances out, total housing prices may be lowest in the older industrial neighborhoods of the central cities. This fact is explained in part by the characteristics of

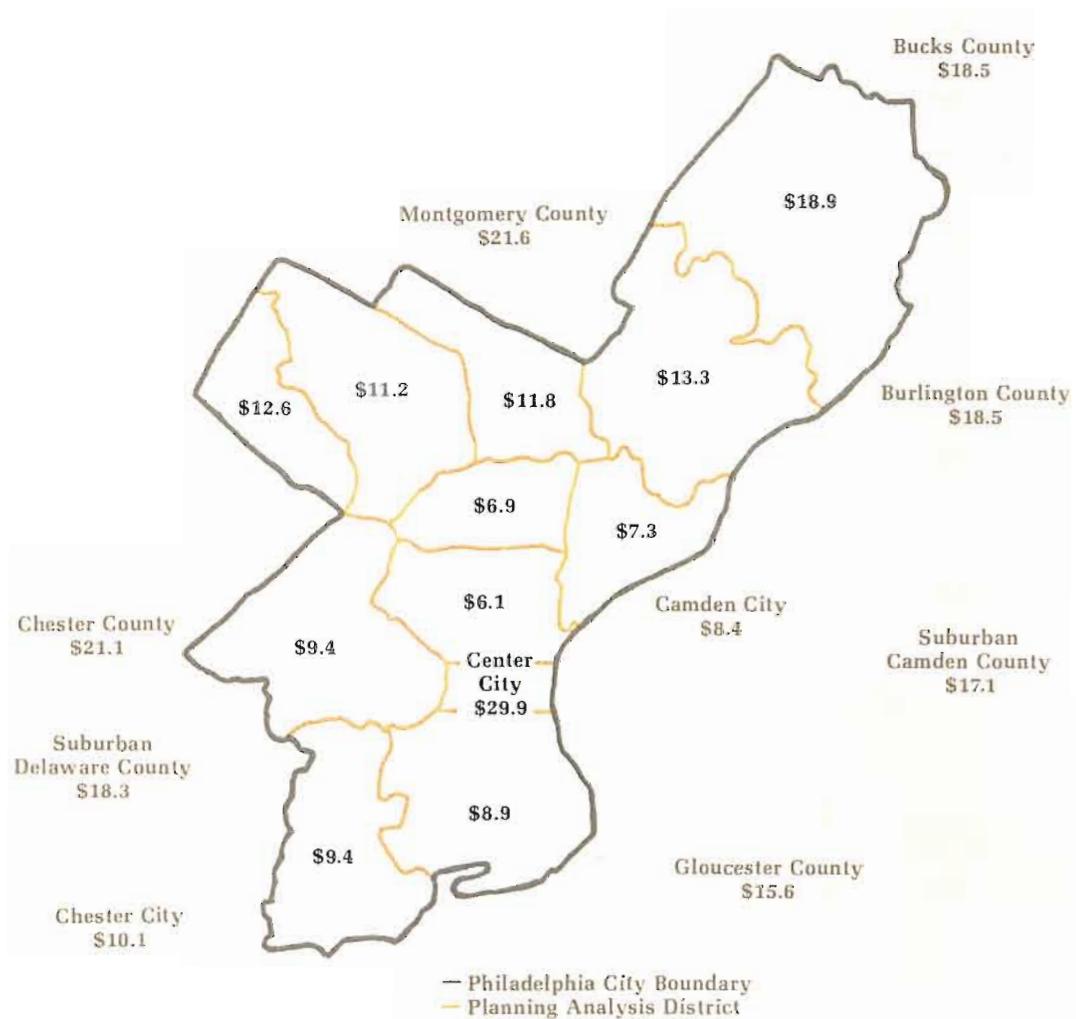
these neighborhoods and by the smaller size and poorer condition of their houses.

This pattern of lower grade and thus cheaper housing in the older central cities is evident, for example, in the 1970 census figures for the Philadelphia metropolitan area. The \$8,400 median value for owner-occupied houses in the central city of Camden compares with a \$17,100 value for the remainder of Camden County. Chester City's median house value of \$10,100 contrasts with the \$18,300 figure for the remainder of Delaware County. There are some exceptions, however, in the City of Philadelphia itself. The median house values of \$29,900 for Center City and of \$18,900 for the newly developed Far Northeast approach the figures for the surrounding suburban areas. But the median value of housing in the neighborhoods immediately surrounding Center City Philadelphia is equal to or less than the figures for the cities of Camden and Chester (Figure 2).

Thus, as a result of the uneven distribution of housing prices, employers of low-skilled and low-paid workers may find that they can reduce their labor costs by setting up shop near the relatively inexpensive housing stock of a central city. But employers that depend heavily on higher paid managerial, professional, and technical workers may be able to reduce their labor bills by locating near the more attractive suburban housing.

. . . And With Commuting Distances. The proximity of housing to a worksite influences the number of workers available to an employer at that site for a given wage. Because the road networks of the older metropolitan areas radiate outward like the spokes of a wheel, some suburban business locations may be quite inaccessible to all but those workers who live on or close to one spoke. As long as suburbs remain low in their density of development, labor scarcity may force the suburban employer to pay higher wages than the central-city

FIGURE 2
MEDIAN HOUSING PRICES ARE LOWER IN THE
OLDER CENTRAL CITIES
THAN IN THE SURROUNDING SUBURBS
 (Thousands of Dollars, 1970)



SOURCES: Philadelphia City Planning Commission; U.S. Department of Commerce, Bureau of the Census.

employer even in the absence of higher commuting costs and housing prices. But the construction of highways in outlying areas has improved the competitive position of suburban locations as employment sites. And the rise in auto ownership by individuals has increased the number of people available to employers at noncentral locations (Box 2).

By influencing the wage at which people are willing to work, the cost of commuting—including the price of housing and its accessibility to a job site—affects the number of workers willing to commute for a

given wage. The availability of labor at a site, in turn, influences the wage that will be paid there. Setting up in locations near suitable housing may help businesses save on labor costs, since lower commuting costs can result in lower wages.

Thus, in short, our pattern of residential and business location has depended in an important way on the costs associated with commuting—the cost of housing and the cost of transportation. But as those costs change, especially with respect to one another, so will people's responses to them.

BOX 2

REVERSE COMMUTING

Suburban businesses can look to city residents as well as suburbanites in their search for workers. In 1970, 12 percent of Philadelphia's resident labor force was reverse commuting from the city to the neighboring suburbs each day. These workers may be traveling the other way, but they appear to be responding to the same economic forces that affect suburbs-to-city commuters.

Reverse commuters tend to earn more than their neighbors who both live and work in the City of Philadelphia (though not as much as those who live in the suburbs and work in the city). In 1969, 21 percent of Philadelphia's reverse commuters earned over \$10,000. While 24 percent of suburban resident-workers earned this much, only 15 percent of city resident-workers did so. Suburbs-to-city commuters had the highest income, with 44 percent earning over \$10,000.* Some wages may be higher in the suburbs, in part, because the suburban jobs are more highly skilled or because there is a shortage of workers at suburban locations. But although these people make more money by reverse commuting than they would working in the city, they don't seem to make enough more to compete in the suburban housing market.

Reverse commuters may be taking advantage of the cheaper housing available in the city. To the extent that zoning and the economic pressures of the suburban real estate market discourage the construction of small units, people who can afford only small dwellings cannot benefit from the lower unit price of suburban housing. Their cheapest housing alternative still may be the small rowhouse in the central city. So, if the city is accessible, they may continue to live there even though they work outside the city limits.

Reverse commuters actually may face lower commuting costs. If they travel in the direction of lighter traffic, they should be able to travel longer distances in any given length of commuting time, with lower commuting costs per mile. The faster average commuting speed may make a suburban job even more accessible than a downtown job for someone who lives near the outskirts of the city. Thus a central-city rather than a suburban residence may mean a saving in travel time as well as in housing costs for some city dwellers who work in the suburbs.

*U.S. Department of Commerce, Bureau of the Census, *Census of Population: 1970*. Subject Reports. Final Report PC(2)-6D, Journey to Work (Washington, D.C.: Government Printing Office, 1972). Philadelphia suburban counties include Bucks, Montgomery, Chester, and Delaware in Pennsylvania, and Burlington, Camden, and Gloucester in New Jersey.

WHAT THE FUTURE HOLDS: GREATER DENSITY FOR CITIES AND SUBURBS?

Our present commutation patterns developed in the days of relatively cheap gasoline and easily accessible suburban housing. Now, however, the price of auto fuel has increased; and as the nearby suburbs fill up, people who want large lots must look further and further afield to find them. These conditions mean that people will be paying more in money and in time to continue commuting. As the price goes up, commuters tend to make certain adjustments. And these adjustments are likely to be in the direction of greater density for both cities and suburbs, with people living closer to where they work.

The increased demand for suburban locations by firms and their employees as well as by central-city commuters has raised the relative price of suburban land. The trend of rising land costs combined with the increased demand for smaller housing units has produced a powerful economic force for higher density construction in the suburbs. These developments have increased the variety of nearby housing available to people working in the suburbs as well as the size of the nearby work force available to employers. The increasing costs of transportation and housing suggest that this movement toward increased residential density in the suburbs is likely to continue.

Other recent trends have combined with the rising cost of energy to decrease the benefits and increase the costs of the suburbs-to-city commute for some workers. The resulting increase in demand for centrally located residences has provided a financial incentive for the conversion of a few downtown neighborhoods, such as the Society Hill and Art Museum neighborhoods of Center City Philadelphia, from low-income to middle-income and upper-income areas.

These trends are expected to continue as the growth in downtown employment of professional and managerial workers in-

creases the demand for central-city neighborhoods as upper-income and middle-income residential sites. Well-paid workers, whose time has a relatively high opportunity cost, have a strong incentive to reduce their commuting time; and they are in a financial position to bid for the expensive locations accessible to their worksites. Further, the demographic trend toward reduced family size—by shifting demand to smaller houses—diminishes the house savings to be gained from a longer trip to the suburbs. Finally, Federal subsidies for urban renewal and redevelopment, along with the increased cost of new housing, help make the rehabilitation of older structures more attractive economically.

In short, higher future commuting costs are likely to reinforce present trends towards denser concentration of economic activity, with people living nearer their work both in the suburbs and in the city. The current concern with energy conservation, however, could lead to transportation policies that substantially alter the time and money costs of commuting and hence the trend toward greater density. For example, policies that favored rail systems as an alternative to automotive commuting might save energy. But energy savings would not be the only outcome. Building a rail system to the outer suburbs would tend to increase the spread of development by reducing average travel time and making those suburbs more easily accessible. Thus it would work against the tendency to greater density and might discourage inner-city rehabilitation efforts.

The moral of the story is that policy actions aimed at reducing commuting costs through energy conservation have widespread side effects, especially in the areas where people do the most commuting. This impact is regional in scope, and thus there's a case to be made for coordinating energy conservation policies which affect commuting with policies for improving conditions overall in the nation's metropolitan areas.