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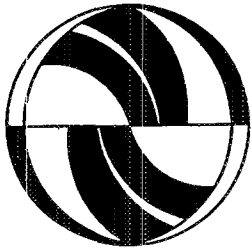
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**The University of California
Transportation Center**

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**The Changing Commute:
A Case Study of the Jobs/Housing Relationship Over Time**

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ABSTRACT

Commuting patterns between home and work were studied among 30,000 employees of Kaiser Permanente, a major health care provider in Southern California. The study tracked the differences between home and work location among employees over six years by analyzing employee records and responses to a survey of over 1,500 of the workers. It was found that work trip lengths had in general not grown over the six year period. Growth of the work force had contributed more to the growth in local traffic congestion than had a lengthening of the work trip over time. The automobile remains the dominant mode of travel between home and work for these employees, and choices of residential location were found to be based upon many factors in addition to the home-work separation, such as quality of neighborhood and schools and perceived safety.

1. Introduction: The Jobs-Housing Balance Hypothesis

In the United States there is renewed interest in patterns of travel between home and work. This interest reflects recent findings indicating that the rate of increase in vehicle miles of travel during the decade of the eighties was greater than the rate of increase in population, workers, and even vehicles, and that during that decade the share of total travel consisting of commuting between home and work rose from 20.1 to 22.7 percent of all travel (Pisarski, 1992).

Many are investigating the role which the spatial pattern of cities plays in determining the rate of increase in work-related travel. In particular, the notion of "Jobs-housing balance" has become a major issue in urban and regional policy. Some observers and regional policy makers believe that a primary cause of worsening traffic congestion in some expanding metropolitan areas is a growing imbalance in the location of jobs and housing. They argue that work trips are lengthening at least in part because new residential construction is concentrated in outlying suburbs far from the traditional urban core, while new employment centers are being created far from areas with new housing. The imbalance occurs because some parts of the metropolitan area are jobs rich and housing poor, others are housing rich and jobs poor, and few provide both residences and employment sites for roughly an equal number of people (Cervero, 1989a). Middle and lower income people, it is argued, cannot find affordable housing near their places of work, and are forced to accept longer commutes in order to find housing within their budgets.

Seeking remedies for growing traffic congestion, many regional authorities are turning to the jobs-housing relationship as a planning tool. The perception of a growing imbalance between jobs and housing has motivated regional bodies and public agencies to concentrate new policies on the home-to-work commute. Cities, counties, and large regional employers are being encouraged to develop policies which would create a better balance between jobs and housing (Cervero, 1986). In Southern California, for example, two plans adopted by regional planning bodies have shifted the focus of transportation planning from construction of transportation facilities to a broader approach that includes transportation demand management. The *Regional Mobility Plan*, adopted by the Southern California Association of Governments (SCAG), and the

Air Quality Management Plan, adopted by the South Coast Air Quality Management District (SCAQMD), both urge vigorous implementation of programs that alter travel behavior patterns by consciously balancing the location of new jobs and housing. The 1989 versions of these plans called for local governments to adopt ordinances locating 9% of all new jobs created between 1990 and 2010 in "housing-rich areas" and 5% of all new housing added during the same period in "jobs-rich areas" (Southern California Association of Governments, 1989).

The jobs-housing balance hypothesis, however, remains highly controversial. Critics of this perspective point out that there are many other sources of growth in traffic congestion which may be equally or more important than the jobs-housing balance. Growth in population, increased per capita use of automobiles for travel, higher rates of female labor force participation, and a decline in freeway construction during the past two decades all contribute significantly to worsening congestion independent of any changes which are taking place in the spatial distribution of jobs and housing (Giuliano, 1992). There is also increasing evidence that non-work travel by automobiles is increasing faster than commute trips, even at the peak hours of traffic congestion (Richardson and Gordon, 1989). Furthermore, critics of jobs-housing balance policies argue that even communities which provide for approximately the same number of residents and employees have few effective policies to encourage residents to work near their homes, or to encourage local employees to seek housing near their work sites. And, the growing prevalence of multiple worker households decreases the probability that people can both live and work within the same community. Furthermore, workers often retain their residences after changing jobs, and many move their residences for reasons not related to the locations of their employment.

There is a clear need for empirical studies to document the relationship between traffic and the spatial relationship between jobs and housing, and for studies which elucidate the dynamics of household decision making related to job location, housing location choice, and commuting decisions. Most of the studies of jobs-housing balance to date are aggregate analyses of all commute trips made by all workers within a region. It is useful to also examine the home-work separation in a more focused way, using case studies of particular employers, groups of workers, and of particular geographical areas. This paper summarizes one such case

study which has recently been completed in the Los Angeles Metropolitan area (Wachs, *et al*, 1991).

2. Case Study of Kaiser Permanente Employees in Southern California

A unique opportunity to study the jobs-housing relationship over time was presented to us by senior management of Kaiser Permanente of Southern California, a prepaid health care plan serving 2.3 million members residing throughout the Los Angeles metropolitan area. Because of the increasing interest in the jobs-housing relationship in Southern California, Kaiser Permanente management wanted to know more about the commuting patterns of its own employees, so that it could develop a corporate strategy to minimize the growth of commuting travel by its workers. Kaiser Permanente is one of the largest and fastest growing employers in the region, which gave us the opportunity to study the changes over time in commuting patterns among its work force using a data base of a sort not usually available to planners.

Over 30,000 Kaiser-Permanente employees commute to 134 sites within the Los Angeles metropolitan area. These sites range in size from just a few dozen employees in outlying Lancaster to nearly 4,500 employees at the Los Angeles Medical Center in Hollywood. Between 1984 and 1990, Kaiser Permanente added over a dozen new offices and clinics, a major new medical center in Riverside, and over 8,000 new employees - a 40% work force increase in just six years.

Concomitant with Kaiser Permanente's explosive growth during the 1980's was a dramatic increase in vehicle travel and traffic congestion in the Los Angeles metropolitan region. L.A.'s drivers spent an average of 215,000 hours a day stuck in traffic during 1984, leading the region to be ranked as the most congested metropolitan region in the country (Cervero, 1989b). Congestion has, if anything worsened during the six years spanned by our study, evidenced by the fact that another national study recently documented the finding that Los Angeles continues to experience severe traffic congestion (U. S. General Accounting Office, 1989, p. 45). Vehicle delay and traffic congestion are major sources of the region's serious air quality problem; 90% of the 1989 person hours of exposure to hazardous air in the US was in the Los Angeles air basin (South Coast Air Quality Management District, 1989).

3. Methodology and Data Base

This study analyzed trends in residential and commuting patterns of Kaiser Permanente employees in Southern California in order to determine the contribution of the jobs-housing balance among the employees to the growth in traffic congestion in southern California. To do this, we examined housing markets (i.e. housing prices and locations of new developments) and changing commuting conditions (i.e. travel speeds and congestion levels) to determine their relationships to residential location patterns and housing preferences. To accomplish these tasks, two primary sources of information were used. First, an employee database was constructed using Kaiser Permanente personnel files, *Los Angeles Times* housing cost data, U. S. Census data and files which allowed geographic units of analysis to be identified and compared with one another. Second, a data set was constructed using the results of a survey which we conducted of a broad cross-section of employees (except medical doctors) at five major Kaiser Permanente facilities in Southern California.

The employee database included information on all Kaiser Permanente employees in 1984 and 1990. For each employee the file contained sex, ethnicity, age, wage category, job code, job location, years of service, home zip code, scheduled weekly hours of work, and a unique serial number. These files were merged and linked with a separate file constructed for this project which contained median home prices for each zip code from the *Los Angeles Times* real estate survey and straight line travel distances from the center of each Southern California zip code to each major Kaiser Permanente facility.¹ The residential location and commuting patterns of three classes of employees were examined: employees who left Kaiser Permanente between 1984 and 1990, employees working for Kaiser Permanente in both 1984 and 1990, and current employees hired after 1984. The housing location and commuting patterns of these employees were explored, particular emphasis was given to employees commuting long distances to work and those living very close to work.

The work locations of more than 1,500 employees who were surveyed are summarized in Table 1, shown relative to downtown Los Angeles in Figure 1. The survey explored housing costs and conditions, mode of travel and travel time to work, attitudes toward commuting, and attitudes toward factors affecting residential location. For those employees who had moved since joining Kaiser Permanente, questions explored the reasons for their move. Four thousand

questionnaires were mailed to employees in the sample with 1,557 employees (38.9% of those surveyed) returning completed questionnaires. The survey responses were weighted to reflect the number of employees in each of the five facilities. All reported results from the survey database are weighted responses.

4. Results

To understand the locational factors affecting commuting, we began by analyzing the residential location of Kaiser Permanente employees in Southern California using the 1984 and 1990 employee databases.

4.1 Changes in Commute Distances

A key question motivating this study was whether commute distances are growing longer. The answer, for these employees, is no. Figure 2 presents the travel distance to work for all employees for both the 1984 and 1990 employee populations and the figure reveals only slight differences in commute distances between 1984 and 1990. Despite adding over 8,000 employees since 1984, the estimated average commute for a Kaiser Permanente employee actually *decreased* slightly (2.5%) from 10.0 miles in 1984 to 9.7 miles in 1990. The very long commutes by a few employees in both 1984 and 1990 tend to pull these average commute distances up. The median commute of seven miles did not change between 1984 and 1990; in other words half of the work force commutes less than seven miles to work and half over seven miles. The modal commute was only about two miles in both 1984 (12.2% of the workers) and 1990 (11.6%). Such a stable commute pattern in the face of worsening traffic congestion in Southern California is significant. Fully 68% of all commuters in 1990 travelled less than ten miles to work. As a major regional employer, Kaiser Permanente has not itself experienced a growing jobs-housing imbalance among its work force, nor has it in any obvious way contributed to a growing regional imbalance.

The distribution of commute distances became more compact between 1984 and 1990; a smaller proportion of all workers commute very short or very long distances and a larger proportion are middle distance commuters. The estimated proportion of employees with very short commutes (less than 3 miles) decreased slightly from 17.4% in 1984 to 16.4% in 1990. The proportion of very long distance commuters (20 miles or more) remained essentially unchanged between 1984 and 1990. It is important to note, however, that while the proportion of employees commuting very long distances changed little during the past six years, the absolute number travelling over twenty miles to work in this sample grew 36.5%, from 2,109 in 1984 to 2,879 in 1990, reflecting the dramatic growth in the size of the Kaiser Permanente work force. This growth in the number of employees commuting to and from Kaiser Permanente facilities mirrors the growth of workers commuting to and from jobs all over Southern California.

The estimated average commute distance for all employees decreased about 2.5% (less than 1,600 feet) since 1984, while the total number of commuters increased 40.2% (over 8,300) during the same period. Clearly, the growing number of commuters contributes far more to worsening traffic congestion in Southern California than does increasing commute distance. This impression is upheld by the map presented in Figure 3, which summarizes the proportional shift between 1984 and 1990 in residential location by zip code of employees at the Los Angeles facility. While some zip codes have experienced some growth or decline of Los Angeles Center employees' residences, no significant geographical shift is apparent.

Though average commute distances for all employees did not change significantly between 1984 and 1990, commutes do vary significantly from facility to facility. Commute tend to be shorter among workers at older facilities and in central city areas and longer at newer facilities and in outlying areas. Figure 4 presents the estimated employee commute distance profiles to a sample of major Kaiser Permanente facilities in both 1984 and 1990 and reveals tw

trends. First, workers at facilities established within the last decade, such as Riverside and Pasadena, tend to have longer commutes than those who work at older facilities, such as Los Angeles and Harbor City. Second, employees at suburban facilities, such as Anaheim and Riverside, tend to have longer work trips than do those who work at central city facilities, such as Los Angeles and Harbor City.

The longer commutes to the newer Pasadena and Riverside facilities are probably the result of two major factors. First, a substantial proportion of the employees at those facilities transferred from positions at older Kaiser-Permanente facilities, and there is normally a time lag in the residential relocation of employees associated with a move to a new facility. People choose their residential locations for many reasons in addition to proximity to work and many employees with very long commutes to their new work sites continue to live at residences nearer their former work sites because of personal reasons (price, quality of schools, proximity to recreational facilities, attachment to neighborhood, etc.). Over time, as these long distance commuters move, they tend to select homes which, in addition to many other factors, reduce their commuting distances between home and work. A second reason for longer commutes at the Pasadena facility is less applicable to the Riverside facility. The Pasadena office is the corporate headquarters, an administrative center which does not offer health care directly, and which employs a more specialized work force than most other Kaiser Permanente facilities. It draws management, administrative, and technical workers from the entire region whose skills can only be utilized at that single location.

The longer suburban commutes are consistent with general metropolitan travel patterns. The Los Angeles Medical Center is located in Hollywood, a densely populated area with endemic traffic congestion. Employees at this facility tend to live closer to work both because there is a wide variety of housing nearby and because of the difficulty commuting long distances to and from congested Hollywood. In contrast, land development in outlying Riverside is less dense and more dispersed; there are fewer residential opportunities very close to the Riverside Medical Center and trips of all types are longer than they are in the core of the region.

4.2 Changes in Commute Time

Commute time is more important to workers than distance and, for many employees, commute times are gradually increasing as traffic congestion worsens. Among the employees in the survey data base who neither moved nor changed job locations between 1988 and 1991, nearly two-thirds reported little or no change in commute time during the past two years, nearly 30% say that their commute time has increased; and less than 5% report a commute time decrease during the same period. Table 2 shows that the estimated average commute time changes for non-moving, non-transferring employees at the five surveyed medical centers results in a net average increase of 3.2 minutes per employee since 1989; this is an average increase in commute time of about 6% per employee per year. Commute times are gradually increasing for the employees in our sample, but not due to lengthening commutes; commute times are increasing in Southern California because congestion is worsening.

Figure 5 displays a graph of the usual travel time from work to home broken down into 5-minute intervals. To approximate true travel times and to avoid "spikes" in the reported data at ten minute intervals, we averaged three 5-minute periods to produce a 15-minute moving average, which shows the most common work-to-home commute time (12% of all employees) to be between 15 and 20 minutes.² Despite gradually increasing commute times, however, the majority of employees have manageable commutes: over two-thirds spend less than thirty-five minutes commuting to work.

We used this moving average technique to compare the commute time distributions for each of the five facilities. Figure 6 shows, interestingly, that employees at the inner-ring suburb Harbor City Medical Center have the highest proportion of short commute times followed by employees at the outlying Riverside facility. On the other hand, employees at the Pasadena

headquarters have the highest proportion of very long commutes (80 or more minutes) followed closely by employees of the Los Angeles facility. Most interestingly, employees at the Los Angeles Medical Center also have a very high modal (i.e., most common) travel time of around 30 minutes (which represents an averaging of intervals from 24 to 37 minutes); in congested Hollywood, there are very few short commutes.

Employees at inner-ring Harbor City and outlying Riverside have relatively short commute trips but for different reasons. Our analysis of commute distance showed that Harbor City employees tend to live closer to work than employees at other facilities and, consequently, have the shortest commute times as well. Harbor City is a lower income area which has a supply of relatively affordable housing in proximity to the employment center. The employees at Riverside, on the other hand, are commuting in a lower density, rapidly growing suburban environment. They have longer distance commutes than the region-wide average, but the relative lack of congestion in the Riverside area translates into faster travel speeds and shorter commute times.

4.3 Commute Mode

As expected, the automobile was, by far, the dominant mode of travel for commuters in this sample. Table 3 demonstrates that over 91% of the Kaiser Permanente employees at the five study sites use automobiles for their journeys to work, with 79.4% usually driving alone and 12.0% sharing rides with others who may or may not work at Kaiser Permanente. Table 3 also shows the breakdown of employee commutes by mode and travel time. Clearly the attractiveness of driving alone to work is related to travel time; except for bicyclists and those living close enough to walk to work, driving alone is by far the fastest way to work.

The high proportion of drive alone commuters may, in part, result from the fact that, except for Pasadena, the five Kaiser Permanente facilities surveyed are 24-hour-a-day operations. Table 4 separates employees into three categories: (1) those who commute during both the morning and evening peak periods; (2) those who commute either during the morning or the evening peak period (but not both); and (3) those who commute entirely outside of peak commute times. This table shows that nearly one-quarter of the employees commuting during both peaks (i.e. working traditional 8:00 a.m. to 5:00 p.m. schedules) use means other than driving alone to get to work compared to less than 7% for those commuting exclusively during the off-peak when transit service is limited and shared rides are more difficult to arrange. Altogether, just 6 out of 10 employees are typical drive-alone, peak hour commuters.

Using this same breakdown of commuters into three types (both peaks, one peak, or neither peak), we found that attitudes toward commuting varied as well; 17.1% of the survey respondents who commute during both peak periods report that their commutes have grown "much more difficult" during the past two years compared to just 9.6% for employees commuting exclusively outside of the peak periods.

4.4 Short and Long Commutes

Although commute distances changed little during the 1980's and the majority of employees commute fewer than seven miles, over 11,000 employees in our sample commute ten miles or more to work. This large and growing number of workers merits special attention because, while comprising less than 40% of the work force, they account for over 70% of the vehicle-miles commuted by all employees.

Why do some employees choose to spend substantial time and money commuting long distances and, in some cases, very long distances to Kaiser Permanente facilities? We can begin to answer this question by comparing short- and long-distance commuters. The results show that the stereotype of the low-wage worker forced to commute long distances to jobs in high-rent areas is simply not accurate; the true picture, in fact, is quite the opposite.

From the employee database, we compared employees commuting over 10 miles to work (about 32% of the work force) with those commuting less than 10 miles (about 68%). In order to examine the impact of travel times for long and short commuters, we divided the survey sample into roughly the same proportions, yielding a split in the usual travel time between work and home of 36 minutes or more (68% of the sample) and those traveling 35 minutes or less (32%). By using both the distance variable from the employee database and the usual work-to-home travel time variable from the survey database, we can construct a picture of the long-distance commuter.

Table 5 presents the distinctive characteristics of long-distance commuters. The table shows that long-distance commuters are more likely to be middle-aged than younger, more likely to be male than female, more likely to be Asian or White than Hispanic or Black, and to be unrepresented by a labor union (i.e. management), and earning a relatively high-wage. Likewise, Table 6 presents selected demographic characteristics of employees with respect to commute time; the table shows that employees with long commute times are likely to be single parents, work in administration, to have moved since joining Kaiser, to be Black or Hispanic, and slightly more likely to own their own homes, to be male, and to have had an annual household income greater than or equal to \$40,000 in 1991. While generally consistent with Table 5, one point in particular stands out: commute times vary dramatically by living situation. Generally, employees living alone are least likely to have long commutes and single parents are more likely to have longer work trips. The influence of children on commute times is straightforward; parents' commute trips often include dropping off or picking up children from school or day care. Parents may also have longer commute times than those without children because the presence of children in the family causes such factors as the quality of schools, neighborhood safety, and the availability of open space to become more important criteria than travel time in the selection of neighborhoods in which to live.

4.5 Residential and Employment Locational Decision Making in Relation to Commuting

Given the clear demographic variation of employee commuting by both time and distance, we examined the role of commuting in the choice of home and work location. This analysis was predicated on the hypothesis that commuting distance is likely to be a secondary consideration in choosing where to live; housing costs, quality of schools, and safety from crime were anticipated to generally play a much larger role.

Purchasing a home reflects a number of factors. First, housing affordability has declined generally in the last twenty years due to increasing land values. Older workers are more likely to have bought homes at a time when they were more affordable. Second, home ownership is a function of the life cycle. As people age and form families, their needs for a home increase. We consequently find that older employees are more likely to own homes than younger employees; employees under age 30 are much less likely to own their own homes. A third factor is that homes cost more in the central core of the metropolitan area compared to the fringes. Consequently, persons living at the periphery of the urban area are more likely to own their own homes. Employees at the outlying Riverside and Anaheim facilities are more likely to own homes than employees at the more central Pasadena, Harbor City and Los Angeles facilities.

While few employees commute very long distances to work, workers who have moved their residences tend to have longer commutes. We can see this by comparing in Table 7 the home and job locations of employees in 1984 and 1990 to see what changes occurred during this six year period. We analyzed three groups of employees and found that: (1) employees who moved or changed job locations between 1984 and 1990 included the highest proportions of long distance commuters; (2) employees who joined Kaiser Permanente between 1984 and 1990 and those who have recently left the organization by means other than retirement tend to fall in the middle, with a proportion of long distance commuters similar to the organization-wide average of 32.3%; and (3) employees who retired or did not change either job or residential location are the least likely to be long-distance commuters.³ Of the six possible changes Kaiser Permanente employees could make between 1984 and 1990 (shown in Table 7), a change in residential location was most closely linked to commutes of 10 miles or more.

Given the link between a residential move and long commutes, we examined the influence of ownership status on commute distance. Table 8 shows the changes in employee commute times with the four possible changes in owner/renter status that can accompany a move. It shows that employees moving into rental housing tend to shorten their commutes, while employees who own their new homes tend to lengthen their commutes; these patterns are consistent regardless of the employee's owner/renter status prior to moving. In other words, we find that many employees will accept a longer commute in order to buy a house.

While employees buying homes tend to lengthen their commutes, this does not mean that workers commuting long distances are necessarily more satisfied with their homes and neighborhoods. The constellation of employee home and work locations is far more complex than a simple pattern of short commute renters and long commute owners. Table 9 shows that employees in general are quite satisfied with their homes and neighborhoods, though long commuters are somewhat more satisfied with neighborhood quality, local schools, and safety. This is consistent with the widely held view that people trade off the inconvenience of a long commute for other characteristics of communities which they value greatly.

The importance of neighborhood quality to employees who move is confirmed in Table 10. While Table 9 reports the housing and neighborhood satisfaction of all employees, Table 10 focuses specifically on residential movers and their reasons for moving. When asked about their reasons for moving, neighborhood and housing quality factors - safety from crime (94.1%), better neighborhood (92.6%), more living space (88.8%), and better schools (82.3%), were ranked by employees as most important. In contrast, distance factors - close to family/friends

(56.0%), close to work (65.2%), close to child care (71.9%), and close to schools (74.8%), were less important.

Some differences emerge in Table 10 when comparing movers with short commutes and movers with long commutes. Both types of commuters, in nearly equal numbers, cited safety from crime, better neighborhoods, and more living space as the most important reasons for moving. Commuters having longer trips were more likely than those having short commutes to cite better schools, more affordable housing, and nearness to schools as important reasons to move. Commuters having shorter trips, on the other hand, were much more likely to cite nearness to both work and family and friends as important reasons to move. In summary, employees for whom commute time is an important factor tend to choose housing near work; those for whom commute time is less important, tend to trade off commute time for higher neighborhood quality.

4.6 Satisfaction with Commuting Arrangements

In contrast to the subtle differences in housing satisfaction among employees with short and long commutes, Table 11 shows that differences in commute satisfaction are quite dramatic. Particularly with respect to commute distance satisfaction, commuters having long travel times are much less satisfied than those having short travel times; clearly dissatisfaction with the distance to work is primarily, though not exclusively, a function of travel time

To examine the issue of commute satisfaction more closely, we constructed a regression model, using a quadratic function, relating satisfaction with the distance from home-to-work as a function of the usual number of minutes it takes to return home from work. The statistically significant results are displayed in Figure 7 and show commute satisfaction dropping off rapidly as travel time increases.⁴ Though most employees are generally satisfied with their commute

distances, the *point of indifference* - the estimated travel time when responses shift from being satisfied to being dissatisfied - occurs at about 46 minutes.

After controlling for travel time, few remaining factors correlate with commute distance satisfaction. We constructed a second regression model to test the influence of factors other than commute time on commute satisfaction. From a wide variety of possible demographic, socio-economic, job type, and facility variables, only two were statistically related to commute satisfaction, and these only slightly. First, long-term Kaiser Permanente employees tended to be more satisfied with travel time. Second, other things being equal, employees who believed that their commute time had grown longer in the last two years were more dissatisfied.⁵

The first additional variable appears to reflect more satisfaction with housing location. Long-term Kaiser Permanente employees have most likely been able to locate in places of their choices, most probably at more affordable prices. The second variable suggests a conceptual frame of reference. When traffic is actually perceived as becoming worse, then dissatisfaction with long commutes increases. Interestingly, once commute time and these three factors are controlled for, no other factors emerge as significant; commute distance satisfaction does not vary by income, job classification, or work site.

5. Summary and Conclusions

A thorough investigation has been conducted of the commuting patterns of the Southern California employees of Kaiser Permanente. This investigation, using Kaiser Permanente's employee data base and a survey of employees at five major facilities, was intended to elucidate trends in the commuting patterns and in particular to examine whether there is a worsening jobs-housing imbalance evident among the Kaiser Permanente work force. The investigation was motivated by growing concern among regional planning and environmental agencies that growth in traffic congestion is attributable to a widening jobs-housing mismatch and that local governments and major regional employers should focus on the spatial relationship between

workers' residences and places of employment as part of a regional effort to overcome the problems of traffic congestion and air quality.

This examination of the residential locations and commuting patterns reveals little evidence of an increasing jobs-housing imbalance. While average commute times are increasing about 5% per year, this is due primarily to the increasing volume and density of traffic, not to increasing commute distances; the average commute distances for employees actually *decreased slightly* since 1984.

Between 1984 and 1990, the mean distance, measured in miles, between home and work has decreased slightly. The median journey to work is about seven miles and 62% of all workers travel less than ten miles from home to work. Workers at outlying suburban facilities travel longer distances between home and work than do workers at inner-city facilities; hence it appears that the employees are not experiencing a worsening jobs-housing imbalance, nor is Kaiser's work force contributing in any obvious way to a regional jobs-housing mismatch.

Travel times, measured in minutes, have gradually increased despite the fact that travel distances have not grown. This reflects the fact that growth in population and economic activity throughout the Los Angeles region have far exceeded increases in transportation system capacity during the past several decades and, thus, traffic congestion has worsened. Kaiser Permanente has been part of the overall growth in the region, having added some 8,000 employees since 1984. In outlying areas, higher travel speeds are coupled with longer travel distances between home and work; in the inner city, workers tend to live shorter distances from their work, but to travel at slower speeds because of greater congestion.

Contrary to the jobs-housing imbalance hypothesis, the proportion of employees commuting very long distances to work (20 miles or more) has actually *declined slightly* (2%) since 1984. The tremendous (40%) growth of the Kaiser Permanente work force since 1984, however, has caused an absolute increase in the number of long distance commuters. Today, more than 11,000 employees reside more than ten miles from their places of employment; though they constitute less than 40% of the work force, these long distance commuters travel more than 70% of the vehicle miles commuted by all of the employees in our sample.

Many observers have argued that the high cost of housing and dispersion of jobs in Southern California is forcing low-wage workers (who tend to be young, female, and ethnic

minorities) into increasingly long commutes. This study, however, suggests otherwise. Long distance commuters are more likely than employees with short commutes to be male, older, professional or administrative employees, and somewhat more likely to be White or Asian rather than black or Latino. Importantly, those commuting longer distances are more likely to be married, to have children, and to be homeowners rather than renters. Also, those who commute long distances are more likely than other employees to have relocated since starting work with this organization, and are more likely to have transferred from one Kaiser Permanente facility to another.

The employees who were studied, like most citizens, consider many factors when deciding where to live and work. The cost of housing, the quality of neighborhood, and especially the quality of schools and the absence of crime, influence choice of housing location to a greater extent than the convenience of the commute. While many employees are frustrated by traffic congestion and delay, they are more sensitive to the cost of housing and the quality of their communities. When they do relocate their residences, about 44% of Kaiser Permanente employees find that their commutes are longer than they were before moving, about 26% find that their trips to work are shorter after moving than before, while about 30% find that a move leaves their commute distance unchanged. Further, employees moving into rental housing tend to shorten their commutes, while employees buying homes tend to lengthen their commute times.

Over 91% of all employees use automobiles for their journeys to work, with about 79% driving alone and about 12% sharing rides with others who may or may not work for Kaiser Permanente. Employees commuting during peak traffic periods (Monday through Friday from 8.00 to 5.00) are most likely to commute by means other than driving alone; about 75% of the employees commuting during both peak traffic periods drive alone to work, compared to over 93% for employees commuting outside peak periods. Fewer than 3% of Kaiser Permanente employees, regardless of commute time, use public transit. Overall, about three in five employee commute trips to and from Kaiser Permanente facilities are made by driving alone during peak periods.

The jobs-housing balance as a strategy to combat growing traffic congestion and air pollution has been advanced on the basis of logic which is persuasive but tested at the most aggregate level. While the case study presented here does not sustain the assertions of those

who promote the jobs-housing hypothesis, it was conducted in only one metropolitan area and on the basis of the employment force of a single large regional employer. We have no reason to believe that the Kaiser Permanente work force is in any way atypical, yet no single case study can be decisive. Our findings add credence to the arguments of those who are questioning the effectiveness of policy proposals advocating the jobs-housing balance as a principal strategy for the alleviation of traffic congestion, but further case studies are needed to fully elucidate this complex issue.

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NOTES

1. The use of straight-line distances between centroids of census tracts introduces some possibility of systematic bias in the data, since census tracts in outlying areas can have much larger areas than tracts located in the more central, densely populated parts of the region.
2. Since the graph presents a 15-minute average of grouped 5-minute intervals, the 20 minute modal work-to-home travel time actually represents an averaging of intervals between 12.5 minutes and 27.5 minutes (i.e., 12.5 to 17.5, 17.5 to 22.5, and 22.5 to 27.5). The graph rises a bit at the right end because the last two data points represent aggregates of larger time intervals than the remainder of the graph (i.e. the scale is compressed at the end).
3. While the proportion of all employees commuting 10 miles or more decreased between 1984 and 1990, Table 7 shows that a higher proportion of new employees are long distance commuters (32.8%) than the employees leaving (28.2%) or retiring (20.0%). While a higher proportion of new employees commute over 10 miles to work, many of these workers are employed in newer hospitals and clinics in outlying areas like Riverside.

4. The model was:

Dependent Variable: Satisfaction with distance from home to work

Independent

<u>Variables</u>	<u>Coefficient</u>	<u>t-Value</u>	<u>p</u>
Constant	4.4452317	78.79	≤ .001

Usual Number of Minutes to Return from Home to Work	- 0559969	-20.14	≤ .001
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Square of (Usual Number of Minutes to Return from Home to Work)	0.0002908	10.35	≤ .001
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N = 1522

R² = 0.472.

5. The model was:

Dependent Variable: Satisfaction with distance from home to work

Independent

<u>Variables</u>	<u>Coefficient</u>	<u>t-Value</u>	<u>p</u>
Constant	4.376648	68.80	≤ .001
Usual Number of Minutes to Return from Home to Work	-.0531440	-18.61	≤ .001
Square of (Usual Number of Minutes to Return from Home to Work)	0.0002701	9.55	≤ .001
(Dummy) Getting to Work More Difficult Than Two Years Ago	-.1716184	-3.90	≤ .001
Number of Years Worked at Kaiser Permanente	0.0086017	2.76	≤ .01

N = 1,491

R² = 0.489.

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Table 1

CHARACTERISTICS OF THE FIVE SAMPLED FACILITIES

Facility	Year Opened	Location	Facility Type
Anaheim	1982	Outer-ring Suburb	Medical Center
Harbor City	1970	Inner-ring Suburb	Medical Center
Los Angeles	1962	Central City	Flagship Medical Center
Riverside	1988	Outlying Area	Medical Center
Pasadena	1986	Inner-ring Suburb	Administrative Center

Table 2

**INCREASES IN COMMUTE TIME DUE TO
CONGESTION BETWEEN 1989 AND 1991**

Reported Commute Time Changes for Employees
Who have not Moved nor Changed Job Location since 1988
(Based on Survey Data Base)

<u>Employees Whose Commutes Have:</u>	<u>Percent</u>	<u>Average Change in Minutes</u>
Become Longer	29.2%	+ 14.6
Stayed About the Same	66.2%	0.0
Become Shorter	<u>4.5%</u>	<u>- 23.5</u>
Total	100 0%	+ 3.2

Table 3

COMMUTE MODE OF KAISER PERMANENTE EMPLOYEES

(Survey Database)

<u>Commute Mode</u>	<u>Percent</u>	<u>Average Commute Time (minutes)</u>	<u>% of Drive Alone Time</u>
Drive Alone	79.4%	29.9	100.0%
Car/Van Pool	12.0%	41.6	139.1%
Public Transit	2.2%	59.6	199.3%
Bicycle/Walk	<u>6.4%</u>	<u>27.8</u>	<u>93.0%</u>
Total/Average	100.0%	31.8	106.4%

Table 4

COMMUTE MODE BY TIME OF TRAVEL
(Survey Database)

Employees Commuting To and From Work During:

<u>Commute Mode</u>	<u>Both Peak</u>	<u>Either Peak</u>	<u>Neither Peak</u>	<u>Total</u>
Drive Alone	75.4%	84.9%	93.4%	79.1%
Car/Van Pool	14.8%	7.1%	3.7%	12.1%
Public Transit	2.4%	2.2%	1.5%	2.2%
Bicycle/Walk	<u>7.4%</u>	<u>5.9%</u>	<u>1.5%</u>	<u>6.6%</u>
Total	100.0%	100.0%	100.0%	100.0%

Table 5

**CHARACTERISTICS OF LONG DISTANCE COMMUTERS
(Employee Database)**

<u>Characteristic</u>	<u>Commute 10 Miles or More</u>
All Commuters	32.3%
More than \$15/hour	39.4%
Less than \$15/hour	26.9%
Non-Union	41.6%
Union	29.9%
Male	37.5%
Female	30.8%
Age 30 to 49	34.1%
Under Age 30, or over 49	28.8%
Asian and White	33.7%
Black and Hispanic	29.6%

Table 6

**CHARACTERISTICS OF LONG TRAVEL TIME COMMUTERS
(Survey Database)**

<u>Characteristic</u>	<u>Commute 33 Minutes or more</u>
All Commuters	31.7%
Single Parent	41.3%
Live Alone	19.4%
All Other Household Types	30.8%
Non-Medical Administration	41.1%
Service/Maintenance	24.9%
Other Job Categories	30.8%
Moved while with Kaiser	35.5%
Not Moved while with Kaiser	25.8%
Own Residence	33.5%
Rent/Other	28.9%
Male	35.9%
Female	30.3%
Asian and White	29.8%
Black and Hispanic	38.9%
Household Income > \$40,000	33.5%
Household Income < \$40,000	31.1%

Table 7

CHANGES IN KAISER PERMANENTE EMPLOYEE

JOB AND HOUSING LOCATION BETWEEN 1984 AND 1990

(Employee Database)

<u>Changes between 1984 and 1990</u>	<u>Commute 10 Miles or more</u>
All Workers	32.2%
Moved residence, but kept the same job location	39.4%
Moved both residence and job location	36.8%
Kept the same residence, but changed job location	35.8%
Started with Kaiser Permanente after 1984	32.8%
Left Kaiser Permanente between 1984 and 1990	28.2%
Kept both the same residence and the same job location	26.0%
Retired from Kaiser Permanente between 1984 and 1990	20.0%

Table 8

COMMUTE TIME CHANGES FOR RESIDENTIAL MOVERS

(Survey Database)

<u>Type of Movers</u>	<u>Percent</u>	<u>Average Change in Minutes</u>
<i>All Residential Movers</i>		
Longer Commute	43.8%	+25.8
About the Same	25.7%	0.0
Shorter Commute	<u>30.5%</u>	<u>-23.8</u>
Totals	100.0%	+4.1
<i>Renter to Renter</i>		
Longer Commute	29.4%	+ 22.6
About the Same	29.8%	0.0
Shorter Commute	<u>40.8%</u>	<u>-22.5</u>
Totals	100.0%	- 2.5
<i>Renter to Owner</i>		
Longer Commute	49.2%	+ 28.1
About the Same	24.9%	0.0
Shorter Commute	<u>25.9%</u>	<u>-22.4</u>
Totals	100.0%	+ 8.0
<i>Owner to Renter</i>		
Longer Commute	22.2%	+ 24.1
About the Same	18.8%	0.0
Shorter Commute	<u>59.1%</u>	<u>-15.9</u>
Totals	100.0%	- 4.1
<i>Owner to Owner</i>		
Longer Commute	50.1%	+ 24.9
About the Same	24.2%	0.0
Shorter Commute	<u>25.7%</u>	<u>-27.9</u>
Totals	100.0%	+ 5.3

Table 9

**HOUSING SATISFACTION FOR
SHORT AND LONG TRAVEL TIME COMMUTERS**

(Survey Database)

<u>Percent Who are "Satisfied" or "Very Satisfied" with:</u>	<u>Commute More than 32 Minutes</u>	<u>Commute 32 Minutes or Less</u>	<u>Percent Difference</u>
Safety from Crime in Neighborhood	76.8%	69.1%	11.1%
Overall Quality of Neighborhood	85.8%	79.6%	7.8%
Monthly Cost of Housing	73.5%	72.6%	1.2%
Amount of Living Space	76.5%	77.3%	- 1.0%
Quality of Area Schools	74.7%	78.2%	- 4.5%

Table 10

**IMPORTANCE OF FACTORS AFFECTING
DECISION TO MOVE SINCE STARTING AT KAISER PERMANENTE**

(Survey Database - Those Who Had Moved Since Starting Work at Kaiser Permanente)

Comparison of Employees with Short and Long Commutes

<u>Percent Who Cited the Following as <i>Important</i> or <i>Very Important</i> Reasons for Moving</u>	<u>Commute More than 32 Minutes</u>	<u>Commute 32 Minutes or Less</u>	<u>Percent Difference</u>
Safety from Crime	94.9%	93.6%	1.4%
Better Neighborhood	93.2%	92.2%	1.1%
More Living Space	90.6%	87.7%	3.3%
Better Schools	86.4%	79.2%	9.1%
Moved to be with Spouse	79.8%	82.0%	- 2.7%
More Affordable Housing	84.5%	77.8%	8.6%
Closer to Schools	79.7%	71.1%	12.1%
Closer to Child Care (for those with children)	76.8%	76.8%	0.0%
Closer to Work	47.2%	76.9%	-38.6%
Closer to Family/Friends	52.2%	58.9%	-11.4%

Table 11

**COMMUTING SATISFACTION FOR COMMUTERS
HAVING SHORT AND LONG TRAVEL TIMES**

(Survey Database)

<u>Percent Who are Satisfied or Very Satisfied with:</u>	<u>Commute More than 32 Minutes</u>	<u>Commute 32 Minutes or Less</u>	<u>Percent Difference</u>
Distance From Home to Work	46.5%	93.8%	-50.4%
Distance to Work for Other Household Members	66.8%	82.1%	-18.6%
Distance to Child Care Facilities (for those with children)	79.1%	86.2%	- 8.2%
Distance to Area Schools	93.2%	91.2%	2.2%778

Figure 1: LOCATION OF SURVEYED KAISER-PERMANENTE FACILITIES

Employees Sampled from Five Facilities

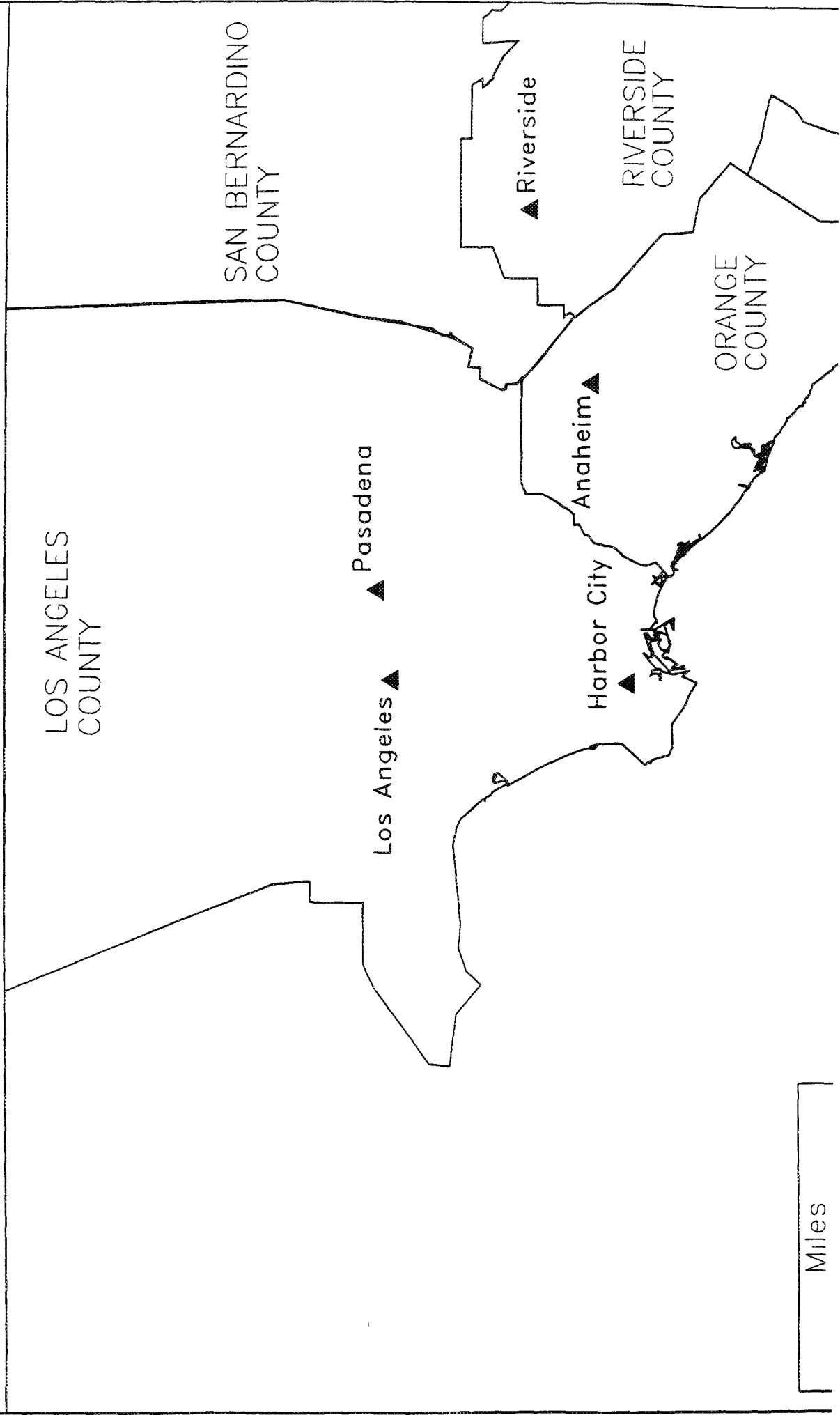


Figure 2 A COMPARISON OF EMPLOYEE COMMUTE DISTANCES
 Kaiser Permanente Employees: 1984 and 1990

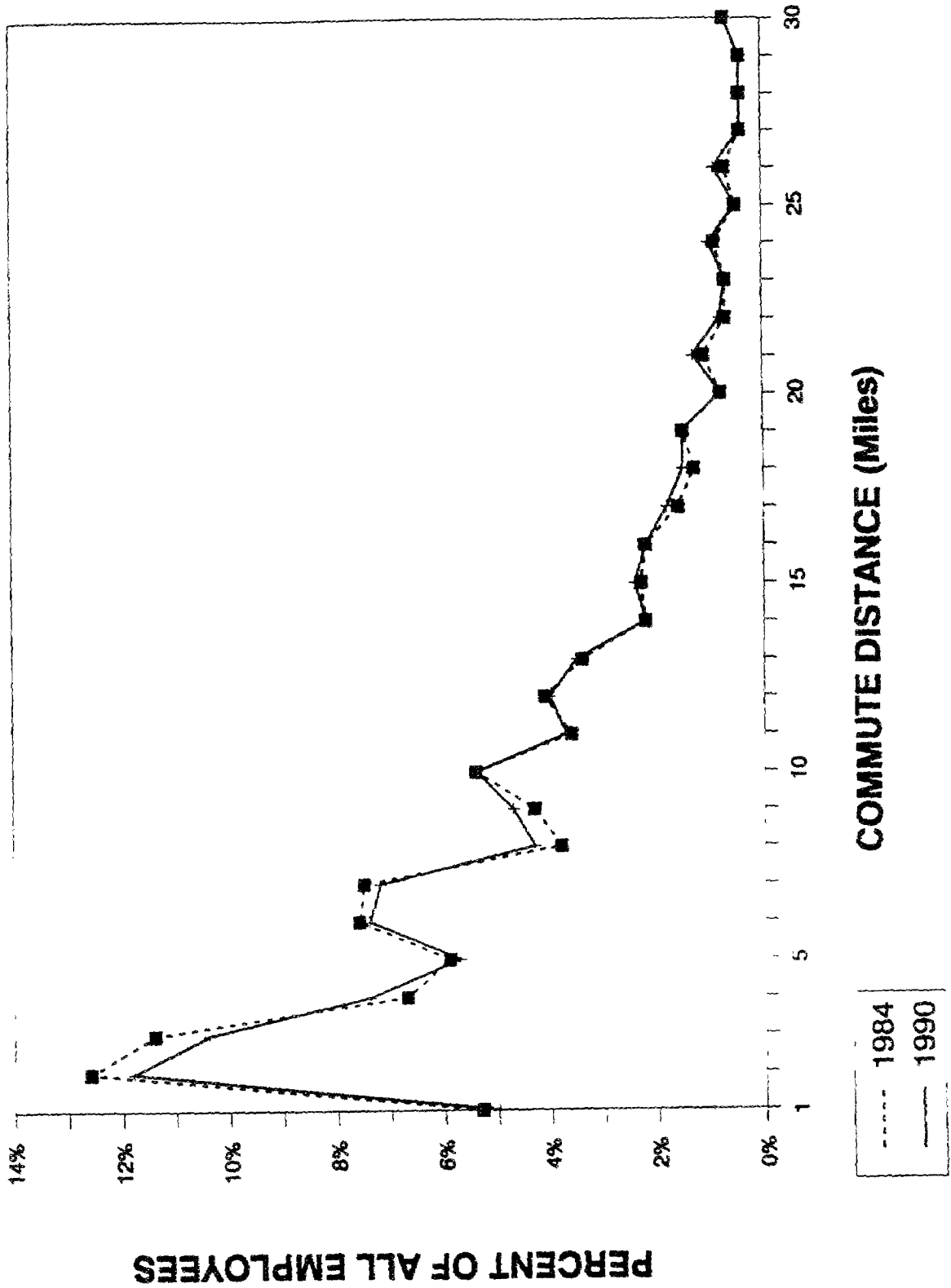
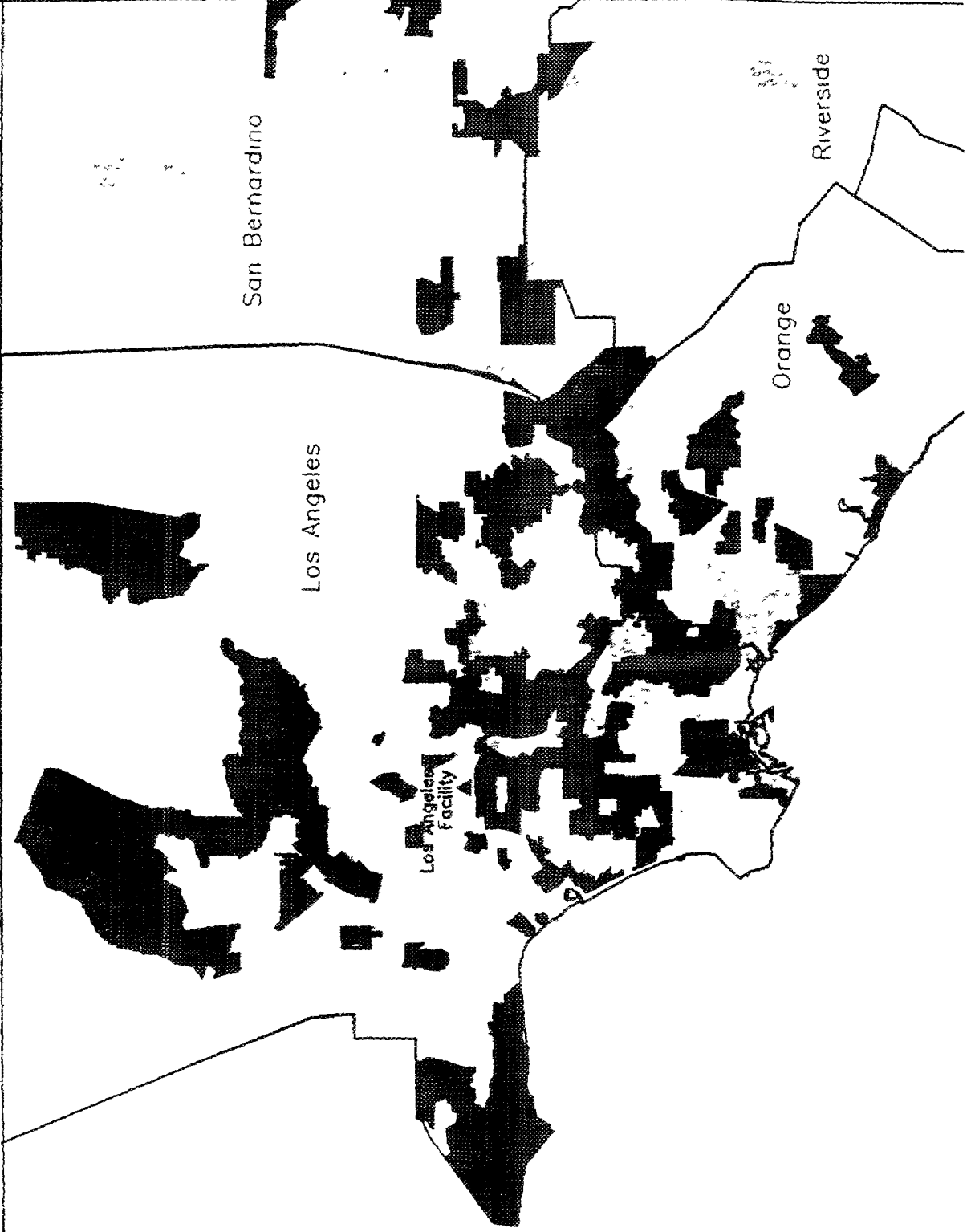
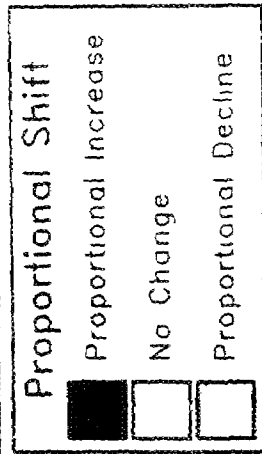


Figure 3: SHIFT IN RESIDENCES OF LOS ANGELES EMPLOYEES: 1984-90

Proportional Change by Zip Code



Miles

Figure 4 EMPLOYEE COMMUTE DISTANCE: 1984 AND 1990
By Facility

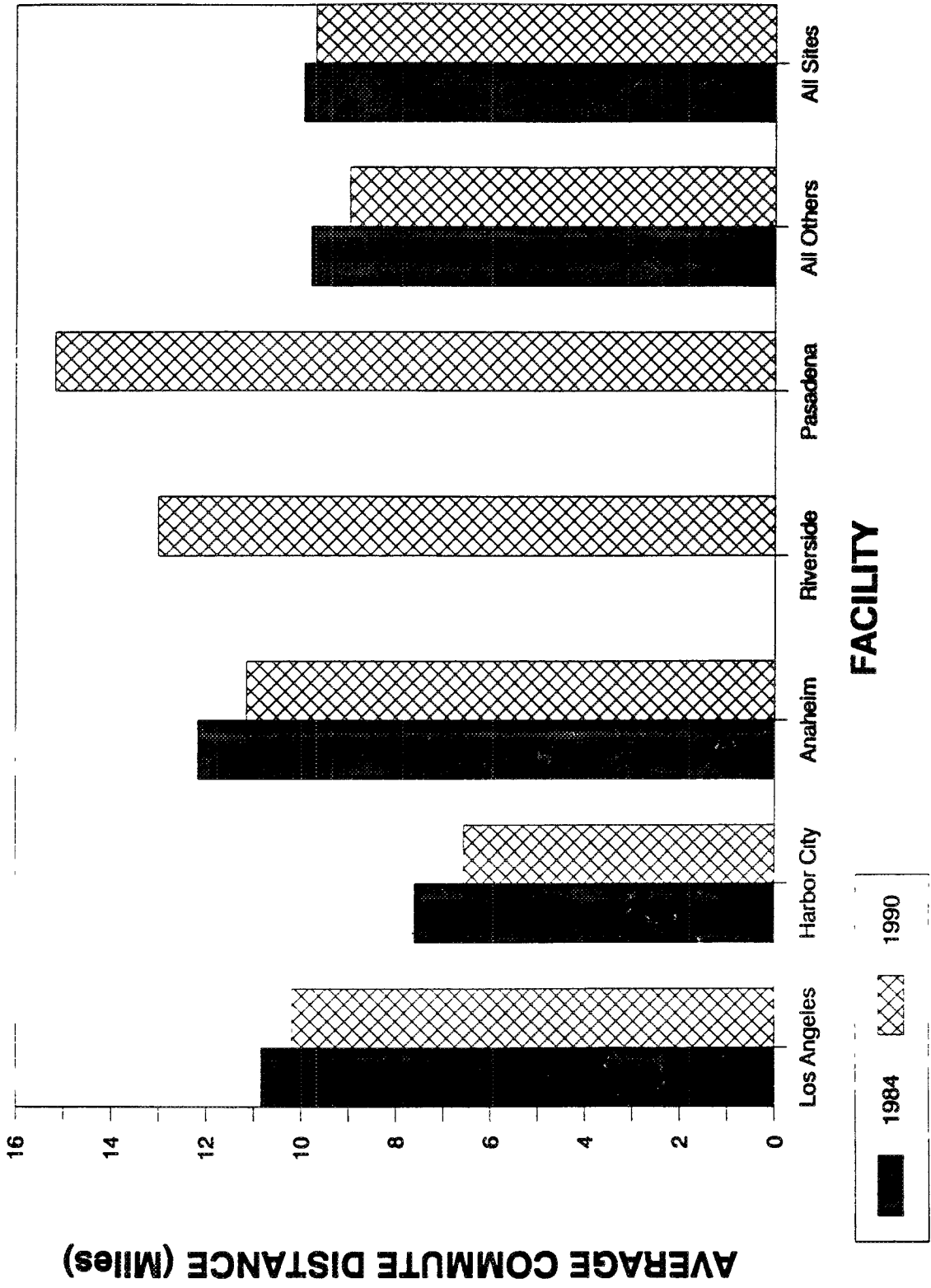
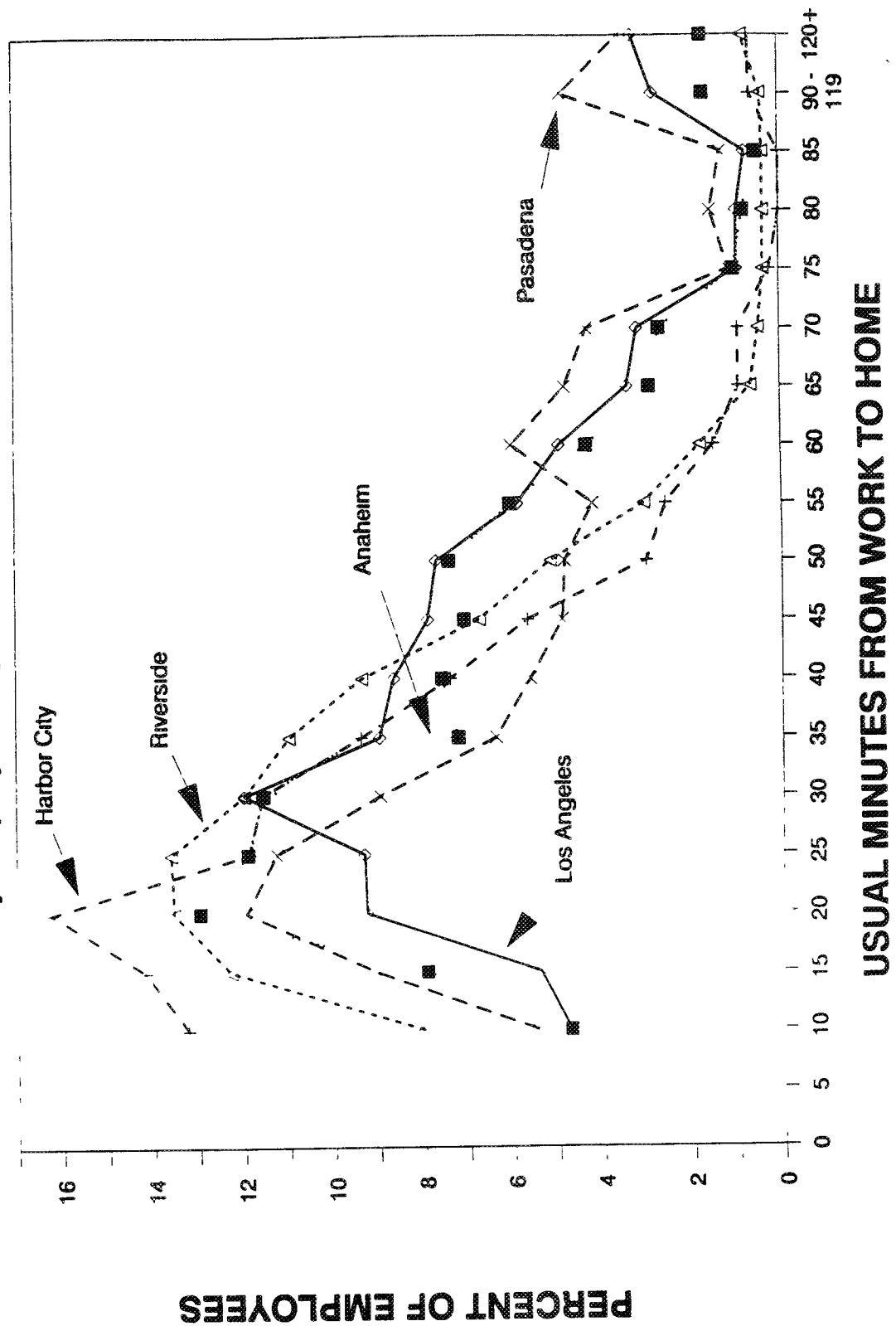


Figure 6 USUAL TIME TO GO HOME AFTER WORK
 Percent of Facility Employees by 15 Minute Average of Grouped Intervals



SATISFACTION WITH COMMUTE TIME

Estimated for Usual Return Trip Home

Figure 7

