Emerging Commuting Trends:
Evidence from the Chicago Area

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ABSTRACT

Over the last several decades commuting distances have increased in both miles and travel time. Our analysis focuses on the 2000 county-to-county commuting data from Census Transportation Planning Package that show intercounty commuting has increased substantially. In the Chicago six-county region these data indicate that three of the six counties are now net importers of commuters. In the past only Cook County (Chicago) had more commuters into than from the county.

There are, however, demographic changes that contribute to lower increases in growth in commuters. Namely, the 1990s signaled the first increase in household size in over a hundred years. This was partially responsible for a decline in the portion of the population that is employed, a statistic that had been steadily increasing. In fact, in previous decades there was a larger growth in the number of commuters than in people thereby disproportionately adding to peak-period traffic.

At the same time the exceptionally high increases in homeownership added to the size of the urbanized area. These data suggest that commuters are making housing choices that contribute to commuting travel distances. The ability and willingness to increase commuting distance makes it possible for employers to find their employees from an extended geographic region. As the economy is becoming more specialized, we may achieve the desired match between the jobs sought by commuters and the skill needs of employers.

INTRODUCTION

As part of the decennial census the Census Bureau collects information on where we live, where we work and how we commute. This commute is very predictable but causes recurring stress to the transportation system. Numerous studies have been conducted to examine these data (e.g., Reschovsky 2004 and Sööt et al. 2004). Further, the 2001 Nationwide Household Travel Survey has also received considerable scrutiny in achieving a better understanding of how commuting trends change (Pucher and Renne 2003). Many of these and other studies have achieved a comprehensive overview of the multitude of changes that have characterized commuting in the last few decades (e.g., Pisarski 1987; Pisarski, 1996).

Using the Census Transportation Planning Package (CTPP) and by focusing on two competing trends, we will show that in the last several decades the Chicago area experienced evolutionary changes in economic activity and traffic. On the one hand demographic changes are ameliorating the growing number of commuters. Despite a sizeable increase in population, the number of commuters has not increased as rapidly as it did in previous decades. Conversely many home purchasers are acquiring homes on the fringe of the metropolitan area thereby raising homeownership rates but increasing commuting distances.

Further, this paper provides a brief overview of the most noteworthy changes in commuting patterns since 1960. It highlights a substantial decline and shift in bedroom communities. All of the Chicago-area collar counties experienced major increases in commutes to the county. Since 1970 DuPage County, immediately to the west of Chicago, experienced a growth of more than 100,000 commuters to the county (23% increase since 1970) while Lake County, to the north, registered a lower growth in numbers (81,000) but a higher percentage change (33%). Now both counties import more commuters than they export. The stereotypical bedroom communities no longer characterize these counties. The face of suburban Chicago has changed dramatically.

In a major shift, growth in population now outpaces growth in commuters for the first time in at least forty years. Specifically, the alarms raised in the 1970s and 1980s about major increases in congestion, due to expected increases in population, have not materialized. Still, congestion has increased, with longer commutes, perhaps reflecting the increasing specialization in the labor force in which employers draw workers from an expanded geographic area. The choices urban residents make regarding life style and affordable housing on the fringe of the region also contributes to higher travel times to work and the associated congestion.

DATA AND STUDY AREA

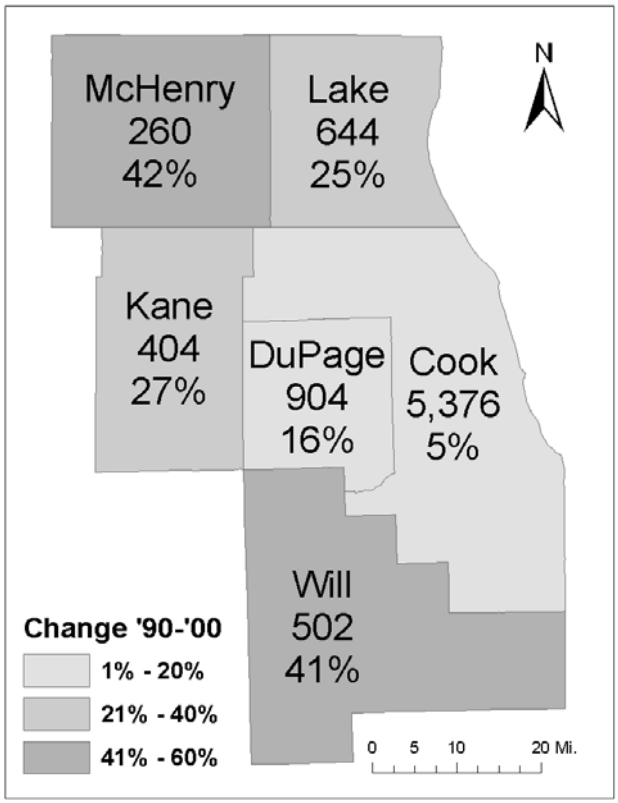
The findings in this paper are based on the county-to-county work-trip information released by the U.S. Bureau of the Census in March 2003. The data were tabulated from the census question: "At what location did this person work *last week*?" This would refer to the last week of March 2000. When using these data, it is important to note that there are several reasons why these data do not precisely represent the number of jobs. They exclude persons not working during the reference week and do not account for persons with multiple jobs or multiple work sites. Neither do they record trip chains or multiple transportation modes in one trip.

There is a difference between the size of the civilian labor force (that includes the unemployed), the number employed and the number of commuters as examined in this paper. For 2000, the Census Bureau reports the size of the resident six-county *labor force* as 4.17 million, 3.78 were *employed* and the number of *commuters* residing in these counties as 3.73 million (Table 1). Further, 3.83 million workers commuted to the six-county area, regardless of their place of residence. It is important to understand the differences in these definitions.

Despite these differences, the commuting data represent a unique product that has been collected consistently for many decades. While they do not report the exact number of jobs, the data provides important information on trends, such as the generalized increases and decreases in jobs in large geographic areas, e.g., counties.

We further recognize that the Chicago metropolitan area has grown during the past 30 years from six to over a dozen counties. However, our focus is on the original six-county metropolitan area (Cook, DuPage, Kane, Lake, McHenry and Will). Of the current 13-county metropolitan population, 88% lives in the six-county study area. Most of the metropolitan population outside the six-county area resides in Indiana (7% of the total population).

CHANGE IN POPULATION AND COMMUTERS



The Chicago area has traditionally been a very concentric region with population and employment moving outward in a concentric pattern. Figure 1 illustrates the current population distribution and the recent growth rates. Notice that since 1990 the central county, Cook, grew by only five percent and the most distant counties, Will and McHenry, grew by over forty percent.

← Figure 1
Population in 2000 and Percent Change, 1990-2000
(population in thousands**)**

Both the number of people and commuters has grown since 1970 (Table 1). Commuters had increased by double digits from at least 1960 until the last decade when it dropped to 6.9%. With the recent decline, the encouraging news from a travel congestion perspective is that both the rate of increase and the growth in the number of commuters declined in the 1990s.

The growth in the number of commuters and the distances traveled by private vehicles contribute to congestion. In the 1970s and 1980s the number of commuters grew much faster than the number of people. The proportion of the population that was commuting rose from 40% in 1970 to 48% in 1990, raising concerns about the effects of looming increases in population and the number of commuters in this future population.

Nationally, the proportion of the population that commutes to work rose from 36.1% in 1960 to 37.8% in 1970, 42.6% in 1980 and 46.3% in 1990. There was a ten-percentage point increase from 1960 to 1990. This indicates that, on average, without an increase in population there would be a 28% increase in the number of commuters (dividing the 0.463 proportion of commuters to work in the 1990 by 0.361 in the baseyear 1960). For a 20% growth in population, an increase of 54% in the number of commuters would be expected. It did not take a large increase in population to find a substantial increase in the number of commuters and the effect it had on the rush hours. Coupled with the increase in trip chaining, the afternoon rush-period traffic grew with little population growth.

The national pattern is quite similar to the Chicago area model. The disproportionate growth in commuters accounts for much of the ensuing increase in traffic. Further, if working is a sign of prosperity then congestion and prosperity are related and in times of prosperity we find more congestion. An illustration for this relation is the temporary decline in traffic in the Houston area after the collapse of Enron.

The 1990s marked a noticeable change in the trends discussed above. Most noteworthy is the modest increase in commuters given the large increase in population. For the first time in decades the population began growing in the 1990s at a robust pace. Between 1970 and 1990, population grew by only 4% in contrast to the 11% population growth in the 1990s.

Table 1
Change in Population and Commuting, 1970-2000

Year	Total Population	Change		Total Commuters	Change		Commuters/ Population
		Number	Percent		Number	Percent	
2000	8,092	831	11.4%	3,726	239	6.9%	**0.46**
1990	7,261	157	2.2%	3,487	328	10.4%	**0.48**
1980	7,104	129	1.8%	3,159	341	12.1%	**0.44**
1970	6,975	754	--	2,818	407	--	**0.40**

The 4% increase in population can also be contrasted with a more than 20% jump in commuters between 1970 and 1990. Had this previous ratio of commuters to population continued between 1990 and 2000, commuters would have increased by 55%, bringing the transportation system to an effective stand still. While the likelihood of this 'doom scenario' to occur is small - as some of the population would shift modes, origins and destinations - there is no doubt that a substantially larger increase in the number of commuters would have caused a considerable increase in highway congestion.

Indeed, in the 1990s there was a growing concern that when the population began to grow at a higher rate, it would result in an even greater increase in the number of residents commuting to work and therefore increases in congestion. Inevitably, increases in the number of commuters contribute to peak period traffic, particularly in the morning. Since *the ratio of population growth to commuter growth* has not held constant, the direct congestion consequences of major increases in population have not occurred. Still, population has grown and so has the number of commuters contributing to traffic congestion.

The 1990s decline of the population that is employed is both a national and Chicago-area phenomenon. In the Chicago area it declined from 48% to 46% while nationally it declined from 46.3% to 45.6%. The Chicago area decline is slightly more dramatic, perhaps partly because it started from a higher base.

WORKING WITHIN COUNTY

Based on county units the 2000 census data also indicate the numbers and proportions of workers who are employed within the county of residence. In a place such as suburban Chicago, where the counties are roughly equivalent in area, it also provides some information on commuting distance and distribution of jobs.

Quite expectedly, the trend is toward a smaller proportion of the commuters working within the county of residence (Table 2), suggesting an increase in commuting distances. In particular Cook County exhibits an increase in reverse commuting (see also Christopher et al., 1995)—each increase in out of the county work is an example of reverse commuting. The fact that the intracounty percentage declined from 98% in 1960 to 88% in 2000 is more an indication of the size of Cook County (the second largest county in the U.S.) than of the growth magnitude in reverse commuting. Conversely, the percent commuting from the county rose from 2% to 12% more accurately reflects this trend.

Conversely, DuPage County has had a steady increase in intracounty commuting from 44% to 59%. While this reflects a substantial increase in the number of local jobs, as will be established in Table 3, the number of workers commuting from DuPage has also nearly doubled since 1970. This leads to considerable more traffic within and around the county.

Similar to Cook County, in Will County to its south, the proportion of the population working within the county has dropped, but more dramatically, from 77% to 44%. This suggests a large growth in households seeking modestly priced housing on the fringe of the metropolitan region beyond the centers of employment. According to the 2000 Census, 47.5% of the homes in Will County had a value under $150,000 while in DuPage County the equivalent percentage was only 21.8%. While the number of workers employed in the county increased by approximately fifty thousand the number of workers residing in Will County increased by just over seventy thousand. Clearly, the number of workers moving into the county has outpaced the growth in jobs.

Will County is a large low-density county (600 persons per square mile in 2000) with large tracts of undeveloped land. It is reminiscent of DuPage County in the 1960s, when it was the choice of households seeking affordable housing. Note that the number of employees who live and work in the same county is both 44% for DuPage County in 1960 and for Will County in 2000 (Table 2). It raises the interesting question whether Will County will follow DuPage's model of increased local employment over future decades.

Table 2
Employees Who Live and Work in the Same County

County	1960	1970	1980	1990	2000
Cook	98%	95%	94%	91%	88%
DuPage	44%	49%	53%	58%	59%
Kane	85%	74%	70%	60%	56%
Lake	79%	73%	69%	63%	67%
McHenry	73%	63%	59%	51%	51%
Will	77%	69%	56%	46%	44%

Lake County also had an increase in workers working in the county, from 63% to 67%. This is analogous to the increase in jobs found in DuPage County.

The proportion of the workers in the entire six-county area, that lived and worked in the same county, dropped from 87% to 73%. This suggests that workers are commuting longer distances.

While the drop in in-county employment may contribute to longer commuting distance and travel time, it may also reflect the increasing specialization in the labor market. Employers need workers with well-defined skills and are able to tap nearly the entire six-county area in search of the right person. With growing affluence, workers with the requisite skills may be adequately compensated for long commutes.

IMPORT AND EXPORT OF COMMUTERS

Embedded in the county-to-county commuter flows is another remarkable story describing how the region is changing. Table 3 depicts those individuals who live and work within the same county, the number of commuters entering the county to go to work, the number leaving their home county to go to work, as well as the net flows or commuting balance (import minus export). Counties that import workers have job centers attracting labor from surrounding areas.

With the exception of Cook County, that shows little change, all of the counties display increases in commuting within the county. From 1990 to 2000 there was a 43% commuting increase in McHenry County, a 37% increase in Will County and a 24% increase in Lake County. This suggests that decentralization of jobs into the suburban counties has changed commuting patterns in these counties and the transition of the Chicago region in the direction of the multinuclei metropolitan area model.

Table 3

Changes in Within and Between County Commuting, 1970–2000

County	Year	Commute within County	Import of Commuters	Export of Commuters	Commuting Balance
Cook	2000	2,077,798	476,320	293,363	182,957
	1990	2,147,598	424,755	222,026	202,729
	1980	2,150,111	305,896	130,739	175,157
	1970	2,105,178	199,593	108,630	90,963
DuPage	2000	277,934	256,617	191,439	65,178
	1990	244,898	188,352	180,386	7,966
	1980	178,473	89,504	156,487	-66,983
	1970	97,226	44,435	100,050	-55,615
Kane	2000	107,807	67,543	85,055	-17,512
	1990	94,614	49,147	62,868	-13,721
	1980	90,702	30,156	38,088	-7,932
	1970	76,982	25,045	26,953	-1,908
Lake	2000	212,450	113,717	104,992	8,725
	1990	171,535	73,630	98,709	-25,079
	1980	145,550	33,637	65,923	-32,286
	1970	121,183	29,695	44,491	-14,796
McHenry	2000	68,108	28,534	65,149	-36,615
	1990	47,757	17,241	46,119	-28,878
	1980	40,354	9,349	27,553	-18,204
	1970	28,076	5,183	16,529	-11,346
Will	2000	107,456	53,377	134,431	-81,054
	1990	78,614	31,617	91,631	-60,014
	1980	75,175	17,285	60,183	-42,898
	1970	63,957	10,193	28,266	-18,073
Total	2000	2,851,553	996,108	874,429	121,679
	1990	2,785,016	784,742	701,739	83,003
	1980	2,680,365	485,827	478,973	6,854
	1970	2,492,602	314,144	324,919	-10,775

All counties experienced a growth in both commuters from and to their counties (exports and imports). As expected, Cook County had the largest increase in exports, over 71,000 from 1990 to 2000. Will County is not far behind with approximately 43,000. The other counties had more modest increases in the export category.

On the import side, DuPage County registered an impressive gain of approximately 68,000 from 1990 to 2000. Also large increases in commuters to a county were recorded by Cook County (52,000) and Lake County (40,000). These three counties are establishing themselves as job destinations. Still, regardless of origin of trips and county

location, all counties had increases in commutes entering the region. In particular the collar counties imported nearly 160,000 additional commuters in the 1990s.

The net changes in commuting indicate that two suburban counties are no longer 'bedroom counties' that export their workers to the central county. DuPage is now solidly an importing county, barely achieving that status in 1990 (Table 3). New to the list is Lake County that now has 8,725 more workers commuting into as opposed to out of the county. This reinforces the growing suburb-to-suburb pattern that began to emerge a few decades ago and will be explored in a future paper.

COMMUTING TIME

Another dimension to congestion is commuting time. Commuting times in the region have continued to increase. However, given the modest population growth in the 1970s and 1980s, the growth in the 1990s only contributed to a slightly higher rise in commuting travel times. Average commutes grew by two minutes in the 1980s and by less than three minutes in the1990s. This reflects not just increases in commuters but also work-trip lengths and disproportionate increases in vehicle-miles driven versus growth in lane miles of highways and streets.

Average commute times have increased in the Chicago area. There has been a decrease in the number of short commutes, defined here as less than twenty minutes. Even with a growth in the number of commuters, there has been a disproportionate increase in long commutes of more than 45 minutes. Despite the increase in the number of commuters, the number commuting less than twenty minutes declined by approximately 5% while the number commuting over 45 minutes increased by 21%.

Increasing travel times were found throughout the study area (Table 4). In Will County, where the growth of resident commuters (71 thousand) outpaced the growth in work destinations (50 thousand), median travel times to work grew the most (4.7 minutes). Despite this noticeable growth, the median level (32.0 minutes) remains less than in Cook and McHenry Counties.

Table 4
Changes in Median Travel Times by County
(travel times in minutes)

County	1990	2000	Change
Cook	29.4	32.6	3.2
DuPage	27.3	29.0	1.7
Kane	23.5	27.3	3.8
Lake	26.4	30.1	3.7
McHenry	28.8	32.2	3.4
Will	27.3	32.0	4.7

At the other end of the spectrum, DuPage County, with its growth in jobs, experienced the smallest increase (1.7 minutes) in commuting time. At 29.0 minutes, the DuPage County median is second lowest in travel time to work behind Kane County's 27.3 minutes. The concentration of people and jobs in the Fox River Valley (including Aurora and Elgin) accounts for the low travel times in Kane County.

TRAFFIC AND HOMEOWNERSHIP RATES

One of the major contributing factors to rising travel times is the rising homeownership rate. In the Chicago area the distant suburbs offer land at lower costs and thereby the lowest costs for new homes in the region. Recent housing transactions indicate that satellite cities such as Joliet and Aurora have median sales prices less than half those of the Chicago neighborhoods with the largest sales rates.

Homeownership is promoted by many organizations as an important household investment, contributing to financial stability (STPP and CNT 2000). The highest homeownership rates, however, are in places that can grow territorially providing households with the opportunity to buy new homes at modest prices. This allows the household to spend more on transportation and in many cases leads to long commutes, at least in distance (Sööt and Sen 1977) if not in time. The ability to buy modestly priced housing on the fringe of the metropolitan area has traditionally accounted for long commutes in the Chicago area.

Homeownership rates are positively correlated with the physical size of the metropolitan area. The highest rates are in mid-size areas. Another indicator of home ownership is the location of the metropolitan area. Home ownership is higher in the central sections of the US where metropolitan areas can sprawl. These include (with their 2003 homeownership rates) Chicago (68.6%), Detroit (75.3%), Minneapolis-St. Paul (75.2%), Indianapolis (72.9%) and Milwaukee (70.0%). Lower rates are found in places in California and Florida where local topographic conditions limit territorial expansion. These include Los Angeles (50.0%), San Francisco (50.8%) and Miami (55.9%).

Further, the Chicago area has had one of the highest increases in homeownership rates in recent years. It has increased from 54.7% in 1986 to 68.6% in 2003, accounting for a 13.9 percentage point increase. The nationwide average for the 75 largest metropolitan areas was 5.3 points. Other places with double-digit increase are Dallas (11.9 points), Baltimore (11.6), Minneapolis (11.0) and Atlanta (10.4). One can expect noticeable traffic effects from major shifts in homeownership rates. This has particularly been true in Atlanta.

On the lower end of the homeownership increase range are places that cannot sprawl. This is the case for Los Angeles (1.7) and San Francisco (2.1). Both have small overall homeownership rates but major traffic congestion problems due to the concentration of a large number of people and cars in a relatively compact space. They rank first and second in annual hours of traffic delay (Shrank and Lomax 2004).

Another metropolitan area with limits on territorial expansion is Portland, Oregon, where the state has enforced an urban growth boundary. Homeownership grew by only 0.9 points from 1986 to 2003, reminiscent of many California metropolitan areas that are constrained by topography. Portland now has a homeownership rate that is lower than the Chicago area (66.1% versus 68.6%).

In the Chicago area, then, some of the demographic trends may be ameliorating traffic impacts but increasing homeownership rates and urban territorial growth have contributed to higher travel times to work. Other than Cook County, where the use of public transportation and road congestion account for high average travel times, the two fastest growing and most distant counties from Chicago, Will and McHenry, have the highest average travel time to work.

Lastly, the growing number of homeowners may have an effect on the number of workers employed at home. Increasing homeownership rates in the U.S. are associated with declining population densities and these declining densities may make working at home in more traditional business more difficult. This would not generally affect internet-based businesses. Nationally the number of persons working at home has decline from 4.7 million in 1960 to 4.2 million in 2000, though it has increase in the last twenty years. During the forty-year period the number of employed persons nearly doubled from 65 million to 128 million.

SUMMARY AND CONCLUSIONS

Census data show that the average household size in the Chicago area has now stopped declining. For the first time in over 150 years the number of persons per household in this region is now stabilizing at 2.65 (in 2000). This is important since households generate workers and work trips. When household size declines as it had for 150 years, a constant population resulted in more households, more workers, and more traffic. Now that the portion of the population that is commuting is also declining in the Chicago area (for the first time in forty years), the factors that translate population growth into travel consumption and traffic generation are changing. Traffic congestion may be increasing but the two factors, household size and proportion of the population commuting, tend to moderate the effect of population growth on traffic.

Summary

Demographic trends

- For the first time in many decades population is growing faster than the number of workers. Therefore the association between population growth and increased congestion is changing.

Distribution of jobs

- Half of the counties are now net importer of workers.
- Decentralization of jobs: in the last decade within-county commuting rose sharply in the collar counties.

- A smaller portion of workers works in their home county. DuPage and Lake Counties are exceptions.
- A county such as DuPage that had high growth rates in the 1960s and 1970s is now more centrally located contributing to net inflow of commuters, low travel times and low increases in travel times.

Commuting trends
- The work force is becoming more mobile, contributing to more intercounty work trips and longer work trips.
- Increase in mobility: there is more county-to-county commuting, travel times are increasing and automobile commuting is on the rise (not documented here).
- The commuting patterns in the region are becoming more diverse and harder to describe through a simple model.

Reverse commuting
- Cook County continues to exhibit a large increase in the work trips to the county but the reverse commute from the county is growing even faster.
- Reverse Work trips to the five collar counties from Cook County have grown by more than 160,000 between 1980 and 2000.
- Reverse commute vs. decentralization— jobs are decentralizing into the collar counties and the 1990s saw a sharp increase in within-county commuting, especially in McHenry, Will and Lake County.

Homeownership rates and traffic
- Homeownership rates are positively correlated with urban territorial expansion.
- Metropolitan areas that have few limits on territorial growth have high ownership rates.
- This urban expansion contributes to long commutes to work.

Conclusions and Implications

A major finding of this research is that an increasing proportion of the workers commute to sites outside their home county and therefore commute times are increasing. This has two interpretations. First, work sites are decentralizing and workers commute greater distances or on roadways that are more congested. This suggests that the search for affordable housing (large houses with large lots) may well be contributing to longer commutes. To the extent that this is true, as it reflects personal choice, it is difficult to devise a transportation-related solution to increasing commuting times. Urban dwellers are participating in the traditionally cited trade-off between housing and transportation costs.

The second interpretation is from the perspective of the employer. The job market is undergoing a process of specialization and since workers are increasingly mobile, nearly the entire region is the labor shed for an employer. This means that a specific job may be filled by almost anyone in the metropolitan area, providing employers with a better match between the job requirements and the skills of the worker. The rise in intercounty

commuting suggests that the market is shifting into an employers market. A better match between employer need and employee skills will likely add to worker productivity, the major contributing factor to increasing living standards. Conversely, if the commute becomes more onerous it may detract from productivity. This needs more research.

The study also concludes that over the decades employment has followed population to suburban counties. The relocation of employment centers can lead to shorter commutes for those that work locally. Many, however, are choosing to work in distant suburbs. This has lead to a dispersed distribution and relatively low densities for both population and employment. This process has two implications for transportation planners and providers. First, the densities are frequently too low to offer frequent transit service unless local communities are willing to change their zoning ordinances to allow high-density land uses, residences and employment. Second, as trip origins and destinations become more dispersed, highway planners may need to focus their attention more on local arterials than on expressways and transit planners need to focus on more specialized services, such as van pools.

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