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Transit Mobility, Jobs Access and Low-income Labour Participation in US Metropolitan Areas

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Summary. While policy-makers assert that increased public transit mobility can positively affect employment status for low-income persons, there is little empirical evidence to support this theory. It is generally assumed that public transit can effectively link unemployed, car-less, persons with appropriate job locations—hence the call for more public transit services to assist moving welfare recipients to gainful employment. Thus far, the available evidence is anecdotal, while general patterns of transit access in relationship to labour participation remain relatively unexplored. This analysis examines whether increased transit access is associated with the case status (employment status) of Temporary Assistance for Needy Families (TANF) recipients in the Atlanta, Georgia; Baltimore, Maryland; Dallas, Texas; Denver, Colorado; Milwaukee, Wisconsin; and Portland, Oregon metropolitan areas. Individual TANF recipient location data, transit route/stop data and employment location data were used in limited dependent variable regression analyses to predict the employment status of TANF recipients. The results of this analysis indicate that access to fixed-route transit and employment concentrations had virtually no association with the employment outcomes of TANF recipients in the six selected metropolitan areas.

Introduction

The Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) of 1996—also known as Welfare Reform—was a renewed effort to move persons from public assistance to stable employment. This legislation attempted to provide states with more flexibility in how they assist low-income households while at the same time providing incentives for states to reduce welfare caseloads. The revised system was administered through the Temporary Assistance to Needy Families (TANF) programme (formerly Aid to Families with Dependent Children—AFDC) which instituted increasingly severe time restrictions and qualifying criteria for recipients (Danziger *et al.* 2000).

Along with TANF, transport funds for welfare recipients are primarily provided through the Jobs Access-Reverse Commute (JARC) programme and Welfare-to-Work grants, with TANF and JARC providing most of the funds. Recognising the fact that most households in the TANF programme have very limited transport mobility, the Balanced Budget Act of 1997 provided one source of funds that could be used for trans-

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port through Welfare-to-Work grants. A total of US$3 billion was allocated to states for the fiscal years 1998 and 1999 and could be used to address these mobility needs (Kaplan, 1998). Because low-income households receiving TANF have especially low rates of automobile ownership (21 per cent in the case of Baltimore and 16 per cent in the case of Milwaukee)[1], with many having no access to an automobile, they depend upon public transit, which limits the location and types of employment that are available to them (Murakami and Young, 1997; Coulton *et al.*, 1997; Meyer, 1999; Ong *et al.*, 2001). Compared with public transit, autos are also more convenient and flexible for job search activities. In addition, some are sceptical of public transit's role in addressing the geographical imbalance between housing and job locations, especially compared with autos (Wachs and Taylor, 1998; Ong and Blumenberg, 1998). This perceived spatial mismatch between the residential location of low-income, urban households and the location of low-skill jobs has received considerable attention in the academic literature (see Ihlanfeldt and Sjoquist, 1998).

Other research, however, contradicts the notion of spatial mismatch as defined by several urban economists who believe that low-income persons tend to reside in geographically disadvantaged urban neighbourhoods and that job opportunities are relatively concentrated in suburban areas. Other evidence has been presented showing that low-income persons do not have a geographical disadvantage with respect to job opportunities; rather, many of them suffer from a spatial disadvantage because they are dependent on relatively slow, inflexible and limited public transit services (Shen, 1998, 2001; Taylor and Ong, 1995). Such evidence has been reported in the cases of Boston, Los Angeles and San Francisco and in the analysis presented here.

Public Transport

The isolation of inner-city and underemployed persons from suburban employment opportunities was identified many years ago as the 'ghetto transport' or 'poverty transport' problem (Kain and Meyer, 1970). From the transport perspective, the reverse commute represented a significant challenge for these persons because many did not own automobiles and because transit service did a poor job of serving these types of trip (Crain, 1970). To address what was perceived as a transport problem, the Urban Mass Transport Administration (UMTA), which was established by the Urban Mass Transport Act of 1964, awarded grants for transit system development activities.

In terms of public transport impacts, some studies have mentioned that, while current patterns of urban development produce spatial disadvantages for low-income workers, public transport represents a means to overcome employment accessibility and mobility problems. Others, however, dismiss public transport, compared with autos, as a viable link between urban residents and employment locations. Studies in Dade County, Florida, and Alameda County, California, found little or no relationship between public transport access to employment locations and employment participation (see Thompson, 1997; Cervero *et al.*, 2002). On the other hand, a study examining Atlanta, Georgia, and Portland, Oregon, found that access to bus transit had positive employment effects in both cities (Sanchez, 1999a). For Los Angeles, Kawabata (2002b) found that improved accessibility, whether through auto or transit, had a positive effect on employment. Ong and Houston (2002) also found that single women on public assistance who did not have autos benefited from transit access. These women were more likely to be employed compared with those with lower levels of transit access. Other more recent research has discussed transport immobility as one of several barriers to employment encountered by welfare recipients (Blumenberg, 2002; Danziger, *et al.*, 2000). Still other studies have simply ignored public transport as a meaningful work trip mode and have excluded it from employment accessibility estimates (see Gordon *et al.*, 1989).

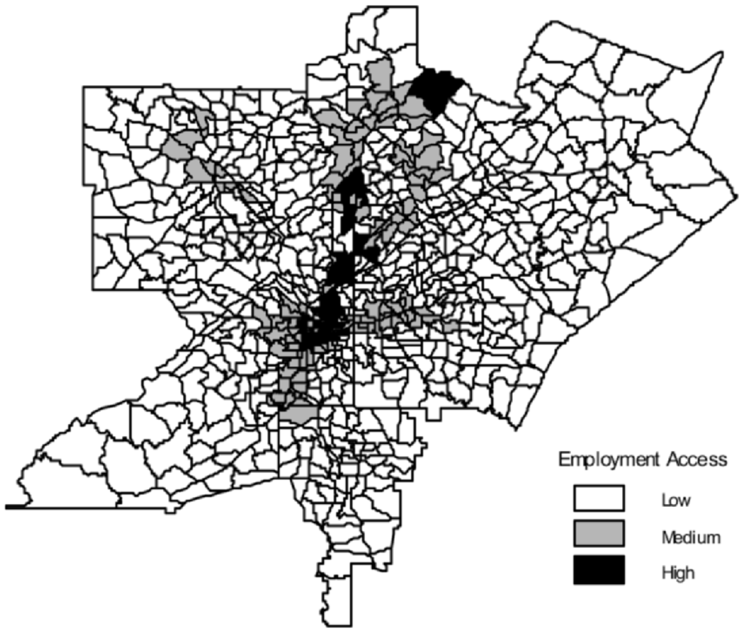

Figure 1. Atlanta, Georgia.

Other recent research has focused specifically on the characteristics of persons leaving federal and state cash assistance programmes. Such studies have tried to isolate the particular factors that influence transitions from welfare to work, including job training, education, child care needs, housing and assistance programme performance (Loprest, 1999; Pearlmutter *et al.*, 1999; Loprest and Zedlewski, 1999; Schumacher and Greenberg, 1999). The majority of this research relied on survey data from recipients and/or administrative records and, despite transport mobility being cited as an obstacle to employment, none of these studies explicitly accounts for transport or employment accessibility. An exception is an analysis by Pearlmutter *et al.* (1999), who considered possession of a driver's licence as a proxy for transport mobility. They found that possessing a driver's licence was positively associated with the use of childcare subsidies by AFDC recipients in Ohio. Eleven other studies (surveys) in Arizona, California, Florida, Georgia, Illinois, Missouri, Ohio, South Carolina, Wisconsin, Washington and Washington, DC, reviewed by Isaacs (1999) did not include transport mobility or employment access measures. These examples highlight a significant dearth of evidence about transport mobility and labour participation for low-income persons.

Research Focus

The objective of this analysis was to test whether access to public transit and regional employment had detectable effects on employment outcomes for TANF recipients in Atlanta, Baltimore, Dallas, Denver, Milwaukee and Portland (see Figures 1-6). The analysis compared public transit access levels for open TANF cases (primarily unemployed persons), closed TANF cases (for employment reasons) and closed TANF cases (for non-employment reasons). Controlling for other demographic and case characteristics, the analysis tested whether employed persons previously receiving cash assistance through the TANF programme have higher levels of transit accessibility and regional employment access compared with persons still receiving assistance.

The six selected metropolitan areas used in

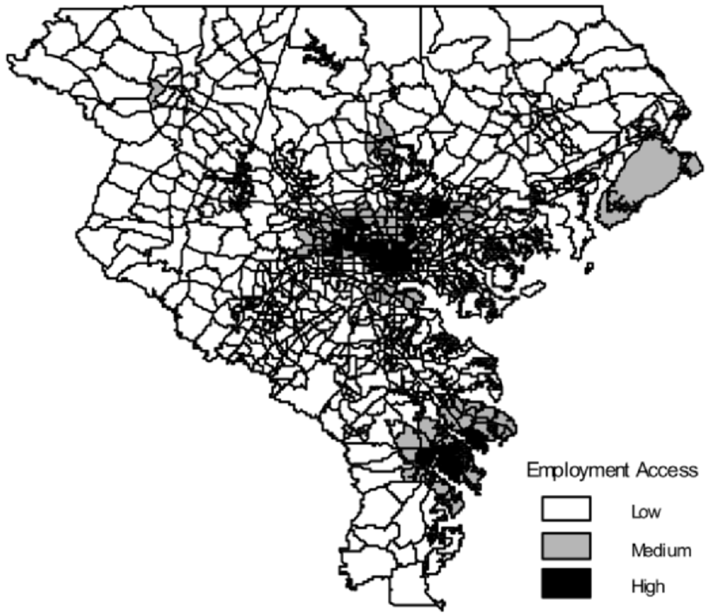

Figure 2. Baltimore, Maryland.

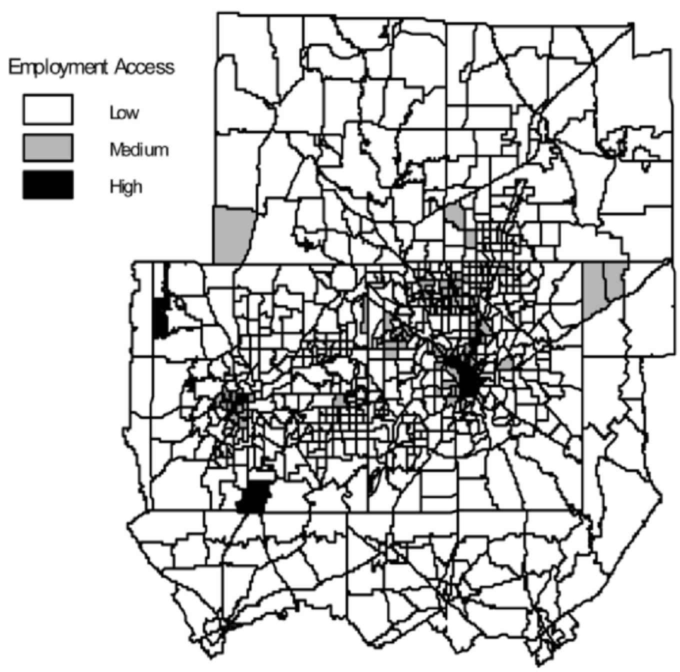

Figure 3. Dallas, Texas.

this analysis do not follow the geographical boundaries defined by the US Census Bureau. The most urban counties of each metropolitan area were used because they were more likely to be served by public transport compared with the rural counties. In most states, the majority of TANF cases are located in urban core areas, so including only the urban counties also provided a more direct comparison across metropolitan areas in

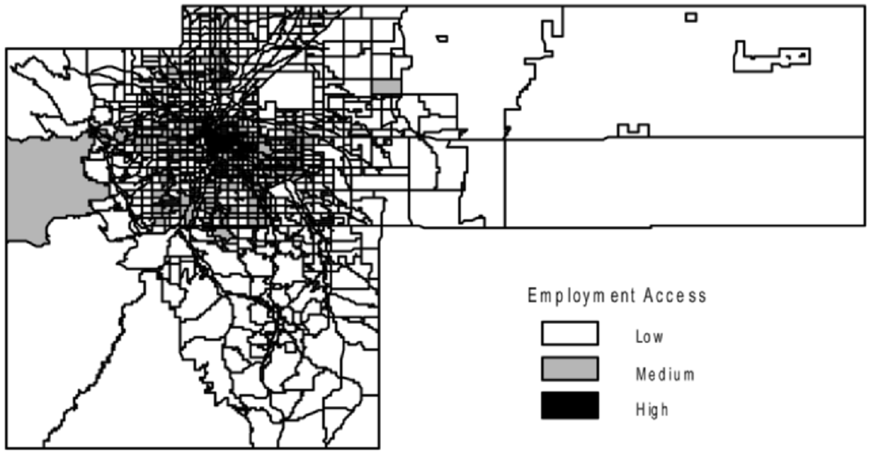

Figure 4. Denver, Colorado.

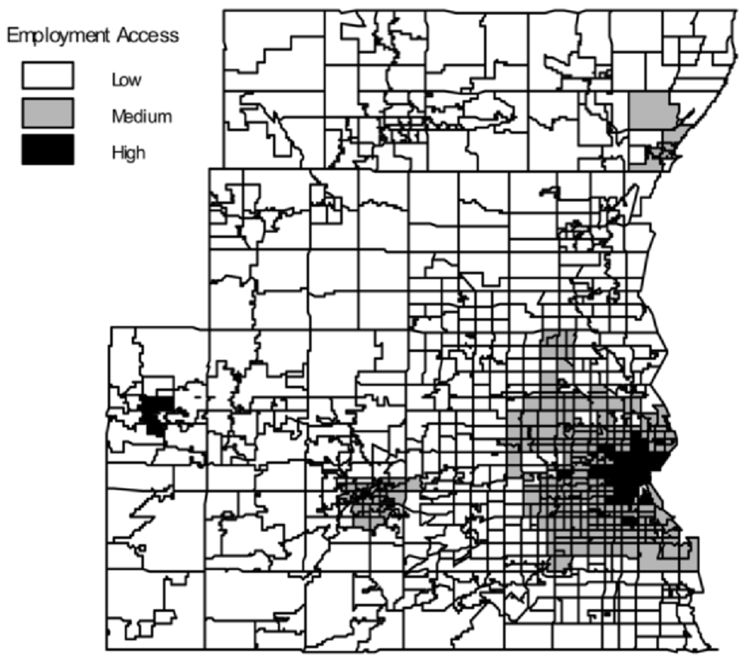

Figure 5. Milwaukee, Wisconsin.

terms of access to transit and employment opportunities.

Methodology

The Georgia Department of Labor, Maryland Department of Human Resources, Texas Department of Human Services, Colorado Department of Labor and Employment, Wisconsin Department of Workforce Development and the Oregon Department of Adult and Family Services provided address databases for TANF recipients in each respective metropolitan area. Along with street addresses, each agency provided demographic characteristics about recipients and their case status (open, closed and reason for closure) as of June 1999.[2] After the data were geocoded, only cases for persons between the ages of 16 and 65 were retained. Because

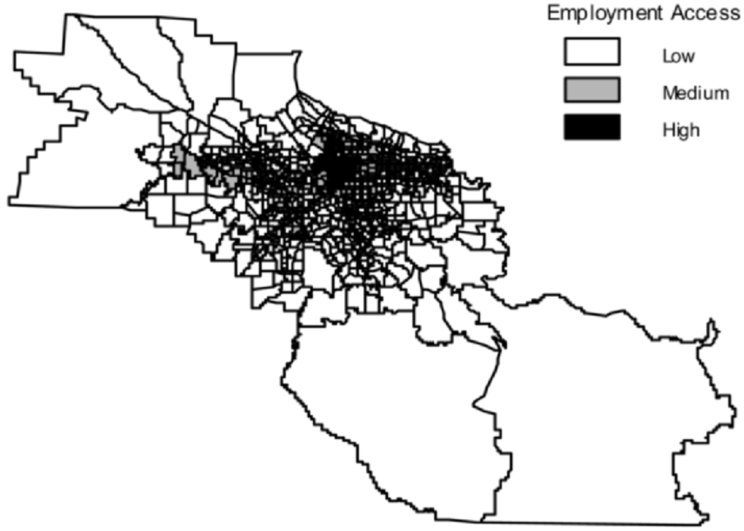

Figure 6. Portland, Oregon.

employment status was the primary concern, only working-age persons were included in the analysis. Table 1 shows the number and type of cases for each of the six selected metropolitan areas.

Along with disaggregate TANF recipient data, the analysis used transit route and stop data from the Metropolitan Atlanta Rapid Transit Authority, Baltimore Metropolitan Council, Maryland Transit Administration, Dallas Area Rapid Transit, North Central Texas Council of Governments, Denver Regional Transport District, Milwaukee County Transit System and the Tri-County Metropolitan Transit District of Oregon (Tri-Met). For each TANF recipient's residential location, the distances along the street network were used to calculate the proximity of transit stops. In addition to physical access to transit stops, it was important to account for the quality of the available transit service. Service frequency has a significant effect on ridership and mobility levels increase when riders are not limited by infrequent or unreliable transit availability (Black, 1995). The mean off-peak (night and weekend) scheduled service frequency at the nearest transit stops for all TANF recipients was included in the model along with the other explanatory variables shown in Table 2.[3]

Regional Employment Accessibility

For entry-level (service and retail) job locations, an employment accessibility index was calculated for each TANF recipient. Recipient locations were used as trip origins with the locations of service and retail jobs as destinations. Significantly lower levels of job access for current TANF recipients compared with past recipients (now employed) will suggest that spatial disadvantages are a factor contributing to low rates of labour participation. The following equations are used to calculate employment accessibility for recipients based on auto and transit travel, respectively

$$A_i^{auto} = \sum_j \frac{E_j f(C_{ij}^{auto})}{\sum_k[\alpha_k W_k f(C_{kj}^{auto}) + (1-\alpha_k)W_k f(C_{kj}^{trans})]} \quad (1a)$$

$$A_i^{trans} = \sum_j \frac{E_j f(C_{ij}^{trans})}{\sum_k[\alpha_k W_k f(C_{kj}^{auto}) + (1-\alpha_k)W_k f(C_{kj}^{trans})]} \quad (1b)$$

where, $A^{auto}{}_i$ and $A^{trans}{}_i$ are accessibility scores that measure the ease with which workers who are auto drivers and workers who are captive transit riders, respectively, can reach spatially distributed job opportunities from

Table 1. Case status for the six selected metropolitan areas

Metro area	Employed		Closed		Open		Total
	Number	Percentage	Number	Percentage	Number	Percentage	
Atlanta, GA	21 479	25.27	23 557	27.72	39 949	47.01	84 985
Baltimore, MD	1 606	3.76	2 300	5.39	38 753	90.84	42 659
Dallas, TX	83	0.89	1 494	15.98	7 773	83.13	9 350
Denver, CO	233	3.09	2 081	27.59	5 229	69.32	7 543
Milwaukee, WI	2 813	7.44	5 191	13.73	29 800	78.83	37 804
Portland, OR	207	2.57	560	6.94	7 297	90.49	8 064
Total	26 421	13.88	35 183	18.48	128 801	67.65	190 405

Note: Caseloads differ by metropolitan area due to the magnitude of poverty (i.e. persons on public assistance) and the geographical extent of each study area.

Table 2. Variables included in the analysis

Variable	Atlanta	Baltimore	Dallas	Denver	Milwaukee	Portland
Case status (dependent)	♦	♦	♦	♦	♦	♦
Age of recipient	♦	♦	♦	♦	♦	♦
High school degree			♦			♦
Gender	♦	♦	♦	♦	♦	♦
Race	♦	♦	♦	♦	♦	♦
Number of adults in household	♦		♦		♦	♦
Number of children in household	♦	♦	♦	♦	♦	♦
Marital status		♦		♦	♦	
Years on assistance	♦	♦	♦	♦	♦	
Employment training		♦			♦	♦
Educational assistance		♦				♦
Automobile ownership		♦			♦	
Percentage persons 25 + with HS degree or higher (block group)	♦	♦	♦	♦	♦	♦
Transit service frequency within walking distance (evening)	♦	♦	♦	♦	♦	♦
Regional employment access	♦	♦	♦	♦	♦	♦

♦ denotes data available.

residential location i ($i = 1, 2, \ldots, N$); E_j is number of jobs in location j ($j = 1, 2, \ldots, N$); $f(C^{auto}{}_{kj})$ and $f(C^{trans}{}_{kj})$ are impedance functions for auto drivers and transit riders, respectively, travelling between i and j; W_k is the number of TANF recipients living in location (TAZ) k ($k = 1, 2, \ldots, N$); and α_k is the percentage of automobile ownership in location (TAZ) k ($k = 1, 2, \ldots, N$).

As shown in Weibull (1976) and Shen (1998), the measure represented by equations (1a) and (1b) captures the 'demand side' of employment accessibility—that is, the spatial distribution of workers. This measure is a variation of the Hansen (1959) accessibility index. It is the more suitable indicator of accessibility when there are limited numbers of job opportunities available in a metropolitan area. Note that in each equation, locations of competing demands are generally denoted by k to distinguish them from any particular residential location, denoted by i, for which the accessibility score is calculated. There are many possible ways to specify the travel impedance function. We chose the exponential function

$$f(C_{ij}) = e^{-\beta C_{ij}},$$

where, β is an empirically determined parameter and C_{ij} is travel time from i to j.

Everything else being equal, accessibility is usually higher for workers who commute by automobile than for workers who commute by public transit. A general accessibility index proposed by Shen (1998) takes into account the level of automobile ownership and adequately measures the overall accessibility for each residential location. This index can be used if vehicle ownership information is not available for individual TANF recipients

$$A_i^G = \alpha_i A_i^{auto} + (1 - \alpha_i) A_i^{trans} \quad (2)$$

where, A^G_i is the general employment accessibility for residential location i; and α_i is the percentage of workers in location i whose household has at least one automobile.

This general accessibility index defines the relative position of each residential location in the urban spatial structure. The higher the score, the greater advantage the residents have in access to job opportunities. Shen (1998) showed that the expected value of equation (2) equals the ratio of the total employment to the total labour force, E/W. Alternative accessibility measures, such as Hansen's (1959) original formulation and other spatial search/shortest travel time approaches, were used to test the robustness of our results.

Variables Included in the Analysis

Age of recipient. Older recipients are expected to have greater chances of being employed. Younger workers have less job skills and experience, perhaps making it more difficult to compete with older, more experienced workers. However, it is likely that older recipients may be at a disadvantage due to labour force competition with younger persons who may be more willing to accept minimum wage positions. A positive correlation between age and employment is expected, similar to the findings of Ong and Blumenberg (1998).

Educational attainment. Individuals with higher levels of education are expected to have greater employment opportunities compared with those with less education (Danziger *et al.*, 2000). Persons with less than a high school degree or general education diploma (GED) are at a particular disadvantage, especially in combination with other employment barriers.

Gender. Male recipients are expected to have greater employment opportunities because they do not generally take primary responsibility for childcare or other familial caregiving. In addition, females, especially low-income females, may have fewer job skills and training compared with males of the same age because they have needed to forego these opportunities to assume childcare responsibilities (Waldfogel and Mayer, 2000).

Race. Racial differences in the probabilities of finding employment may indicate discrimination in hiring practices (the same can also be true for gender) (Danziger *et al.*, 2000). Significant employment and wage differences, especially between Whites and African Americans, indicate the persistent connection between race and class in the US. However, while TANF recipients cluster at the lowest end of the income scale and encounter a range of employment barriers, poor employment outcomes for this population may be relatively uniform.

Household composition. While the vast majority of adult TANF recipients are single females, the ratio of children to adults (parents) in a household indicates the degree of household need. Much of the welfare reform legislation refers to the importance of marriage in the transition from welfare to work. Households with married adults (especially with the spouse present) are considered to be more stable environments having positive impacts on children in the household as well as increasing employment chances as previously mentioned. A household with more than one adult is not necessarily a married couple; rather, one adult may be a dependent such as in the case when an elderly family member is being cared for. On the other hand, more children in the household may make job search activities more difficult, due to increased childcare and transport needs. Transporting children to daycare or school in addition to a work commute (often by public transit for low-income persons) are often significant obstacles.

Length of time on assistance. The length of time that a recipient has been on public assistance may be an indication of several factors related to employment readiness. Long spells of unemployment (or underemployment) are more likely to be related to longer-term circumstances such as chronic health problems or other employment-related limitations. For these reasons, longer periods on assistance may be associated with declining employment chances (Ong and Houston, 2002). On the other hand, time limits imposed by welfare reform legislation may increase the chances of case closures, especially for those persons that have been on longer-term assistance. These persons would be considered 'leavers' due to sanctions rather than employment-related reasons.

Training and education. Participation in job or skills training, work experience or education programmes is expected to have positive impacts on employment chances for TANF recipients. As discussed earlier, states have the flexibility to provide different forms of job preparedness programmes with either mandatory or voluntary participation by recipients. Some research has documented significant successes associated with such programmes (Hamilton *et al.*, 1997). Some research has noted that the perception of job skill levels may also factor in employment participation (Blumenberg, 2002).

Neighborhood educational attainment level. The social environment, especially for neighbourhoods with concentrated poverty, has a significant influence on the employment outcomes of individuals within the neighbourhood (Wilson, 1996; Jargowsky, 1997). This influence can affect the strength of social networks among residents related to the sharing of employment information and employment-related services. There are direct correlations between educational attainment, socioeconomic rank and labour force participation. The educational attainment levels of the neighbourhood are also correlated with social issues such as crime, poor health and racial discrimination—all of which affect the individuals in a neighbourhood. For this reason, the educational attainment level of the census block group is used as an indicator of the social environment. Persons on public assistance in areas with higher proportions of educated persons (measured as those with a high school degree and above) are expected to have greater employment chances compared with persons in neighbourhoods with lower proportions of educated persons.

Automobile ownership. A survey of AFDC recipients showed that those who owned automobiles were more likely to be employed and earn higher wages compared with those not owning an automobile (Ong, 1996). Recent research by Raphael and Rice (2002) suggested that auto ownership increases employment potential due to increased mobility, which positively influences job search and retention. These studies did not, however, adequately depict the causal nature of this relationship. Due to data limitations, it was not possible to determine which came first, the job or the automobile. Rosenbloom (1992) reported that upon employment, low-income persons frequently purchase automobiles. In these cases, the job makes auto ownership possible instead of the opposite. Initial state TANF programmes imposed asset limitations on recipients, which made automobile ownership difficult; however, many states have subsequently relaxed these restrictions. Twenty-one states exclude the entire value of a car in each household from asset calculations (State Policy Documentation Project, 1999).

Access to transit. Public transport access is typically considered adequate if persons live within a 0.25-mile walking distance of a stop or station (UMTA, 1979). Beyond 0.25 miles, the time cost and inconvenience usually inhibit the use of public transport. Good physical access to public transport, however, is of little use if the route network itself does not effectively link residents with employment opportunities. For this reason, additional control variables were used to account for employment accessibility.

Transit service frequency. Research shows that while on-time performance at transit stops is an important factor affecting a rider's choice to use transit, it has also been shown that riders are likely to prefer a more frequent service, even if it deviates from published schedules. Headways of 5–10 minutes virtually relieve riders of concern about scheduled stops because the average wait usually exceeds this interval (Bowman and Turnquist, 1981). The current analysis uses the evening service frequency because it has been reported that many low-skilled positions often have late-shift or weekend work hours (reference). For this reason, peak-hour service levels, at the margin, are less important for persons commuting during off-peak hours.

Employment accessibility. In addition to having frequent transit service within walking distance, high levels of regional employment accessibility by transit should increase the employment chances of persons seeking employment. The accessibility measures devised by Shen (1998, 2001) and applied by Kawabata (2002a) have found statistically significant associations with outcomes for low-income and unemployed persons (see the previous discussion of these measures).

Empirical Model

An ordered multinomial logit (OML) model was specified to estimate the probability that TANF cases found employment as a function of the explanatory variables shown in Table 2. The OML model assumes that there is an underlying continuous variable with certain threshold points. In this case, the variable is the probability of leaving TANF for employment reasons (coded as the lowest category = 1), case closure for non-employment reasons (coded as the middle category = 2), and open case status (coded as the highest category = 3, the reference category).[4] OML regression uses maximum-likelihood methods and estimates coefficients to predict the probability that an observation falls into a particular category. This means that positive coefficients increase the chances that an observation falls into a higher category and negative coefficients increase the chances that an observation will fall into a lower category (see the previous discussion about the anticipated performance of the explanatory variables). Models were estimated separately for each of the six selected metro areas.

Results

The descriptive statistics for the selected variables are shown in the Appendix and compare the three categories of TANF recipients for each of the six selected metro areas. The average age of recipients ranges from 29 to 35 years old with nearly 90 per cent being female. Race and ethnicity varied by region with Denver and Portland having approximately 20 per cent African American recipients while Atlanta and Baltimore had above 80 per cent. Overall, approximately 8 per cent of adult recipients reported being married with the most typical household being a single adult (usually female) with 2 children. Where the data were available (Denver, Milwaukee and Portland) only 16 per cent of recipients had high school degrees or GEDs compared with 60 per cent for the census block groups in which they lived. In the six selected metros, the average time on assistance was 4.2 years.

In terms of transit and employment access, Atlanta had the lowest proportion within walking distance of transit (approximately 60 per cent) while the rate for Milwaukee was

Table 3. OML regression results (sign of coefficients and significance shown)

	Atlanta ($N = 84\ 895$)	Baltimore ($N = 42\ 659$)	Dallas ($N = 9\ 350$)	Denver ($N = 7\ 543$)	Milwaukee ($N = 37\ 179$)	Portland ($N = 8\ 093$)
Age	−	−	−	+	−	−
Age^2	+	+	+	−	+	+
Male	−	−	+	+	+	−
White	+	−	−	−	−	+
Black	+	−	−	+	−	−
Hispanic	+	−	−	−	+	−
Asian		−	−	+		−
Number adults	+		+		−	−
Number children	+	+	+	−	−	+
Years on assistance	−	−	+	−	−	
Married		−		−	+	
HS degree				−	−	+
Own vehicle		−			+	
Skills training		+				+
Work experience		−				
Education services		+				
W2 Programme					+	
JOBS programme						−
BG percentage HS degrees	−	+	−	+	−	
Service frequency	+	−	−	+	+	+
Employment access	+	−	+	−	−	−
Pseudo R^2	0.043	0.021	0.289	0.005	0.128	0.634

Bold signs denote significant at $p < 0.05$.
+ indicates higher probability of remaining on public assistance.
− indicates higher probability of leaving assistance and being employed.

nearly 90 per cent. The descriptive statistics also show little variation between case status (employed, close and open) for evening transit service frequency and regional employment access within each metro. It was anticipated that closed cases, especially those for employment reasons, would have higher levels of transit and employment accessibility compared with open cases for reasons previously discussed.

The correlation matrices for Atlanta, Baltimore, Dallas, Denver, Milwaukee and Portland did not suggest that there was a substantial threat of multicollinearity. The highest pairwise correlations were between the evening transit service frequency and the regional employment accessibility measures. In all six cases, the pairwise correlations were positive, suggesting that transit service may be contributing to increased levels of regional employment accessibility or that regional employment accessibility influences the location of additional transit investment. The correlation was highest for Baltimore (0.484) and the lowest was Milwaukee (0.276). The others were Dallas (0.373), Atlanta (0.410), Portland (0.442) and Denver (0.452).

OML Regression Results

The performance of the six models varied considerably with pseudo R^2 statistics ranging from 0.005 for Denver to 0.634 for Portland (see Table 3 for a summary of results). On average, there were approximately 18 variables in each equation that controlled for demographic characteristics, training/education programme participation, transit access/service quality and employment accessibility. The coefficient for the number of children in the household was significant in five of six models. With the exceptions of Denver and Milwaukee, the coefficients for number of children were positive, suggesting that households with more children were more likely to stay on public assistance compared with those having fewer children. This was especially true in the case for Portland, where employed persons had significantly fewer children on average (0.36) compared with persons still on assistance (2.02) (see Appendix). This variable explained a substantial amount of the variation that distinguished the cases based on TANF status. Further data analysis is needed to determine why the model for Portland performed extremely well compared with the other metros. It is likely that there are metro-level factors that play more significant roles in some regions compared with others. These factors could not be discerned with the data and methods used in this analysis.

Three other variables that exhibited statistical significance were recipient age (and squared term in 5 of 6 models), number of adults in the household (in 3 of 4 models) and years on assistance (in 4 of 5 models). In general, the results for these variables suggest that younger persons, with shorter periods of time on assistance, having more dependent children in the household, were more likely to be unemployed and on public assistance compared with other cases.

Of the transit and employment access variables, none performed consistently and in no cases were there statistically significant coefficients with the anticipated sign. Atlanta and Milwaukee had the only significant transit or employment access coefficients. For Atlanta and Milwaukee, transit service frequency had positive signs that were the opposite of the anticipated outcomes. Employment access was also significant and positive for Atlanta, but not significant in the case of Milwaukee. The coefficients with positive signs meant that as evening service frequency and employment access increased, the probability of finding employment and leaving TANF decreased. An initial interpretation of these results is that transit and employment access have not played significant roles in the welfare-to-work transition in the six selected metropolitan areas.

Additional models were analysed to isolate the differences among sub-populations of TANF recipients. Separate models for non-auto owners and auto owners were analysed for Baltimore and Milwaukee (the only metros with reliable vehicle ownership data). Transit and employment access were expected to be significant determinants of employment outcomes, especially in the case of non-auto owners. With the exception of the transit service frequency coefficient for non-auto owners in Milwaukee, the transit service frequency and regional employment access coefficients were not statistically significant. The transit service frequency coefficient for Milwaukee non-auto owners was actually positive (0.006, $p = 0.004$) suggesting that non-auto owners in areas with better transit service were more likely to be unemployed—contrary to the anticipated relationship.

Another model that was analysed used a binary dependent variable (in a logit regression) indicating whether a TANF recipient had worked or not. This differed from the original dependent variable in the OML regression because it examined work activity independent of TANF case status. The analysis assumed that work activity was the primary outcome of interest because some recipients work at least part-time, and this may be facilitated by good access to transit or good accessibility to regional employment. The results were nearly identical to the OML shown in Table 3, with Atlanta and Milwaukee having the only statistically significant coefficients for the transit service frequency and employment access variables. Also similar to the OML results, the signs for the Atlanta and Milwaukee coefficients were opposite from what was expected, with greater transit service frequency and employment access being associated with higher probabilities of being unemployed.[5]

A final alternative model included only persons between the ages of 16 and 45—the most typical age range for TANF households of working age. For each of the six selected metro areas, the results from an OML regression including only this age range were again virtually identical to those shown in Table 3.

The descriptive statistics in the Appendix illustrate the lack of trend in transit and employment access for the three classes of TANF cases. The OML regression tested whether the employed cases had consistently higher levels of physical transit access, higher transit service frequency and greater access to regional employment by transit. The results of the OML regression and the aggregate trends in the descriptive statistics did not provide evidence to suggest that there were significant differences between these groups.

Discussion

Because a large percentage of TANF recipients do not have access to a reliable automobile for personal use, their transport mobility needs have to be met by alternative means (USDOT, 1998). The results of this analysis indicate that TANF recipients in Atlanta, Baltimore, Dallas, Denver, Milwaukee and Portland with relatively higher levels of transit and regional employment access were not more likely to find employment and leave public assistance compared with other TANF recipients.

The results of the OML analysis suggest that transit mobility and regional employment access factors did not play a significant role in explaining changes in TANF case status. In general, personal and household characteristics were significant variables in explaining the case outcomes. To improve model performance, additional variables could be added such as childcare needs, costs and access, as well as other economic considerations for costs of living. In addition, personal circumstances like health status, job skill levels and work histories are important factors that have been identified in other research. This information, however, is very difficult to obtain or estimate at a disaggregate level.

It should also be noted that analyses using disaggregate data, such as the one presented here, for a variety of reasons tend not to perform as well as analyses using aggregate data. The behaviour and activities of individuals result from complex and intricate factors (Meyer and Miller, 2001, p. 263). In this case, the data were also spatially aggregated to the traffic analysis zone level; however, the results did not differ substantially from those presented for the OML regression. If significant, the probabilities for employment would then be based primarily on location rather than on the characteristics of individual TANF recipients.

While most TANF recipients have experienced job retention difficulties, it would seem that the first closed cases would be those with the least number of difficulties followed by the more extreme cases (Blumenberg, 2002). The results of this analysis do not indicate that the cohort of TANF leavers for the six selected metropolitan areas have necessarily benefited from good access to transit for employment purposes relative to other employment barriers that they faced. Pugh (1998) discussed the susceptibility of targeted transport programmes for welfare recipients. Considering the other analyses discussed, there are mixed interpretations of the significance of transit mobility benefits for low-income persons.

Further research is needed that combines measures of transit and employment access with other measures of access to shopping, schools and daycare centre locations in order to make a better assessment of overall transport mobility needs. This analysis focused on the impact of transit mobility on employment and only addresses a portion of (albeit important) overall transport mobility needs. The employment accessibility measure used here, by focusing on the home-jobs connection, does not fully account for the wide range of accessibility effects (for example, shopping, daycare, school and social services) of transit. For this reason, the results should be viewed cautiously and not be interpreted as an overall evaluation of public transport.

Even with the considerable amount of attention paid to the role of public transport in addressing inner-city mobility problems for workers over the past 30–40 years, very little evidence has been published that identifies successful mobility strategies. In other words, very little empirical research has specifically focused on how labour participation is affected by increased public transport services across the US. A significant amount of research has dealt with the relationship between labour force participation and the spatial separation of jobs and houses; however, most analyses concentrate on commuting time or distance as a function of automobile accessibility. Few studies have considered the relative impacts of employment accessibility resulting from public transport services, while recommendations for increased public transport expenditures for addressing urban unemployment problems persist (for example, NACCD, 1968; Blackley, 1990; Hughes, 1991).

Similar to the Urban Mass Transport Administration (UMTA) demonstration projects over 30 years ago, there has been little systematic evaluation of performance and project outcomes especially by the states implementing these programmes. Some concede that there were inherent difficulties in determining the effectiveness of such mobility programmes, which include having no accepted performance measures and an inability to control for intervening factors such as those affecting the employability of certain individuals. In addition, some have noted that, as low-income workers benefit from increased job access, they have the opportunity to purchase an automobile, which would end their reliance and use of public transit.

In summarising the UMTA demonstration projects, Rosenbloom concluded that

> The earliest reverse commute projects were generally failures whether measured by jobs gained or new transportation services created and sustained. The only possible 'successes' were those that did little more than effectively use underutilized outbound capacity on traditional peak hour bus service (Rosenbloom, 1992, p. 17).

From a policy perspective, it is interesting to note the similarities between the UMTA demonstration projects mentioned and the more recent transport mobility programmes that were linked with welfare reform. The historical evidence, along with the results of this analysis, call for more consistent evaluation and monitoring of projects to increase transport mobility in addressing urban unemployment.

Notes

1. These rates were calculated from 1999 TANF administrative records for Baltimore and Milwaukee that were used in the analysis.
2. Administrative records in each state are managed with different databases and case management systems, therefore not all of the same variables are available from all states.
3. The closest accessible bus stops for bus routes by direction were selected by using queries in MS Access database. Once a relation between TANF recipients locations and the closest bus stops was built, the aggregated bus service (runs/hour) was computed by the following formula

$$s = \sum_{i}^{n} (60/hw_i)$$

where, s is the aggregated bus service; hw_i is the headway of route (include direction) i; and n is the total number of bus routes (including directions).
4. While some open cases do work, we see case closure for employment reasons as being the appropriate threshold to classify them as being 'employed'.
5. These results were also similar when using a general multinomial logit regression.

References

BLACK, A. (1995) *Urban Mass Transportation Planning*. New York: McGraw-Hill, Inc.

BLACKLEY, P. R. (1990) Spatial mismatch in urban labor markets: evidence from large U. S. metropolitan areas, *Social Science Quarterly,* 71, pp. 39–52.

BLUMENBERG, E. (2002) On the way to work: welfare participants and barriers to employment, *Economic Development Quarterly,* 16(4), pp. 314–325.

BOWMAN, L. A. and TURNQUIST, M. A. (1981) Service frequency, schedule reliability and passenger wait times at transit stops, *Transportation Research,* 15A(6), pp. 465–471.

CERVERO, R., SANDOVAL, O. and LANDIS, J. (2002) Transportation as a stimulus of welfare-to-work: private versus public mobility, *Journal of Planning Education and Research,* 22(1), 50–63.

COULTON, C., LEETE, L. and BANIA, N. (1997) *Housing, transportation and access to suburban jobs by welfare recipients in the Cleveland area*. Center for Urban Poverty and Social Change, Mandel School of Applied Social Sciences, Case Western Reserve University.

CRAIN, J. L. (1970) *The Reverse Commute Experiment: A $7 Million Demonstration Program*. Prepared for Urban Mass Transportation Administration, SRI Project MSU-7598, Menlo Park, Stanford Research Institute, CA.

DANZIGER, S., CORCORAN, M., DANZIGER, S. *ET AL.* (2000) Barriers to the employment of welfare recipients, in: R. CHERRY and W. M. RODGERS (Eds) *Prosperity for All? The Economic Boom and African Americans*, pp. 245–278. New York: Russell Sage Foundation.

ELLWOOD, D. T. (1986) The spatial mismatch hypothesis: are there teen-age jobs missing in the ghetto?, in: R. B. FREEMAN and H. J. HOLZER (Eds) *The Black Youth Employment Crisis*, pp. 147–185. Chicago, IL: University of Chicago Press.

GORDON, P., KUMAR, A. and RICHARDSON, H. W. (1989) The spatial mismatch hypothesis: some new evidence, *Urban Studies,* 26, pp. 315–326.

GREENBERG, M. and LARACY, M. C. (2000) *Welfare reform: next steps offer new opportunities. a role for philanthropy in preparing for the reauthorization of TANF in 2002*. Center for Law and Social Policy and Annie E. Casey Foundation.

HAMILTON, G., BROCK, T., FARRELL, M. *ET AL.* (1997) *National evaluation of welfare-to-work strategies: evaluating two welfare approaches*. US Department of Health and Human Services and US Department of Education, Washington, DC.

HANSEN, W. G. (1959) How accessibility shapes land use, *Journal of the American Institute of Planners,* 25, pp. 73–76.

HUGHES, M. A. (1991) Employment decentralization and accessibility: a strategy for stimulating regional mobility, *Journal of the American Planning Association,* 57, pp. 288–298.

IHLANFELDT, K. R. and SJOQUIST, D. L. (1998) The spatial mismatch hypothesis: a review of recent studies and their implications for welfare reform, *Housing Policy Debate,* 9(4), pp. 849–892.

ISAACS, J. B. (1999) *Monitoring outcomes for former welfare recipients: a review of 11 survey instruments*. Paper presented at the *National Association for Welfare Research and Statistics 39th Annual Workshop*, Cleveland, Ohio, August.

JARGOWSKY, P. A. (1997) *Poverty and Place: Ghettos, Barrios, and the American City*. New York: Russell Sage Foundation.

KAIN, J. F. and MEYER, J. R. (1970) Transportation and poverty, *The Public Interest,* 18, pp. 75–87.

KAPLAN, A. (1998) Transportation: the essential need to address the "to" in welfare–to-work, *Welfare Information Network: Issues Notes,* 2(10) (http://www.welfareinfo.org/transitneed.htm).

KAWABATA, M. (2002) Job accessibility by travel mode in U.S. metropolitan areas, *Papers and Proceedings of the Geographic Information Systems Association,* 11, pp. 115–120.

KAWABATA, M. (2002) *Job access and work among autoless adults on welfare in Los Angeles*. Working Papers Series No. 40, The Ralph and Goldy Lewis Center for Regional Policy Studies, UCLA.

LOPREST, P. J. (1999) *How families that left welfare are doing: a national picture*. Series B, No. B-1, The Urban Institute, Washington, DC.

LOPREST, P. J. and ZEDLEWSKI, S. R. (1999) *Current and former welfare recipients: how do they differ?* Discussion Paper 99-17, The Urban Institute, Washington, DC.

MEYER, J. A. (1999) Assessing welfare reform: work pays, *The Public Interest*, 136, pp. 113–120.

MEYER, M. D. and MILLER, E. J. (2001) *Urban Transportation Planning: A Decision-Oriented Approach*. New York: McGraw Hill.

MURAKAMI, E. and YOUNG, J. (1997) *Daily travel by persons with low income*. Paper presented at the *Nationwide Personal Transportation Survey (NPTS) Symposium*, Bethesda, Maryland.

NACCD (NATIONAL ADVISORY COMMISSION ON CIVIL DISORDERS) (1968) *Report of the National Advisory Commission on Civil Disorders*. Washington, DC: US Government Printing Office.

ONG, P. (1996) Work and automobile ownership among welfare recipients, *Social Work Research,* 20(4), pp. 255–262.

ONG, P. and BLUMENBERG, E. (1998) Job access, commute and travel burden among welfare recipients, *Urban Studies,* 35(1), pp. 77–93.

ONG, P. and HOUSTON, D. (2002) Transit, employment and women on welfare, *Urban Geography,* 23(4), pp. 344–364.

ONG, P., HOUSTON, D., HORTON, J. and SHAW, L.

(2001) *Los Angeles County CalWORKS transportation needs assessment*. Working Paper Series No. 36, The Ralph and Goldy Lewis Center for Regional Policy Studies, UCLA.

PEARLMUTTER, S., SU, M., COULTON, C. and BANIA, N. (1999) *Characteristics of an exit cohort of AFDC recipients that affect use of child care subsidies*. Center on Poverty and Social Change, Mandel School of Applied Social Sciences, Case Western Reserve University.

PUGH, M. (1998) *Barriers to work: the spatial divide between jobs and welfare recipients in metropolitan areas*. A discussion paper prepared for the Brookings Institution, Center on Urban and Metropolitan Policy, Washington, DC.

RAPHAEL, S. and RICE, L. (2002) Car ownership, employment, nd earnings, *Journal of Urban Economics,* 52, pp. 109–130.

ROSENBLOOM, S. (1992) *Reverse commute transportation: emerging provider roles*. US Department of Transportation, Federal Transit Administration, Washington, DC.

SANCHEZ, T. W. (1999a) The connection between public transit and employment: the cases of Portland and Atlanta, *Journal of the American Planning Association,* 65(3), pp. 284–296.

SANCHEZ, T. W. (1999b) Transit access analysis of TANF recipients in the city of Portland, Oregon, *Journal of Public Transportation,* 2(4), pp. 61–73.

SCHUMACHER, R. and GREENBERG, M. (1999) *Child care after leaving welfare: early evidence from state studies*. Center for Law and Social Policy, Washington, DC.

SHEN, Q. (1998) Location characteristics of inner-city neighborhoods and employment accessibility of low-wage workers, *Environment and Planning B,* 25, pp. 345–365.

SHEN, Q. (2001) A spatial analysis of job openings and access in a US metropolitan area, *Journal of the American Planning Association,* 67(1), pp. 53–68.

STATE POLICY DOCUMENTATION PROJECT (1999) Asset limits and vehicle exclusions (http://www.spdp.org/tanf/financial/asset.pdf).

TAYLOR, B. D. and ONG, P. M. (1995) Spatial mismatch or automobile mismatch? An examination of race, residence and commuting in US metropolitan areas, *Urban Studies,* 32(9), pp. 1453–1473.

THOMPSON, G. L. (1997) *How ethnic/racial groups value transit accessibility: modeling inferences from Dade County*. Paper presented at the *Annual Meeting of the Association of Collegiate Schools of Planning*, Ft Lauderdale, Florida.

UMTA (URBAN MASS TRANSIT ADMINISTRATION) (1979) *Analyzing transit options for small urban communities: analysis methods*. Washington, DC: US Department of Transportation.

USDOT (US DEPARTMENT OF TRANSPORTATION) (1998) *Access to jobs: a guide to innovative practices in welfare-to-work transportation*. Report prepared by the Community Transportation Association of America, Washington, DC.

WACHS, M. and TAYLOR, B. D. (1998) Can transportation strategies help meet the welfare challenge?, *Journal of the American Planning Association,* 64(1), pp. 15–19.

WALDFOGEL, J. and MAYER, S. E. (2000) Gender differences in the low-wage labor market, in: D. CARD and R. M. BLANK (Eds) *Finding Jobs: Work and Welfare Reform*, pp. 193–232. New York: Russell Sage Foundation.

WEIBULL, J. W. (1976) An axiomatic approach to the measurement of accessibility, *Regional Science and Urban Economics,* 6, pp. 357–379.

WILSON, W. J. (1996) *When Work Disappears: The World of the New Urban Poor*. New York: Knopf.

Appendix.

Table A1. Atlanta, Georgia

	Employed ($N = 21\ 479$)		Closed ($N = 23\ 557$)		Open ($N = 39\ 949$)	
Variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age of recipient	35.2140	8.6500	35.9393	10.2100	35.3140	10.0800
Recipient male	0.0565	0.2300	0.0503	0.2200	0.0498	0.2200
Years on assistance	7.8432	3.3651	7.6972	3.8358	6.7960	4.1594
White	0.1383	0.3500	0.1654	0.3700	0.1268	0.3300
African American	0.8017	0.4000	0.7936	0.4000	0.8408	0.3700
Hispanic	0.0297	0.1700	0.0216	0.1500	0.0169	0.1300
Asian	0.0298	0.1700	0.0187	0.1400	0.0136	0.1200
Native American	0.0005	0.0216	0.0006	0.0235	0.0007	0.0255
Adults in household	0.7840	0.5100	0.6961	0.5300	0.8154	0.4400
Children in household	1.6812	1.0800	1.7410	1.1800	1.7440	1.1800
BG percentage with HS degree	0.4866	0.0971	0.4747	0.1051	0.4662	0.1085
Walk to transit	0.5742	0.4900	0.5937	0.4900	0.6545	0.4800
PM service frequency	3.0571	3.7731	3.2474	3.8413	3.6807	3.9487
Employment access	1.4306	2.0106	1.5776	2.1227	1.7633	2.2683

Table A2. Baltimore, Maryland

	Employed ($N = 1\ 606$)		Closed ($N = 2\ 300$)		Open ($N = 38\ 753$)	
Variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age of recipient	32.4159	8.3900	35.4539	11.2500	35.9361	11.9700
Recipient male	0.0299	0.1700	0.0517	0.2200	0.0438	0.2000
White	0.1451	0.3500	0.1591	0.3700	0.1644	0.3700
African American	0.8263	0.3800	0.8000	0.4000	0.7972	0.4000
Hispanic	0.0025	0.0499	0.0057	0.0750	0.0048	0.0691
Asian	0.0012	0.0353	0.0048	0.0690	0.0022	0.0471
Recipient married	0.0529	0.2200	0.0670	0.2500	0.0716	0.2600
Years on assistance	3.2973	3.4780	3.3400	3.5360	2.7562	3.4530
Children in household	1.7727	1.0300	1.5748	1.0900	1.7987	1.1300
Skills training	0.0019	0.0432	0.0013	0.0361	0.0022	0.0473
Work experience	0.4215	0.4900	0.1678	0.3700	0.2068	0.4000
Education programme	0.0853	0.2800	0.0622	0.2400	0.0847	0.2800
Own vehicle	0.2080	0.4100	0.1313	0.3400	0.1624	0.3700
BG percentage with HS degree	0.6450	0.1675	0.6269	0.1651	0.6446	0.1667
Walk to transit	0.8132	0.3900	0.8357	0.3700	0.7983	0.4000
PM service frequency	13.0098	11.3922	13.6846	11.6298	12.7758	11.3040
Employment access	1.6410	1.2219	1.8014	1.2085	1.6631	1.2118

Table A3. Dallas, Texas

	Employed ($N = 83$)		Closed ($N = 1\ 494$)		Open ($N = 7\ 773$)	
Variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age of recipient	29.9157	7.6100	30.7744	10.3000	28.7359	9.0800
Recipient male	0.1205	0.3300	0.0803	0.2700	0.0946	0.2900
White	0.1566	0.3700	0.1553	0.3600	0.1566	0.3600
African American	0.6867	0.4700	0.6339	0.4800	0.6798	0.4700
Hispanic	0.1325	0.3400	0.1921	0.3900	0.1414	0.3500
Asian	0.0241	0.1500	0.0154	0.1200	0.0184	0.1300
Years on assistance	1.0410	0.8390	2.0744	2.1290	1.7268	2.2640
Adults in household	0.5904	0.5900	0.4900	0.5100	0.9373	0.2900
Children in household	2.1687	1.4600	2.0033	1.1100	2.1052	1.1600
BG percentage with HS degree	0.6588	0.2004	0.6392	0.2183	0.6287	0.2128
Walk to transit	0.5663	0.5000	0.6827	0.4700	0.6852	0.4600
PM service frequency	1.5381	1.8415	1.8152	2.2504	1.7276	1.8979
Employment access	0.3774	0.7416	0.5853	0.9952	0.5374	0.9671

Table A4. Denver, Colorado

	Employed ($N = 233$)		Closed ($N = 2\ 081$)		Open ($N = 5\ 229$)	
Variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age of recipient	31.6996	8.7200	31.0216	8.2300	31.3848	8.5000
Has HS degree	0.5966	0.4900	0.5733	0.4900	0.5710	0.4900
Recipient male	0.1202	0.3300	0.0812	0.2700	0.0916	0.2900
Recipient married	0.1459	0.3500	0.1326	0.3400	0.1360	0.3400
White	0.4120	0.4900	0.3537	0.4800	0.3557	0.4800
African American	0.1631	0.3700	0.2350	0.4200	0.2293	0.4200
Hispanic	0.3305	0.4700	0.3277	0.4700	0.3209	0.4700
Asian	0.0086	0.0924	0.0101	0.1000	0.0180	0.1300
Native American	0.0172	0.1300	0.0058	0.0757	0.0071	0.0838
Children in household	1.5579	1.5200	1.5978	1.4300	1.4471	1.4600
Years on assistance	0.4146	1.3930	0.8164	2.1850	0.7505	2.0160
BG percentage with HS degree	0.6949	0.2065	0.7068	0.1928	0.7072	0.1959
Walk to transit	0.7983	0.4000	0.7900	0.4100	0.7810	0.4100
PM service frequency	3.7082	4.4655	3.7564	4.1205	3.7967	4.1405
Employment access	3.6220	3.920	3.8948	4.035	3.7834	3.987

Table A5. Milwaukee, Wisconsin

	Employed ($N = 2\ 183$)		Closed ($N = 5\ 191$)		Open ($N = 29\ 800$)	
Variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age of recipient	28.9922	9.7533	29.7253	11.0049	29.7686	11.5572
Recipient male	0.2103	0.4076	0.2377	0.4257	0.2152	0.4110
White	0.0944	0.2924	0.0769	0.2664	0.0743	0.2623
African American	0.5996	0.4901	0.6101	0.4878	0.6056	0.4887
Hispanic	0.0751	0.2637	0.0763	0.2655	0.0818	0.2741
Recipient married	0.0880	0.2833	0.0836	0.2768	0.0845	0.2782
Years on assistance	2.9093	1.2789	2.7087	1.4077	2.1853	1.5080
Has HS degree	0.0953	0.2937	0.0927	0.2900	0.0938	0.2916
Adults in household	1.0701	0.2589	0.8580	0.4865	0.8094	0.4692
Children in household	2.4572	1.6247	2.1202	1.5209	2.1195	1.3910
Wisconsin W2 programme	0.0596	0.2367	0.0329	0.1785	0.2597	0.4385
Own vehicle	0.0838	0.2772	0.0651	0.2467	0.0719	0.2584
BG percentage with HS degree	0.6412	0.1662	0.6350	0.1529	0.6418	0.1563
Walk to transit	0.8887	0.3146	0.8900	0.3129	0.8974	0.3035
PM service frequency	11.8335	7.1635	12.0847	7.2843	12.2434	7.5386
Employment access	1.5365	0.8407	1.5536	0.8120	1.5139	0.8115

Table A6. Portland, Oregon

	Employed ($N = 207$)		Closed ($N = 560$)		Open ($N = 7\ 297$)	
Variables	Mean	Standard deviation	Mean	Standard deviation	Mean	Standard deviation
Age of recipient	30.8995	9.4500	31.8378	12.6700	32.8236	12.6200
Recipient male	0.1531	0.3600	0.1889	0.3900	0.1823	0.3900
White	0.6794	0.4700	0.6524	0.4800	0.6521	0.4800
African American	0.2105	0.4100	0.1979	0.4000	0.2003	0.4000
Hispanic	0.0766	0.2700	0.0766	0.2700	0.0632	0.2400
Asian	0.0144	0.1200	0.0339	0.1800	0.0619	0.2400
Native American	0.0096	0.0976	0.0374	0.1900	0.0175	0.1300
Has HS degree	0.4450	0.5000	0.3619	0.4800	0.4311	0.5000
Adults in household	1.0287	0.1700	0.9465	0.2700	1.0810	0.3600
Children in household	0.3636	0.8400	0.0446	0.3000	2.0179	1.4700
JOBS programme	0.0096	0.0976	0.0053	0.0730	0.0083	0.0909
Skills training	0.1962	0.4000	0.1212	0.3300	0.2107	0.4100
BG percentage with HS degree	0.8102	0.1079	0.8173	0.1055	0.8071	0.1087
Walk to transit	0.8852	0.3200	0.8075	0.3900	0.8535	0.3500
PM service frequency	6.2884	5.2821	6.3451	8.2984	6.2607	6.3374
Employment access	2.0219	1.702	1.8499	1.619	1.9276	1.714