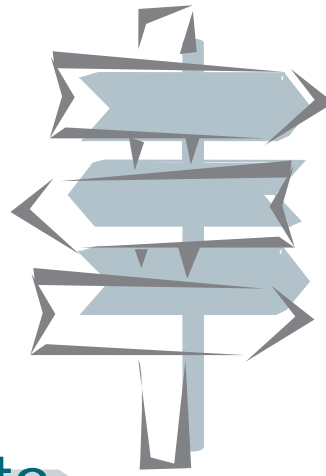


Car Access and Employment Outcomes for Tennessee Welfare Recipients



A Report to the Tennessee Department of Human Services

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Executive Summary

Work requirements imposed on American welfare recipients in 1996 brought a substantial policy and spending shift toward support services. Requiring participants to work meant devoting resources to eliminating the most significant barriers to employment. Participants and administrators have consistently identified transportation as one of the most important barriers to obtaining and maintaining employment. A growing literature continues to explore whether private automobile ownership improves employment outcomes for welfare recipients. We contribute to the discussion by focusing on car access instead of ownership, accounting for urban and rural differences, controlling for the simultaneity of car access and employment outcomes, and examining employment as well as hours worked and hourly wages.

Our results are broadly consistent with those in the prior literature. Our analysis of *unemployed* Wave 1 program participants reveals that those who had car access in the first Wave of the survey are less likely to remain unemployed and on the program and much more likely to become employed and leave the program as of Wave 4 (18-24 months later). Among the subset of unemployed Wave 1 program participants who had work requirements, those who had access to a car in Wave 1 are dramatically less likely to remain unemployed and leave the program as of Wave 4. Results are similar in spirit for *employed* Wave 1 program participants, regardless of work requirement status. For this group, having access to a car in Wave 1 reduces the probability of becoming unemployed while remaining on the program and increases the likelihood of remaining employed but leaving the program.

While car access does not seem to be an important determinant of work hours for broader samples, we do find that gaining access to a car between Waves 1 and 3 increases Wave 4 work hours by nearly 9 hours among Wave 1 program participants with work requirements. Car access also seems to enable respondents to find better-paying jobs. Wave 4 wages were \$0.70 to \$2.06 higher for those who had car access in Wave 1. All of these results suggest that car access is important to the labor market success of low-income households generally and welfare recipients more specifically.

1. Introduction

The imposition of work requirements in 1996 as part of the shift from Aid to Families with Dependent Children (AFDC) to Temporary Assistance for Needy Families (TANF) marked a major change in U.S. welfare policy and prompted states to take a broader approach to welfare assistance. Requiring participants to work meant not only providing cash assistance but also identifying and removing barriers to employment. This broader approach was evidenced by both a change in policy and a shift toward more spending on support services and less emphasis on cash benefits. The primary goal of support services is to remove barriers to work by providing such things as transportation, childcare, dental, and optical assistance.

Among barriers to work, participants consistently identify transportation as a significant problem. Consequently, many states provide some form of reimbursement, shuttle, or public transportation to work-related activities. States also permit asset exemptions (for the purposes of calculating eligibility and benefit level) either for one entire vehicle or for a set value amount. Researchers have argued that car ownership allows for job search in a broader area, increased reliability on the job, and shorter commute times that translate into higher employment rates. The recent literature has provided evidence that car ownership does indeed increase the probability of being employed.

However, previous studies suffer from a few key limitations that are potentially important to policy makers. First, they do not always adequately account for the simultaneity of car ownership and employment (i.e., the idea that correlation between car ownership and employment might not indicate causation). They also have not fully considered the important differences across urban and rural populations. Finally, they have focused almost exclusively on car ownership rather than access. We address each of these, while also improving upon estimation methods and making use of more diverse data, in order to provide a more accurate account of the effects of car access on employment outcomes. Our intent is to inform the policy debate over the relative merits of personal vehicle support programs.

We rely on a unique panel of individual survey data from the state of Tennessee in our analysis. Tennessee's low-income cash assistance program, *Families First* (FF), operates under a waiver from U.S. federal guidelines. Significant features include stricter, more immediate work requirements (40 hours upon entry into the program), shorter interim time limits (18 months at a time followed by three months of ineligibility), and a generous array of non-cash support services (including an allowance of up to 20 hours of the weekly work requirement for education and training activities).¹

An examination of Tennessee data is useful for a number of reasons. First, Tennessee has recognized the importance of automobile access for welfare recipients. In addition to a standard vehicle asset exemption amount, their unique benefit program, *First Wheels*, provides zero-interest loans for the purchase of a used automobile for program participants and for leavers up to 12 months after cash assistance payments end. Second, Tennessee's general welfare policies closely resemble those currently being proposed for implementation at the national level. Third, Tennessee data enable a more complete treatment of urban-rural differences. While most FF recipients live in urban areas, a significant minority are spread across the many rural counties in the state.

¹ For more details, see Center for Business and Economic Research (2000).

2. Why Car Access, and How Is It Promoted?

Proponents argue that the lack of transportation places welfare recipients and the working poor at a disadvantage for several reasons. They note the “spatial mismatch” between rural and inner-city residents and suburban employment opportunities.² Personal vehicles might therefore allow for a broader job search, generally more reliable transportation, shorter commute times, and the ability to work during hours not supported by the mass transit system. Additional trips to day care providers and retailers are also less complicated with a personal automobile. Supporters also note that inner-city car ownership can lead to entrepreneurship as those with cars shuttle neighbors on the way to jobs.³ Car ownership might also provide secondary benefits in the form of greater self-confidence and stronger credit ratings.⁴

Those opposed to promoting car ownership also raise compelling arguments. First, the cars available to welfare recipients and the working poor are generally older with higher mileage. This problem is exacerbated by policies that provide an asset exemption for a set value amount. Older vehicles are costlier to maintain and emit more air pollutants than their newer counterparts.⁵ Further, personal vehicle promotion strategies can also lead to increased congestion, especially in urban areas.

Despite these arguments, several states have adopted measures to facilitate car access or ownership among current and former welfare recipients. Table 1 presents a comparison of Tennessee’s transportation-related benefits with its eight neighboring states. All of these states permit an asset exemption, ranging from a low of \$1,500 in Mississippi to a high of the value of one vehicle in several states. In addition to asset exemptions and the other programs listed in Table 1, a number of other unique transportation benefit programs can be found in the U.S. As noted above, Tennessee’s *First Wheels* program provides zero-interest loans for the purchase of a pre-owned automobile. Wisconsin and Michigan also offer low interest loans while Texas, Maryland, and Colorado operate in conjunction with nonprofit car donation programs. Virginia and Ohio allow the purchase and resale of government vehicles. New York provides participants with mechanical training and then allows them to purchase cars they have re-conditioned.

Given that promoting car ownership has already become an important policy goal for many states, understanding the impacts of these programs on employment outcomes is vital to recognizing whether the stated objectives—namely increased employment rates—are likely to be met. Following a review of the prior literature in Section 3, we turn to a discussion of our data and methods in Section 4. Section 5 presents results, and Section 6 concludes.

² For more discussion, see Ihlanfeldt and Sjoquist (1998), Preston and McLafferty (1999), or Blumenberg and Waller (2003).

³ See Davis and Johnson (1984), and Cervero (1997).

⁴ Research in this area is sparse and focuses on loan or lease default rates. A study of five programs places the default rate between 2 and 7 percent and as high as 17 percent when additional criteria are considered, such as maintaining employment for the duration of the payment period (Port JOBS, 2001).

⁵ Older vehicles are subject to less stringent emission standards, and emission control systems deteriorate over time. For more discussion, see Barbour (2003).

Table 1: Transportation Benefits in Tennessee and Neighboring States

State	Vehicle Asset Limit	Reimbursement	Bus Passes	Repair Allowance	Other
Alabama	Value of one vehicle	\$32 per month	X		County specific solutions in rural areas.
Arkansas	Value of one vehicle		X	X	County specific solutions.
Georgia	\$4,650	State: \$3 per day County: \$25 per month	X	X	
Kentucky	Value of one vehicle			X Up to \$300 per year.	Regional providers and districts provide payment and coordinate transportation.
Mississippi	\$1,500	\$.20 per mile up to \$8 per day	X		
Missouri	Value of one vehicle	\$5 per day			
North Carolina	\$5,000	Allowances determined at local level.			
Tennessee*	\$4,600	\$6 per day**	X	X Up to \$800 per year.	
Virginia	\$7,500	No specific limit or cap.			Benefits paid from overall work program allocation.

Source (except Tennessee): Maiers, Paul. "June, 1999 Transportation in Welfare Reform." Office of Family Assistance.

*Source (Tennessee): Tennessee Department of Human Services. "Families First Handbook" 2000.

Reimbursement rate reduced to \$4 per day as of July 1, 2003.

3. Prior Research

The primary objective of TANF is to encourage self-sufficiency among recipients. Employment has been identified as a means to this end, which makes identifying and removing barriers to employment a key concern. Program participants and administrators consistently identify transportation as an important barrier to employment.⁶ Reasons for the transportation difficulties are well documented. Welfare recipients often live within inner-city areas which are frequently isolated from suburban jobs, and they are often poorly qualified for jobs in the central business district.⁷ Transportation also affects the job-search area, as many entry-level positions require applying in person for face-to-face interviews.⁸

Transportation difficulties among current and former Tennessee welfare recipients are consistent with the recent literature. A 2002 study of welfare leavers found that 6.5 percent of unemployed leavers identified lack of adequate transportation as prohibiting employment (Perkins and Homer, 2002). Consistent with “spatial mismatch,” leavers in urban counties reported transportation difficulties more often than those in rural counties. Lack of a reliable car and limited public transportation were the concerns most often reported by welfare recipients; again the transportation problems were more common for urban residents (Social Work Office of Research and Public Service, 2003).

A number of studies have examined the effects of labor market conditions on welfare dynamics. Blumenberg and Ong (1998) examine access to low-wage jobs and find that those who live in areas of greater job concentration are less likely to be on welfare. However, even among those living in job-rich areas, most work outside of their immediate living area. This study, along with others discussed below, makes use of data from urban California. Consequently, its applicability for policy makers in other areas may be somewhat limited.

Given the above, one would expect that improved transportation might increase employment levels. Cervero, Sandoval, and Landis (2002) find that among forms of transportation, private and public, private mobility is most effective in moving participants from welfare to work. Data limitations in their work, including a rather small sample size, the use of pre-TANF data, and a focus on urban California residents, indicate that findings may not apply in other areas and more recent time periods.⁹ However, the general association of car ownership and improved employment levels has been consistently established elsewhere in the literature.¹⁰

⁶ See Blumenberg and Ong (1999), Cox, et al. (2000), Ebener and Klerman (1999), Fein, et al. (1998), Iowa Department of Human Services (2002), Julnes and Halter (2000), Owen, et al. (2000), and Social Research Institute (1999) for empirical evidence.

⁷ For more discussion, see Bania, Coulton, and Leete (1999), Holzer (1999), Rich (1999), Kain (1992), and Kasarda (1980).

⁸ See Henly (1999), and Ong and McConville (2001).

⁹ Cervero, Sandoval, and Landis (2002) use a multinomial logit to estimate AFDC and employment transitions. Their Alameda County, California sample consists of two points in time and 466 individuals of which only 66, or about 7 percent, transition into employment.

¹⁰ See Ong (1996), Blumenberg and Waller (2003), and the references therein. Ong’s sample included four counties and consisted of 1,112 observations from 1993-1994 AFDC-FC recipients. Owning a car increased employment by 12 percentage points, monthly hours by 23, and monthly earnings by \$152.

Several studies have proceeded beyond association to causality. These studies control for the simultaneity of the car ownership/employment decision either by using the instrumental variable approach or panel data. Again, the evidence is largely consistent with car ownership accounting for higher levels of employment (Raphael and Stoll, 2000; Raphael and Rice, 2002; Ong, 2002; Cervero, Sandoval and Landis, 2002). Differences in car ownership rates have been shown to account for a portion of inter-racial employment gaps, including 43 percent of the black-white differential (Raphael and Stoll, 2000). Evidence also suggests that car ownership increases hours worked (Ong, 1996; Raphael and Rice, 2002). Raphael and Rice (2002) find a negative relationship between hourly wage rates and car ownership. However, failure to control for urban and rural differences may be driving this result as those in rural areas are more likely to own cars and to work for lower wages.

We extend the literature in a variety of ways. First, we use a transition analysis similar to that of Cervero, Sandoval, and Landis (2002) along with panel data to account for the possibility that being employed leads to car ownership or access. This approach overcomes the difficulties of finding appropriate instrumental variables.¹¹ In addition, instead of measuring car ownership, our data provide a proxy for car access (study participants were asked whether anyone in their household owned a vehicle). This distinction is potentially important as household members are likely to share use of a vehicle, making access more relevant than ownership when considering employment benefits.

Further, earlier work either did not control for urban and rural differences or relied on a primarily urban sample. Ong (2002), and Cervero, Sandoval, and Landis (2002) use data from urban areas of Los Angeles and Alameda Counties in California, respectively. Raphael and Rice (2002) and Raphael and Stoll (2002) use national Survey of Income and Program Participation (SIPP) data, however, the former study does not control for urban and rural differences, and the latter focuses exclusively on 242 metropolitan areas. Our data include both urban and rural residents from across the state of Tennessee. This distinction is important to state policy makers as differences in transportation needs and employment opportunities affect the potential benefits of a wide-scale personal vehicle promotion program.

While there is strong and consistent evidence that car ownership improves the probability of being employed, the effects of car ownership on hours and wages are sparsely documented. Our analysis explores each of these employment outcomes. Finally, our rich survey data permit a comparison of different samples: all survey respondents (including those who had recently left the welfare rolls), those who were program participants at the time of the survey, and the subset of program participants for whom a work requirement was in effect.¹²

¹¹ Raphael and Stoll (2000), Raphael and Rice (2002), and Ong (2002) use an instrumental variable approach to overcome the simultaneity problem.

¹² There is evidence that evaluating low-income households separately is appropriate for policy questions as it has been shown that poor households respond differently to factors influencing automobile ownership (Gardenhire and Sermons, 1998).

4. Data and Estimation Procedure

Data for this analysis are taken from the first four Waves of the *Family Assistance Longitudinal Study* (FALS).¹³ The respondents include a large sample of individuals who were on Tennessee's welfare program, *Families First*, as of January 2001. Maximum sample sizes are 1,935, 1,474, and 1,810, and 1,919 for each of the four Waves.¹⁴

We exploit the panel nature of the FALS data in order to control for the simultaneity of car access and employment. Specifically, we estimate the effects of car access in one Wave of the survey on employment (and program participation) in a subsequent Wave. Due to the larger sample sizes in Waves 1 and 4 of the survey and the length of time (18 to 24 months) between these two Waves, these two endpoints are selected for the analysis. While this approach does not completely control for simultaneity, experimentation with alternative estimation techniques led us to prefer it over less reliable instrumental variables approaches.¹⁵

Multinomial logits are used to estimate the effects of Wave 1 explanatory variables (including demographics) on the probabilities of making transitions from being on FF in Wave 1 to being in one of four employment and FF participation categories as of the Wave 4 survey.¹⁶ These categories are unemployed/on FF, unemployed/off FF, employed/on FF, and employed/off FF. Separate multinomial logits are estimated for those who were unemployed and those who were employed in Wave 1. This approach allows us to assess the impact of car access on transitions off welfare and into employment. In addition to the multinomial logit transition analysis, Heckman selection regressions are estimated to evaluate the effects of car access and other factors on hours worked per week and average hourly wages.

Following Cervero, Sandoval and Landis (2002), we include three variables to measure car access. The first indicates whether the participant had access to a car in Wave 1. The remaining two variables account for the effects of gaining or losing access to a car between Waves 1 and 3.

We include a variety of control variables in all multivariate models. The age of the survey respondent is entered in quadratic form. Education variables consist of dummies for less than or more than high school, with high school graduate (and nothing more) as the reference category. We also include three dummies for participation in GED courses, vocational training, and Fresh Start (a program that provides basic job market survival skills). In models that are not restricted to participants with work requirements, we control for work requirement status with an additional dummy variable. Marital status enters in the form of dummies for divorced (including married but separated) and committed (including married, engaged, or living together), with single being the

¹³ The FALS is an ongoing collaborative effort of the Tennessee Department of Human Services, the Bureau of Business and Economic Research/Center for Manpower Studies at the University of Memphis, and the Social Work Office of Research and Public Service, the Center for Literacy Studies, and the Center for Business and Economic Research, all at the University of Tennessee in Knoxville. As of this writing, the fifth Wave was entering the field.

¹⁴ Observations from two over-sampled groups (those referred to or participating in Adult Basic Education or Family Services Counseling) are omitted from our analysis. While a direct analysis of *First Wheels* participants would be useful, sample sizes of *First Wheels* participants in the FALS data are unfortunately too small.

¹⁵ We experimented with county-level instruments using such things as automobile insurance costs and local vehicle taxes, but all of our chosen instruments turned out to be quite weak.

¹⁶ See Green (2003, pages 720-723) for more information on multinomial logit models.

reference category. We control for race using a series of three indicators for White, Hispanic, and other race, with Black serving as the reference category. We also include the number of non-caretaker adults in the household, the dollar amount of spouse's earnings, and a dummy for whether child care was being provided by one of the child's parents as control variables.¹⁷ Region-level controls consist of county population density, a dummy for residence in one of the four major urban counties, and the county's unemployment rate at the time of the survey.¹⁸

Summary statistics for all variables used in the analysis can be found in the Appendix Table. To highlight a few of the key variables, we first note that 36 percent of all respondents were employed as of Wave 1. This rate increases to 42 percent as of Wave 4. The Wave 1 employment rate among FF participants was slightly lower at 29 percent, while about one-third of those FF participants with work requirements were employed. Employment rates as of Wave 4 rose to 40 and 45 percent for these two sub-samples, respectively. Nearly three-quarters of the Wave 1 respondents were participating in FF at the time of the Wave 1 survey, a participation rate that falls to 55 percent in Wave 4. Average weekly hours of work in Wave 4 ranged from 33 to 35 for the three groups, while hourly wages were on the order of \$7.75 to \$8.00. Nearly half of the respondents reported having access to a car in Wave 1 (43 percent of FF participants and 44 percent of FF participants with work requirements). Roughly 30 percent either lost or gained access to a car between Waves 1 and 3.

¹⁷ Due to data inavailability in earlier Waves, spouse's earnings are taken from the Wave 3 data.

¹⁸ Unemployment for June of 2002 was collected from the Bureau of Labor Statistics. Population and land area data are from the U.S. Census Bureau, 2000 Census (<http://factfinder.census.gov/servlet/BasicFactsServlet>). The four urban counties (and the cities they contain) are Shelby (Memphis), Davidson (Nashville), Hamilton (Chattanooga), and Knox (Knoxville). These counties account for nearly two-thirds of Tennessee's welfare caseload.

5. Results and Discussion

Preliminary Transition Matrix Analysis

Before undertaking multivariate analysis, it is instructive to examine the relationships between employment, program participation, and car access in isolation. Table 2 presents two transition matrices, one for program participants and another for program participants with work requirements. Casual observation indicates that the data support earlier findings: car access does seem to improve subsequent employment rates. Wave 1 program participants were generally more likely to be employed in Wave 4 if they had access to a car in Wave 1 (regardless of program participation status in Wave 4). Car access in Wave 1 also generally reduced the likelihood of remaining on FF in Wave 4. These findings are also observed among Wave 1 program participants with work requirements.

Table 2: Program and Employment Transitions Between Wave 1 and Wave 4

Wave 1 Status			Wave 4 Status			
			Unemployed		Employed	
			On Program	Off Program	On Program	Off Program
All Program Participants	All	Unemployed (N=777)	53.53	16.25	11.96	18.26
		Employed (N=299)	26.73	7.26	23.76	42.24
	No Car	Unemployed (N=447)	57.76	15.09	10.99	16.16
		Employed (N=136)	34.03	5.56	25.00	35.42
	Car	Unemployed (N=329)	47.56	17.68	13.41	21.34
		Employed (N=163)	20.13	8.81	22.64	48.43
Program Participants with Work Requirements	All	Unemployed (N=154)	51.11	13.89	13.89	21.11
		Employed (N=144)	26.95	7.19	25.75	40.12
	No Car	Unemployed (N=94)	53.55	15.17	11.85	19.43
		Employed (N=73)	32.53	6.02	31.33	30.12
	Car	Unemployed (N=60)	47.30	12.16	16.89	23.65
		Employed (N=71)	21.43	8.33	20.24	50.00

Entries are row percentages, which might not sum to 100 percent due to rounding.

Source: Authors' calculations using the Family Assistance Longitudinal Study (random sample only).

Multivariate Analysis of Employment and Program Participation

Table 3 presents results of the multinomial logit analysis for those on the program and unemployed in Wave 1. The first four columns of numbers represent marginal effects on the probability of being in each of the four categories given a one-unit change in each explanatory variable, holding all other variables constant at their mean values.¹⁹ The last four columns present results for a sub-sample of the first group—unemployed program participants with a work requirement in Wave 1.

To interpret the results in this table, consider the marginal effects associated with the car access variables in the model. Among these unemployed program participants, having car access in Wave 1 decreases the probability of remaining unemployed and on FF by 9.78 percentage points (or about 16 percent, given that the overall probability of this outcome is 62.64 percent). The increase in the probability of becoming employed and leaving the program is quite substantial, at 7.96 percentage points or about 59 percent. Car access, including gaining or losing a car between Waves 1 and 3, has no statistically significant effects on the other two transitions among the group of all program participants. Note that this result pertains to all FF participants, including those who are exempt from work requirements (many of whom are not able to work).

To investigate the effects of car access on those who may be most likely to benefit from it, we repeat the analysis for those FF participants with work requirements (columns 5 through 7 of Table 3). There are two statistically significant effects of car access among this sub-sample. Access to a car in Wave 1 dramatically reduces the probability of remaining unemployed but moving off the program (by 10.91 percentage points, or about 69 percent). Gaining car access between Waves 1 and 3 of the survey increases the probability of becoming employed and leaving the program by 20.56 percentage points or over 100 percent.

The analysis in Table 3 was duplicated for those who were on the program and *employed* in Wave 1, and results are presented in the same format in Table 4. Among all employed program participants in Wave 1, having access to a car in Wave 1 reduced the probability of becoming unemployed while remaining on the program by 25.96 percentage points (88 percent) and increased the probability of remaining employed but leaving the program by 27.92 percentage points (41 percent). Restricting the analysis to employed Wave 1 program participants with work requirements, we find similar but larger effects. Overall, the results are consistent and indicate large and significant benefits from car access in encouraging self-sufficiency through employment.

¹⁹ For dummy variables, the marginal effect represents the change in the particular probability given a change in the dummy variable from 0 to 1.

Table 3: Multinomial Logit Results -- Wave 1 to Wave 4 Transitions for Unemployed Wave 1 Program Participants

Variables	All Program Participants (N=611)				Program Participants with a Work Requirement (N=283) [^]		
	Unemployed		Employed		Unemployed	Employed	
	On Program	Off Program	On Program	Off Program	On Program	On Program	Off Program
Car in Wave 1	-9.78 *	-1.40	3.22	7.96 *	0.68	-10.91 *	10.23
	(5.88)	(4.20)	(2.99)	(4.12)	(8.95)	(6.47)	(7.28)
Lost Car Access	4.73	-6.74	1.63	0.38	-4.82	-1.48	6.30
	(6.84)	(4.86)	(3.48)	(4.27)	(12.13)	(10.17)	(10.08)
Gained Car Access	-5.88	-1.17	0.15	6.90	-16.18	-4.39	20.56 *
	(6.43)	(4.71)	(3.12)	(4.95)	(11.49)	(5.96)	(10.75)
Age	-20.01	-8.93	23.41 **	5.53	14.06	-2.28	-11.79
	(18.88)	(10.96)	(10.69)	(17.01)	(28.74)	(20.71)	(24.78)
Age ²	4.09	1.88	-4.40 ***	-1.57	-1.71	0.95	0.76
	(2.91)	(1.57)	(1.67)	(2.78)	(4.41)	(3.12)	(3.90)
Density	0.22	0.15	-0.73	0.36	-0.57	1.83	-1.27
	(1.29)	(1.08)	(0.54)	(0.79)	(2.46)	(2.29)	(1.56)
Urban	-2.02	-3.81	9.62 **	-3.79	21.50	-31.14	9.64
	(13.67)	(11.65)	(4.39)	(8.91)	(30.72)	(33.44)	(13.87)
Divorced	-2.24	5.47	-0.27	-2.97	-3.71	-3.13	6.84
	(6.16)	(5.27)	(2.81)	(3.35)	(9.56)	(6.74)	(7.54)
Committed	1.34	1.95	-1.72	-1.57	18.33 *	-11.23 *	-7.09
	(8.50)	(6.33)	(3.71)	(4.99)	(10.06)	(6.16)	(8.34)
Other Adults in Household	-2.93	3.53 **	-1.11	0.52	-3.90	2.48	1.42
	(2.39)	(1.43)	(1.65)	(1.70)	(4.58)	(3.08)	(3.69)
Less than High School	13.53 ***	-3.76	-0.31	-9.46 ***	11.29	1.32	-12.61 **
	(4.59)	(3.39)	(2.31)	(2.84)	(7.96)	(6.49)	(5.36)
More than High School	2.35	-7.11 *	1.30	3.46	-3.97	-1.03	5.00
	(5.84)	(4.09)	(2.76)	(3.69)	(8.57)	(6.68)	(6.19)
Spousal Earnings	-3.74 **	3.03 ***	-0.53	1.24	-5.10 **	3.59 ***	1.54
	(1.90)	(0.87)	(0.90)	(0.81)	(2.24)	(1.34)	(1.31)
Parent Provided Child Care	10.77 **	-5.56	-2.96	-2.26	-13.66	0.33	13.33
	(5.47)	(3.96)	(2.35)	(3.53)	(12.49)	(9.02)	(10.78)
Unemployment	-0.81	0.46	0.40	-0.06	-3.34	1.08	2.26
	(1.78)	(1.19)	(0.85)	(1.05)	(2.96)	(2.25)	(1.79)
White	-13.65 **	8.39	0.27	4.99	-7.19	2.93	4.25
	(6.42)	(5.21)	(3.13)	(3.99)	(8.91)	(6.83)	(6.89)
Hispanic	-0.53	28.53	-10.47 ***	-17.53 ***	-39.89	62.04 **	-22.15 ***
	(23.58)	(23.55)	(1.76)	(1.95)	(25.42)	(25.49)	(3.38)
Other Race	-28.69 **	12.25	3.69	12.75	-43.86 **	11.23	32.62
	(13.87)	(15.97)	(9.26)	(13.19)	(21.12)	(19.55)	(22.27)
Work Requirement	-6.01	0.44	2.14	3.43	n.a.	n.a.	n.a.
	(4.48)	(3.48)	(2.01)	(2.83)	n.a.	n.a.	n.a.
GED Training	1.81	3.14	-0.80	-4.16	2.77968	4.74	-7.52
	(5.02)	(4.21)	(2.21)	(2.91)	(7.53)	(6.41)	(5.49)
Vocational Training	7.37	-1.29	-3.00	-3.08	2.63	-0.87	-1.75
	(6.52)	(5.55)	(2.33)	(3.28)	(8.47)	(6.72)	(5.63)
Fresh Start	-1.78	-1.40	2.58	0.61	4.13	-10.94 **	6.81
	(5.99)	(4.68)	(2.98)	(3.78)	(7.81)	(5.12)	(6.74)
Mean Probability	62.64	15.98	7.98	13.40	66.81	15.92	17.27

Entries are marginal effects and standard errors in parentheses.

* Significant at the 10 percent level; ** Significant at the 5 percent level; *** Significant at the 1 percent level.

[^]The probability of transitioning from unemployed on the program (Wave 1) to employed on the program (Wave 4) was .0014 percent precluding the calculation of meaningful marginal effects. Results are available upon request.

Table 4: Multinomial Logit Results -- Wave 1 to Wave 4 Transitions for Employed Wave 1 Program Participants

Variables	All Program Participants (N=235)				Program Participants with a Work Requirement (N=125) [^]		
	Unemployed		Employed		Unemployed	Employed	
	On Program	Off Program	On Program	Off Program	On Program	On Program	Off Program
Car in Wave 1	-25.96 *** (10.13)	-1.96 (2.30)	0.00 (0.26)	27.92 *** (10.15)	-34.64 ** (14.76)	-0.37 * (0.19)	35.01 ** (14.78)
Lost Car Access	14.01 (15.90)	3.62 (5.12)	0.02 (0.33)	-17.65 (14.97)	27.53 (23.17)	0.07 (0.21)	-27.59 (23.10)
Gained Car Access	5.25 (12.47)	-0.64 (1.14)	-0.35 (0.22)	-4.26 (12.63)	14.40 (21.61)	-0.17 * (0.09)	-14.22 (21.64)
Age	82.37 ** (41.44)	-6.62 * (3.98)	-0.64 (0.90)	-75.11 * (41.05)	56.47 (52.43)	0.45 (0.85)	-56.92 (52.57)
Age²	-14.46 ** (6.68)	1.04 * (0.60)	0.07 (0.14)	13.34 ** (6.59)	-9.48 (8.10)	-0.07 (0.14)	9.55 (8.12)
Density	-1.44 (2.69)	0.57 (0.51)	-0.11 * (0.07)	0.99 (2.74)	3.56 (4.00)	-0.06 (0.07)	-3.50 (4.01)
Urban	11.99 (27.52)	-3.00 (7.74)	1.70 ** (0.82)	-10.69 (28.21)	-47.72 (48.52)	0.39 (0.40)	47.33 (48.53)
Divorced	9.17 (11.10)	-0.55 (1.37)	0.05 (0.28)	-8.67 (11.17)	-4.57 (14.98)	-0.03 (0.12)	4.60 (14.99)
Committed	51.82 *** (15.86)	13.12 (11.77)	-0.21 (0.36)	-64.72 *** (9.32)	79.54 *** (8.37)	-0.09 (0.14)	-79.46 *** (8.35)
Other Adults in Household	7.45 (4.68)	-2.61 * (1.52)	0.06 (0.14)	-4.90 (4.80)	4.25 (7.45)	-0.10 (0.10)	-4.14 (7.48)
Less than High School	17.83 * (10.13)	-0.65 (1.01)	-0.21 (0.21)	-16.96 (10.35)	14.17 (14.87)	-0.15 (0.16)	-14.02 (14.88)
More than High School	-8.93 (9.72)	0.21 (1.21)	-0.31 (0.22)	9.03 (9.74)	-3.11 (14.35)	-0.15 (0.12)	3.25 (14.37)
Spousal Earnings	-4.87 * (2.79)	0.10 (0.11)	-4.64 *** (0.82)	9.41 *** (2.91)	-10.12 ** (4.74)	-1.73 *** (0.52)	11.85 ** (4.85)
Parent Provided Child Care	15.32 (13.62)	-0.90 (0.80)	-0.16 (0.29)	-14.26 (13.60)	15.76 (22.14)	0.05 (0.20)	-15.81 (22.15)
Unemployment	-6.32 * (3.65)	0.17 (0.30)	0.19 * (0.11)	5.96 (3.67)	-13.32 ** (6.65)	-0.02 (0.06)	13.33 ** (6.66)
White	-28.05 *** (9.10)	53.22 *** (20.30)	-0.16 (0.23)	-25.01 (20.46)	-15.42 (19.37)	-0.06 (0.15)	15.48 (19.41)
Hispanic	-32.28 *** (4.78)	-1.39 (0.99)	-0.66 *** (0.12)	34.33 *** (4.70)	-34.78 *** (8.21)	-0.27 *** (0.08)	35.05 *** (8.22)
Other Race	-29.25 *** (4.56)	-1.25 (0.90)	99.47 *** (1.56)	-68.97 *** (4.54)	-26.34 *** (7.03)	99.85 *** (0.69)	-73.51 *** (7.04)
Work Requirement	4.19 (8.04)	-0.12 (1.00)	0.29 (0.22)	-4.35 (8.08)	n.a. n.a.	n.a. n.a.	n.a. n.a.
GED Training	-0.18 (12.58)	0.24 (0.99)	0.08 (0.36)	-0.14 (12.49)	11.95 (19.27)	-0.06 (0.12)	-11.89 (19.28)
Vocational Training	1.21 (15.23)	-0.91 (0.91)	0.04 (0.42)	-0.34 (15.15)	-7.65 (16.29)	0.02 (0.24)	7.62 (16.27)
Fresh Start	-1.09 (10.08)	1.71 (2.25)	-0.21 (0.23)	-0.41 (10.43)	10.34 (13.75)	-0.15 (0.19)	-10.19 (13.78)
Mean Probability	29.53	1.28	0.61	68.58	27.35	0.22	72.43

Entries are marginal effects and standard errors in parentheses.

* Significant at the 10 percent level; ** Significant at the 5 percent level; *** Significant at the 1 percent level.

[^] A very small number of respondents (7) made the transition from employed on the program (Wave 1) to unemployed off the program (Wave 4), which precluded the calculation of marginal effects.

A model excluding this category yielded qualitatively similar results for the other three transition choices.

Multivariate Analysis of Hours Worked and Average Hourly Earnings

Table 5 presents the results from Heckman selection regressions of hours worked in Wave 4.²⁰ Explanatory variables remain the same as those in the preceding multinomial logit analysis, and results for all study respondents, program participants, and program participants with a work requirement are presented separately. For the most part, car access does not seem to be an important determinant of work hours. However, among Wave 1 program participants with work requirements, gaining access to a car between Waves 1 and 3 increases work hours in Wave 4 by nearly 9 hours. The lack of a strong effect of car access overall may be indicative of a general inability among the samples in question to alter their hours of work. Having access to a car might increase one's ability to find and keep a job, but the jobs are likely to be characterized by standard labor hours contracts (e.g., with a 40-hour work week).

Survey evidence adds credence to this contention that employers generally offered a limited set of available hours. Participants were asked how many hours per week they usually worked and responses from Wave 4 are outlined below. The most frequent response was 40 hours per week (34 percent). Other common responses were 20 hours (7 percent), 30 hours (9 percent), 35 hours (9 percent), and 50 hours (3 percent). The average number of hours worked was 34 and the majority of respondents reported that they usually worked less than 40 hours per week (54 percent), suggesting that full-time employment opportunities might have been limited. Fifteen percent worked 20 or fewer hours per week and 39 percent worked between 20 and 39 hours per week. Twelve percent of the respondents reported working more than 40 hours per week.

Regression results for hourly wages are reported in Table 6. We find that Wave 1 car access increases Wave 4 average hourly wage for all three of our samples. In fact, the increases are quite large, ranging from \$0.70 per hour for all respondents to \$2.06 for Wave 1 program participants. Losing car access between Waves 1 and 3 reduces the Wave 4 wage by slightly more than one dollar per hour among all respondents. Even though car access has little to no effect on hours of work, it does seem to enable respondents to find better-paying jobs.

²⁰ We employ a two-stage selection model to account for the fact that hours and wages are only observed for working respondents. The identification variables for the first-stage employment probit are the household's unearned income (as of Wave 3) and the number of children under age 18 in the household (as of Wave 1). Results from first-stage probits are available upon request.

Table 5: Determinants of Wave 4 Work Hours

Variables	All Respondents (N=1,273)	Wave 1 Program Participants (N=939)	Wave 1 Program Participants with a Work Requirement (N=460)
Car in Wave 1	0.18 (2.36)	-1.65 (2.45)	4.44 (2.96)
Lost Car Access	-2.30 (1.63)	-1.32 (2.11)	-1.96 (2.74)
Gained Car Access	1.30 (1.69)	2.07 (1.99)	8.65 *** (2.96)
Age	9.56 (6.82)	3.18 (6.54)	8.40 (12.30)
Age ²	-1.30 (1.14)	-0.38 (1.08)	-1.92 (1.97)
Density	0.45 (0.30)	0.66 * (0.39)	0.26 (0.56)
Urban	-4.23 (3.15)	-7.34 * (4.01)	-3.29 (6.13)
Divorced	-0.44 (1.66)	1.20 (2.10)	6.02 ** (3.01)
Committed	-0.80 (2.26)	2.37 *** (2.95)	2.81 (3.35)
Other Adults in Household	0.01 (0.74)	0.78 (0.97)	-0.35 (1.92)
Less than High School	-2.40 (2.22)	-1.38 (2.32)	-2.69 (2.60)
More than High School	-2.38 (1.49)	-3.74 ** (1.64)	-3.28 (2.58)
Spousal Earnings	-0.20 (0.20)	-0.44 (0.33)	-0.16 (0.38)
Parent Provided Child Care	0.92 (1.85)	3.19 (2.08)	4.52 (2.92)
Unemployment	-0.63 (0.47)	-0.87 (0.53)	-0.81 (0.71)
White	0.80 (1.78)	-0.47 (2.15)	-2.72 (2.81)
Hispanic	-1.97 (8.79)	-10.93 ** (5.58)	-8.41 (6.91)
Other Race	-5.97 (4.77)	-5.32 (5.26)	-6.11 (6.22)
Work Requirement	-0.22 (1.06)	1.13 (1.40)	-4.187118 2.494452
GED Training	0.55 (1.65)	0.26 (2.01)	1.81 * (3.05)
Vocational Training	0.74 (2.36)	2.19 (2.54)	-0.15 (2.22)
Fresh Start	-1.39 (1.48)	-1.61 (1.93)	20.31 (18.98)
Constant	27.41 (16.16) *	40.36 *** (13.43)	22.07 (18.33)

Note: Entries are coefficients from the second stage of a two-stage Heckman selection model, with standard errors in parentheses.

* Significant at the 10 percent level; ** Significant at the 5 percent level; *** Significant at the 1 percent level.

Table 6: Determinants of Wave 4 Hourly Wages

Variables	All Respondents (N=1,273)	Wave 1 Program Participants (N=939)	Wave 1 Program Participants with a Work Requirement (N=463)
Car in Wave 1	0.70 *	2.06 ***	1.70 **
	(0.42)	(0.54)	(0.76)
Lost Car Access	-1.06 ***	-0.82	-0.61
	(0.37)	(0.59)	(0.84)
Gained Car Access	0.39	0.69	1.13
	(0.48)	(0.69)	(1.12)
Age	1.79 *	2.09	2.12
	(1.04)	(1.90)	(4.14)
Age ²	-0.24	-0.43	-0.43
	(0.15)	(0.29)	(0.61)
Density	0.14	0.12	-0.20
	(0.09)	(0.12)	(0.18)
Urban	-1.15	-0.69	3.10 *
	(0.84)	(1.26)	(1.86)
Divorced	-0.38	-0.09	0.89
	(0.37)	(0.56)	(0.80)
Committed	0.04	-1.20	-0.97
	(0.50)	(0.88)	(1.28)
Other Adults in Household	0.05	-0.39	-0.69
	(0.22)	(0.31)	(0.63)
Less than High School	-0.50	-1.43 ***	-1.81 **
	(0.41)	(0.45)	(0.80)
More than High School	1.33 ***	1.47 ***	1.09
	(0.34)	(0.52)	(0.70)
Spousal Earnings	-0.03	-0.11	-0.08
	(0.05)	(0.08)	(0.09)
Parent Provided Child Care	-0.83 ***	-1.02 *	-0.22
	(0.30)	(0.61)	(0.93)
Unemployment	0.08	0.23	0.55 **
	(0.11)	(0.16)	(0.27)
White	-0.46	-0.47	-0.27
	(0.51)	(0.66)	(1.03)
Hispanic	0.15	-0.70	0.32
	(0.90)	(2.47)	(3.01)
Other Race	0.30	0.90	2.00
	(0.72)	(1.14)	(1.56)
Work Requirement	0.18	0.40	n.a.
	(0.26)	(0.40)	n.a.
GED Training	-0.06	-0.49	n.a.
	(0.44)	(0.57)	n.a.
Vocational Training	0.00	-0.82	n.a.
	(0.58)	(0.66)	n.a.
Fresh Start	0.19	0.71	1.23 *
	(0.37)	(0.52)	(0.75)
Constant	4.05 **	-1.28	-3.69
	(1.88)	(3.32)	(8.14)

Note: Entries are coefficients from the second stage of a two-stage Heckman selection model, with standard errors in parentheses.

* Significant at the 10 percent level; ** Significant at the 5 percent level; *** Significant at the 1 percent level.

Effects of Education

Finally, it is interesting to note that education variables had surprisingly little explanatory power in employment transitions, although when significant, the effects followed predictable patterns.²¹ For unemployed participants as of Wave 1, less than a high school education increased the probability of remaining unemployed and on the program (13.53 percentage points) and decreased the probability of becoming employed and leaving the program (9.46 percentage points) relative to those with a high school degree (Table 3). The probability of becoming employed and leaving the program was also significantly lower (12.61 percentage points) for unemployed Wave 1 participants with a work requirement.

For employed program participants, less than a high school education led to a 17.83 percentage point (60 percent) increase in the probability of becoming unemployed and remaining on the program (Table 4). Having more than a high school education only had the effect of decreasing the probability that unemployed participants would remain unemployed but leave the program. The results generally indicate that a high school education is important for achieving better outcomes, particularly for the unemployed (presumably those with the largest skill deficits), and that obtaining education beyond a high school degree, all else equal, has little effect on employment and program participation outcomes.

The only significant effect of education in the hours estimation is that program participants with more than a high school education worked almost four fewer hours per week. This result is less puzzling in light of the hourly wage results, which indicate that participants with more education received higher wages allowing workers with more education to earn comparable wages in a shorter amount of time. In contrast to the employment transition results, education beyond high school leads to more favorable wage outcomes. Gaining high school education, all else equal, also appears beneficial. Participants (all and the sub-set with a work requirement) with less than a high school education earned between \$1.43 and \$1.81 less per hour than their counterparts with a high school education.

²¹ Less education was associated with fewer transitions into employment and off of the program, etc.

6. Conclusions

Early research into the effects of car ownership on employment has established a positive correlation between the two. Subsequent literature has moved toward causality by accounting for the simultaneity of employment and car ownership decisions using both instrumental variable and panel data approaches. We improve on the previous literature in several ways. First, we broaden the perspective to account for car access and not just car ownership. Second, we consider urban and rural differences rather than focusing only on urban welfare recipients. Finally, the rich survey data in the FALS allow for a more detailed analysis. Hours worked and hourly wages are considered as outcomes in addition to employment levels.

Our results are broadly consistent with those of earlier work. Our analysis of *unemployed* Wave 1 program participants reveals that those who had car access in the first Wave of the survey are much more likely to become employed and leave the program as of Wave 4 (18-24 months later). Among the subset of unemployed Wave 1 program participants who had work requirements, those who had access to a car in Wave 1 are dramatically less likely to remain unemployed and leave the program as of Wave 4. Results are similar in spirit for *employed* Wave 1 program participants, regardless of work requirement status. For this group, having access to a car in Wave 1 reduces the probability of becoming unemployed while remaining on the program and increases the likelihood of remaining employed but leaving the program.

While car access does not seem to be an important determinant of work hours for broader samples, we do find that gaining access to a car between Waves 1 and 3 increases Wave 4 work hours by nearly nine hours among Wave 1 program participants with work requirements. Car access also seems to enable respondents to find better-paying jobs. Wave 4 wages were \$0.72 to \$2.12 higher for those who had car access in Wave 1. All of these results suggest that car access is important to the labor market success of low-income households generally and welfare recipients more specifically.

Appendix Table: Summary Statistics

Variable	All Respondents		Wave 1 Program Participants		Wave 1 Program Participants with a Work Requirement	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Employment	0.36	0.48	0.29	0.45	0.33	0.47
Program Participation	0.71	0.45	1.00	0.00	1.00	0.00
Employment (Wave 4)	0.42	0.49	0.40	0.49	0.45	0.50
Program Participation (Wave 4)	0.55	0.50	0.61	0.49	0.61	0.49
Hours Worked per Week (Wave 4)	34.48	11.17	33.33	11.25	33.49	12.26
Hourly Wage (Wave 4)	7.98	3.37	7.75	3.23	7.81	3.59
Car Access	0.47	0.50	0.43	0.50	0.44	0.50
Lost Car Access (Wave 1 to Wave 3)	0.15	0.35	0.14	0.35	0.15	0.35
Gained Car Access (Wave 1 to Wave 3)	0.16	0.36	0.15	0.36	0.13	0.34
Age (Divided by 10)	2.93	0.79	2.94	0.81	2.93	0.72
Age ² (Divided by 100)	9.22	5.33	9.29	5.47	9.09	4.70
Density (Hundreds per Square Mile)	7.64	4.79	7.70	4.77	8.01	4.67
Urban	0.66	0.47	0.67	0.47	0.70	0.46
Divorced	0.28	0.45	0.27	0.45	0.30	0.46
Committed	0.10	0.30	0.10	0.30	0.08	0.27
Other Adults in Household	0.47	0.82	0.47	0.83	0.36	0.66
Less than High School	0.34	0.47	0.37	0.48	0.35	0.48
More than High School	0.23	0.42	0.23	0.42	0.31	0.46
Spousal Earnings (Wave 3, \$100/month)	0.53	2.68	0.39	2.24	0.49	2.46
Parent Provided Child Care	0.15	0.35	0.14	0.35	0.11	0.32
Unemployment Rate (%)	5.24	1.31	5.25	1.33	5.23	1.32
White	0.35	0.48	0.33	0.47	0.30	0.46
Hispanic	0.01	0.08	0.01	0.09	0.01	0.09
Other Race	0.01	0.12	0.01	0.11	0.01	0.12
Work Requirement	0.47	0.50	0.48	0.50	1.00	0.00
GED Training	0.20	0.40	0.21	0.41	0.25	0.43
Vocational Training	0.10	0.30	0.11	0.32	0.16	0.37
Fresh Start	0.14	0.35	0.16	0.37	0.23	0.42
Unearned Income (Wave 3, \$100/month)	3.03	5.12	3.06	3.44	2.89	3.13
Number of Kids Under Age 18 in HH	2.28	1.33	2.35	1.39	2.53	1.49
Maximum Sample Size	1,935		1,370		663	

Note: Sample sizes differ by variable and are available upon request. Statistics are calculated using Wave 1 data unless otherwise noted.

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