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We analyse the impact of the early 1990s welfare waivers and the 1996 TANF reform in the United States on at-risk mothers' labour supply behaviour using the PSID. We find that whereas the welfare waivers had limited impacts on at-risk mothers, the TANF reform played an important role in encouraging those mothers to increase their labour supply at the intensive margin.

Keywords: at-risk mothers, labour supply, welfare reform.

1. Introduction

A series of reforms were implemented in the United States with the objective of getting low income families into work. These welfare reforms include early 1990s waivers to Aid to Families with Dependent Children (AFDC) and the introduction of Temporary Assistance to Needy Families (TANF) in 1996.

There is general consensus in the literature (Blank Rebecca, 2002; Grogger and Karoly, 2005) that the reforms helped increase labour supply of low income mothers. Studies focused on pre-TANF period (Meyer and Rosenbaum, 2001) find significant impacts of welfare waivers whereas studies focused on post-TANF period (Kaushal and Kaestner, 2001) find important impacts of TANF on labour supply.

There is some heterogeneity on the relative importance of the waivers and the TANF in studies that have looked at both pre- and post-TANF period using Current Population Survey Data. Using a difference-in-differences approach and exploiting variation in implementation dates across states, O'Neil and Hill (2001) find that TANF had stronger impacts on employment. Using a triple differences approach, by also exploiting variation in education, Schoeni and Blank (2003) find that the waivers were more successful at increasing labour supply.

Our article contributes to the literature that has analysed the impact of the reforms using both pre- and post-TANF period data. We separately identify the impacts of the waivers and the TANF by using a different data set and identification strategy. We use Panel Study of Income Dynamics (PSID) data and a triple differences approach where we exploit variations in the timing of state implementation of welfare and variations in presence of children to identify the impact of the reforms.

One of the advantages of using PSID data is that its panel feature allows us to control for unobservables in a more robust way than in previous literature. We can therefore incorporate individual fixed effects in addition to state and time fixed effects in our models. We also estimate our models using both fixed effects ordinary least squares and maximum likelihood estimation with fixed effects à la

Mudlak. The latter strategy allows us to take into account the non-linearity of labour supply outcomes.

Our results suggest that whereas welfare waivers had limited impacts, TANF played an important role in encouraging at-risk mothers to increase labour supply at the intensive margin. In particular, we find that once we control for the discrete nature of labour force participation decisions, neither the waivers nor the TANF seem to have had significant impacts on employment. On the other hand, even after controlling for the censored nature of labour supply hours, we find that the TANF was important in driving up labour supply hours of at-risk mothers.

In Section 2, we provide background information on the reforms. We describe our data and empirical strategy in Section 3. We present our results in Section 4 and conclude in Section 5.

2. Welfare Reforms

The early 1990s saw the implementation of TANF-like waivers to the AFDC programme. There are substantial variations in the implementation of the waivers across states and in most states, the waivers were first implemented as pilot programmes in limited geographical areas before being expanded. The full scale TANF reform was implemented from September 1996 to May 1997. In this section, we briefly outline the three main components of the reforms: (i) stricter work requirements; (ii) time limits on benefits; and (iii) increased childcare funding.[2]

2.1 Work Requirement

In 1994, families on welfare were required to participate in work-related activities of at least 20 hours a week. Under TANF, work requirements were even stricter: Single parent families were required to engage in work related activities for at least 20 hours a week in 1997, increasing to 30 hours a week by 2000.

2.2 Time Limits

Although under AFDC recipients faced no time limits, under TANF recipients face a maximum federal lifetime limit of 60 months on benefits. Grogger and Karoly Lynn (2005) point out two effects. A mechanical effect occurs when individuals become automatically ineligible for welfare benefits after the expiry of the time limit. A behavioural effect occurs when forward-looking individuals leave welfare and work more today to preserve eligibility as a safety net for future hardships.

2.3 Child Care Subsidies

From 1996 to 2002, federal funding totalling more than $69 billion supported the childcare needs of low-income working families with a rise of 89 per cent in childcare funding between 1993 and 2000. As most childcare subsidies are conditioned on employment, one would expect that childcare subsidies provision would encourage work participation.

3. Data and Empirical Strategy

We use PSID data corresponding to years 1991–2001. The PSID is a longitudinal data set of individuals starting in 1968 and conducted yearly until 1997 when it was conducted biennially onwards.[3] We

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[2]Other reform components include family caps which can potentially affect fertility and therefore also affect labour supply decisions. The literature so far has found no conclusive impacts of the reform on fertility (Grogger and Karoly, 2005; Kaushal and Kaestner, 2001).

[3]For non-surveyed years after 1997, we impute values by taking the average of variables in the preceding and following years. In particular, respondents are asked about their hours of work in the previous year and about their current employment status. For example, in 1999 respondents are asked whether they are currently working and also about their hours of work in 1998. We consider a woman as employed in 1998 if we observe positive hours of work for 1998. On the other hand, hours of work for 1999 are constructed as the average hours of work in 1998 and 2000 if the woman states that she is employed in the current year and supplies positive hours in both 1998 and 2000. Robustness checks using only years will full data on labour hours are reported in panel (a) of Appendix Table A2 and are very similar to our main results.

Table 1. *Summary Statistics*

Variable	Treatment		Control	
	Mean	SD	Mean	SD
Proportion working	0.74	0.44	0.83	0.37
Hours of work (if > 0)	33.1	14.6	36.7	13.1
Wealth ($'000)	17.8	63.9	35.1	106
Years of schooling	11.4	1.11	11.7	0.90
Black	0.62	0.49	0.35	0.48
Age	34.5	7.35	35.0	9.03
Good health	0.82	0.39	0.85	0.35
Years of work experience	12.4	7.35	14.4	8.67
No. of observations	7874		1846	

limit the sample to young women aged between eighteen and forty-nine, who have high school education or less, and who have been single at some point before the reform.[4] A woman is considered at-risk of being on welfare if she has children under eighteen. Our treatment group therefore includes women with children and our control group women without children.

Summary statistics for are reported in Table 1. Families in treatment group tend to be poorer and more likely to be black than those in control group.

We exploit state variation in implementation dates to identify the impact of the 1996 reform separately from those of the early 1990s waivers. Implementation dates are based on information compiled by US Department of Health and Human Services. We also exploit differences between treatment and control groups to identify the average treatment effect, so that we use a triple differences strategy. We consider latent variable models:

$$Y_{ist}^* = \beta_{waiver}(Treatgroup_i^*Waiver_{st}) + \beta_{TANF}(Treatgroup_i^*TANF_{st}) + \beta_1 Treatgroup_i + \beta_2 Waiver_{st}$$
$$+ \beta_3 TANF_{st} + X_{ist}'\theta + \mu_{ist} + \varepsilon_{ist} \tag{1}$$

Our outcomes of interest are employment which is a dummy variable taking value one if the mother is employed and zero otherwise, and weekly hours of work which are censored at zero.

$Treatgroup_i$ is a dummy variable taking value one if individual i is an at-risk mother, $Waiver_{st}$ is a dummy variable taking value one if state s had a waiver in place in year t and $TANF_{st}$ is a dummy variable taking value one if state s had its TANF programme in place in year t.

X_{ist} is a vector of demographic and economic controls. Demographic controls include second order polynomials in age, wealth, unearned income, education, work experience before the reform, number of children aged 0–2, 2–5 and 5–18, dummy variables for health, ethnicity, homeownership and marital status. Economic controls include local average unemployment rate and average wage of childcare workers in the state of residence. μ_{ist} is a vector of state dummies, time dummies and individual fixed effects.

In addition, we construct the maximum potential Earned Income Tax Credit (EITC) benefits a family can receive. We include this variable to control for the potential effects of EITC changes in the 1990s.

We use two estimation strategies: ordinary least squares with fixed effects and maximum likelihood estimation with fixed effects à la Mundlak (1978). Although introducing a set of fixed effect dummies in a linear regression model would yield unbiased estimates, introducing a set of fixed effect dummies

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[4]Our rationale in limiting the sample to women who have been single at some point before the reform is to consider "broken" families. We conducted robustness checks by dropping any women who got married or partnered from the sample and our results and conclusions remain unaffected.

in a non-linear regression model may lead to the incidental parameters problem. We therefore use a Mundlak type assumption that the fixed effects can be modelled as a linear function of the means of the exogenous explanatory variables. Under the assumption that the transitory error term is uncorrelated with the explanatory variables and is identically independently normally distributed, we can estimate the employment equations using random effects probit and the hours of work equations using random effects tobit.

4. Results

Results are reported in Table 2. In specification (1), we only control for state and time effects. From OLS regressions, the implementation of TANF seems to have had a significant and positive impact on employment of mothers. However, from maximum likelihood estimates, marginal effects evaluated at the mean although positive are small and insignificant. Also, the waivers did not seem to have had much impact on employment. We, however, recognise that it is possible that the TANF estimates are capturing some lagged impacts of the early waivers especially as some waiver components such as work requirements gave welfare recipients up to two years to comply with the requirements.

In specification (2), we also control for demographic variables. The estimated impact of TANF on employment is now smaller. In specification (3), we control for economic and EITC variables. Once again, TANF seems to have had positive and significant impacts on employment as compared to the waivers. On the other hand, once we control for the discrete nature of employment, from our maximum likelihood estimates, the impact of the reform on employment becomes once again statistically insignificant.

The introduction of TANF also seems to have had a positive and significant impact on labour supply of at-risk mothers at the intensive margin. Weekly hours of work seems to have increased by 3–5 hours on average conditional on working. As we control for demographic and economic variables,[5] the estimated impact of the TANF gets slightly smaller, but nevertheless stays positive and strongly significant in all specifications. The estimated impact of the reform on labour supply at the intensive margin is statistically significant and robust even when we control for censoring as can be seen from our maximum likelihood estimates.

Finally, we perform similar regressions as in equation 1 by interacting our $Treatgroup_i$ variable with year dummies instead of $Waiver_{st}$ and $TANF_{st}$. As can be seen in Table 3, from OLS fixed effects regressions, the welfare effects on employment and hours of work become statistically significant only from 1996 onwards which coincides with the TANF reform timing. Similar trends can be observed for hours of work from maximum likelihood estimates.

4.1 Sensitivity Analysis

To test for the validity of using women without children as control group, we perform similar analysis as in the trends test of Table 3 using sample periods without any reforms which could have affected our at-risk mothers. For this purpose, we ran regressions on the sample period from 1980 to 1985 which is prior to the Tax Reform Act of 1986 and find no statistically significant effects on our $Treatgroup_i$ variable interacted with year dummies. Similar analysis performed on the sample period between 1987 and 1989 which is before the EITC expansion of 1990 resulted in no statistically significant effect.[6]

Following Kaushal and Kaestner (2001), we also use married mothers as control group as additional sensitivity check. In other words, our treatment group is the same as before and consists of

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[5]Consistent with the literature, we also find that a fall in average unemployment rate in the state of residence leads to a rise in the labour supply of at-risk mothers at the intensive margin. In particular, a 1 per cent fall in average unemployment rate leads to an increase in labour hours of 0.67 significant at the 10 per cent level from our OLS regressions and an increase of 0.62 significant at the 1 per cent level from our MLE estimates. This suggests that the booming economy also played a role in encouraging labour supply in addition to the impacts of the reforms.

[6]Full tables are available upon request.

Table 2. *Welfare Reform Impacts*

	OLS fixed effects			Maximum likelihood		
	(1)	(2)	(3)	(1)	(2)	(3)
Employment						
Waiver	0.033 (0.028)	0.019 (0.028)	0.011 (0.028)	0.007 (11.22)	−0.009 (0.164)	0.015 (0.265)
TANF	0.079*** (0.024)	0.055** (0.024)	0.058** (0.023)	0.080 (141.6)	0.068 (1.247)	0.069 (1.297)
Hours work						
Waiver	2.178 (1.327)	1.363 (1.288)	1.221 (1.292)	0.068 (0.802)	0.318 (0.827)	0.185 (0.830)
TANF	5.249*** (1.146)	2.914*** (1.106)	3.390*** (1.103)	3.943*** (0.698)	2.939*** (0.736)	3.020*** (0.744)
Controls						
Demographic		✓	✓		✓	✓
Economic			✓			✓

Note: Standard errors (in brackets) for OLS regressions clustered at the respondent level. Marginal effects reported for maximum likelihood estimation. All regressions include a dummy variable taking value 1 if at-risk and a full set of time and state dummies. *significant at 10%, **significant at 5% and ***significant at 1%.

Table 3. *Trends Test*

	Employment				Hours work			
	OLS	SD	MLE	SD	OLS	SD	MLE	SD
Treatgroup*1992	−0.029	0.028	−0.030	0.534	0.380	1.383	0.081	1.132
Treatgroup*1993	−0.015	0.031	0.011	0.205	0.228	1.633	0.078	1.167
Treatgroup*1994	0.002	0.034	−0.006	0.118	1.891	1.430	1.384	1.194
Treatgroup*1995	0.042	0.035	0.046	0.932	1.648	1.432	1.541	1.221
Treatgroup*1996	0.076*	0.039	0.081	1.761	5.800***	1.781	4.812***	1.453
Treatgroup*1997	0.071	0.043	0.074	1.594	6.115***	1.877	4.462***	1.483
Treatgroup*1998	0.087**	0.039	0.066	1.382	6.528***	1.890	5.077***	1.522
Treatgroup*1999	0.090**	0.044	0.083	1.806	6.349***	2.112	4.673***	1.556
Treatgroup*2000	0.092**	0.042	0.077	1.659	6.677***	2.001	4.840***	1.646
Treatgroup*2001	0.116**	0.048	0.096	2.183	6.860***	2.233	5.493***	1.760

Note: Results reported for specification (3). *significant at 10%, **significant at 5% and ***significant at 1%.

at-risk mothers who were single before the reform and our control group consists of mothers who were married before the reform.[7] Seventy-eight per cent of married mothers were working which makes their employment mean closer to that of at-risk mother as compared with single women without children. The results based on using married mothers as control group are reported in Appendix Table A1. As can be seen from the table, all of our previous results are qualitatively similar to those of Table 2. We still find statistically insignificant impacts of welfare waivers. Similarly, the introduction of the TANF does not seem to have affected employment once we control for the discrete nature of employment decisions whereas it has led to statistically significant increases in labour supply at the intensive margin even when we control for censoring.

We present some further sensitivity analysis and additional results in Appendix Table A2. The PSID survey was conducted biannually from 1997 onwards. In panel (a), we present results using only years during which the survey was conducted. As can be seen from the table, all of our previous results still hold.

In panels (b) and (c), we perform similar regressions as in equation 1 but add an additional interaction term between our *Treatgroup$_i$* variable interacted with the reforms and a dummy variable taking value 1 if the woman has less than high school education and 0 otherwise. This additional interaction term is meant to capture the additional impact of the reform on at-risk mothers with less than high school education as opposed to at-risk mothers with high school education. As can be seen from panel (b), the reform had significant impact on labour hours of at-risk mothers with high school education. Similarly, from panel (c), the impact on at-risk mothers with less than high school education was statistically significant on labour supply even when we control for the non-linearity in labour supply outcomes. Thus, it seems that at-risk mothers with less than high school education increased their labour supply by more than at-risk mothers with high school education.

In panels (d) and (e), we perform similar regressions as in equation 1, but add an additional interaction term between our *Treatgroup$_i$* variable interacted with the reforms and a dummy variable taking value 1 if the woman has at least one child who is less than six and 0 otherwise. The rational is that women with younger children tend to have different opportunity costs of work.[8] Moreover, they are the most likely to benefit from the expansion in childcare subsidies. As seen from panel (d), the

[7]There is so far no conclusive evidence that the reform affected marital status (Grogger and Karoly, 2005).

[8]We also ran different regressions by interacting with a dummy variable taking value 1 if the woman had at least one child aged less than two and in another regression, a dummy variable taking value 1 if there is at least one child aged less than thirteen. We did not find any additional significant impact of the reform on those families.

impact of the reform on women with no children aged below six is similar as before. On the other hand, the impact of the reform on women with at least one child aged below six is statistically significant for both employment and labour hours even when we control for the non-linearity of labour supply outcomes.

Time limits are arguably the most significant change among the reforms and the literature has so far found important impacts of the time limits (Grogger and Karoly Lynn, 2005; Kaushal and Kaestner, 2001). We therefore perform similar regressions as in equation 1, but replace our waiver variable with a dummy taking value 1 on if the state has specifically implemented a time limit as waiver (as opposed to other waivers such as stricter work requirements) and 0 otherwise. The results are reported in panel (f) of Appendix Table A2. As can be seen from the table, our previous results still hold. We do not find statistically important impact of the time limits when implemented as waivers, but find statistically important impacts of the TANF on labour supply at the intensive margin from both OLS and MLE estimates.

5. Conclusion and Discussion

Using a triple differences approach on PSID data by exploiting variations in implementation dates of the waivers and of the TANF as well as variations in presence of children, we find that the TANF reforms had strong positive impacts on labour supply of at-risk mothers whereas the welfare waivers had limited impacts. In particular, once we control for the discrete nature of employment decisions, we find that the TANF did not have any significant impact on employment except for mothers with less than high school and mothers with at least one child aged less than six. On the other hand, the TANF had significant impacts on labour supply of at-risk mothers at the intensive margin even when we control for censoring.

Our results imply that the full-scale implementation of the reform was more important at encouraging at-risk mothers to work as opposed to the early waivers. Nevertheless, our results do not necessarily imply that the waivers were not important in affecting labour supply of mothers. It is possible that the waivers affected a smaller subset of the population thereby explaining their limited impact in our sample. Moreover, our TANF estimates could also be partly capturing the lagged impacts of the waivers.

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Appendix

Table A1. *Welfare Reform Impacts Using Married Mothers as Control Group*

	OLS fixed effects			Maximum likelihood		
	(1)	(2)	(3)	(1)	(2)	(3)
Employment						
Waiver	−0.033 (0.022)	−0.028 (0.021)	−0.028 (0.021)	−0.029 (0.020)	−0.033 (2.374)	−0.033 (1.863)
TANF	0.056*** (0.019)	0.057*** (0.019)	0.055*** (0.019)	0.046*** (0.015)	0.033 (2.647)	0.032 (2.031)
Hours work						
Waiver	0.472 (0.919)	0.299 (0.909)	0.283 (0.909)	0.132 (0.486)	−0.027 (0.484)	−0.020 (0.485)
TANF	1.226 (0.820)	1.539* (0.812)	1.483* (0.810)	1.464*** (0.403)	1.353*** (0.426)	1.374*** (0.427)
Controls						
Demographic		✓	✓		✓	✓
Economic		✓	✓		✓	✓

Note: Treatment group comprises of single mothers and control group comprises of married mothers (*N* = 6725). Standard errors (in brackets) for OLS regressions clustered at the respondent level. Marginal effects reported for maximum likelihood estimation. All regressions include a dummy variable taking value 1 if at-risk and a full set of time and state dummies. *significant at 10%, **significant at 5% and ***significant at 1%.

Table A2. *Additional Results*

	(a) No imputation		(b) High school		(c) Less than high school	
	OLS	MLE	OLS	MLE	OLS	MLE
Employment						
Waiver	0.019 (0.029)	−0.008 (0.645)	0.017 (0.029)	−0.003 (0.139)	0.007 (0.036)	−0.047 (0.047)
TANF	0.059** (0.027)	0.077 (0.129)	0.044* (0.024)	0.065 (3.518)	0.106*** (0.034)	0.121*** (0.042)
Hours work						
Waiver	1.390 (1.319)	0.305 (0.860)	1.290 (1.370)	0.390 (0.866)	1.384 (1.571)	−0.335 (1.315)
TANF	3.956*** (1.424)	2.939*** (0.868)	3.494*** (1.170)	2.601*** (0.761)	6.273*** (1.398)	5.308*** (1.139)

	(d) No children aged < 6		(e) Child aged < 6		(f) Time limits	
	OLS	MLE	OLS	MLE	OLS	MLE
Employment						
Waiver	0.020 (0.029)	−0.008 (0.141)	−0.018 (0.034)	−0.041 (0.047)	0.040 (0.024)	0.034 (0.645)
TANF	0.045* (0.025)	0.060 (1.116)	0.107*** (0.031)	0.141*** (0.044)	0.036 (0.030)	0.044 (0.825)
Hours work						
Waiver	1.365 (1.336)	0.493 (0.855)	−0.251 (1.510)	−0.801 (1.289)	1.528 (1.179)	1.299 (0.826)
TANF	3.501*** (1.142)	2.472*** (0.764)	5.681*** (1.396)	5.750*** (1.166)	3.153** (1.459)	2.120** (1.007)

Note: (a) Using only surveyed years, (b) comparison group comprises of single women without children, (c) impact of the reforms on single mothers with less than high school relative to those with high school, (d) comparison group comprises of single women without children, (e) impact of the reforms on single mothers with at least one child less than six relative to those with children aged between six and eighteen, (f) estimated impact when the waiver was a time limit. Results reported for specification (3). Standard errors (in brackets) for OLS regressions clustered at the respondent level. Marginal effects reported for maximum likelihood estimation. All regressions include a dummy variable taking value 1 if at-risk and a full set of time and state dummies. *significant at 10%, **significant at 5% and ***significant at 1%.