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Child Benefit Reform and Labor Market Participation

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Marcus Tamm

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Marcus Tamm*

Child Benefit Reform and Labor Market Participation

Abstract

This paper examines the impact of a change in the German child benefit system in 1996, which led to a large increase in lump sum transfers to families with children. We analyze the impact on the labor force participation of family members. Comparing behavioral changes of adults with children with behavioral changes of adults without children, we find that single mothers and mothers with a working partner considerably reduced the number of working hours (conditional on participation). Participation rates however did not decrease. For single fathers neither participation rates nor working hours display any significant changes.

JEL Classification: H31, I38, J22

Keywords: Child support, labor supply, program evaluation

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1. Introduction

In many European and other developed countries governments distribute important shares of public transfers to families with children, some of them directly targeted at supporting child rearing. In Germany a large part of these child related transfers is distributed through child benefits (*Kindergeld*) which are monthly lump sum transfer to parents. In the year 2006 expenditures for child benefits sum to around 30 billion Euros per year which is equal to 0.9 percent of GDP. Many policy makers argue that child benefits are an important tool to promote equity and to reduce poverty, especially child poverty. Recently a discussion on increasing child benefits was motivated by the increase in child poverty rates observed during the last couple of years (Corak et al. 2008) and the alleged potential to combat poverty by means of transfers. Yet, for Germany only few studies evaluate the impact of child related transfers on family behavior and child outcomes.¹

We take this as a starting point to analyze the impact of child benefits on labor market participation of parents. The focus on labor market participation is due to evidence that parental non-participation in the labor market is the main reason for child poverty (Fertig and Tamm 2009). Furthermore, simple models of consumer behavior predict that lump sum income transfers lead to a reduction in labor market participation and the number of working hours (e.g. Pencavel 1986) and might thus lead to an increase in poverty. In fact various studies based on German data provide evidence of negative income elasticities, especially for married women.² Most of this evidence, however, is based on cross-sectional differences in labor market participation between individuals with different levels of non-labor incomes or earnings of the partner. In contrast to this, the following analysis is based on exogenous changes in income induced by a policy reform.

In order to identify any impact on labor market participation there has to be a significant variation in policy over time, space or by recipient. Such variation is provided by the reform of the system of child benefit transfers which was implemented in 1996/1997. The reform led to large increases in transfer payments directed to families with children. We attempt to estimate the impact of transfers by comparing changes in outcomes of individuals affected by

¹ While it has become standard to analyze tax and transfer reforms ex-ante by means of tax simulation models (e.g. Steiner and Wrohlich 2006), there is considerable lack of ex-post evaluation studies in this area. A recent exception evaluates the parental leave benefit introduced in 2007 (RWI 2008).

² Franz and Kawasaki (1981) find sizable effects of husband's earnings on women's participation rates and on working hours using Microcensus data from 1976. Similar income effects are reported in Franz (1985). Kaiser et al. (1992) however report an insignificant (positive) coefficient for non-labour income on participation rates of married women and a significantly negative coefficient for non-labour income on hours of work using GSOEP data from 1984. Wagenhals (2000) reports income elasticities of hours of work of around -0.20 using GSOEP data from 1984 to 1996 which is close to findings in Franz and Kawasaki (1981) and Franz (1985).

the reform (i.e. those with children) with changes in outcomes of individuals not affected by the reform (i.e. those without children).

We begin by presenting the reform and the institutional background in Section 2. Section 3 presents the data and identification strategy. Main results as well as sensitivity checks are provided in Section 4. The final section provides conclusions.

2. Institutional background

Child benefit payments have a long tradition in Germany existing since the 1950s. The system underwent several reforms since being introduced, mainly extending coverage to larger shares of the population. In contrast to family directed public assistance in other countries, as for example the American earned income tax credit (EITC) or the British working families' tax credit (WFTC), eligibility is not based on family income or any other form of means test. During the 1990s, the period we are focusing on, eligibility for child benefit was only pegged to the age of the child and his/her participation within the educational system. For children up to age 17 all parents were eligible. For children aged 18 to 26 parents were eligible if children were participating in the educational system (e.g. school, college, university, apprenticeship) and if the personal income of the child (e.g. through part time jobs) did not exceed 6135 Euro per year. Eligibility was not restricted to children living within the household of the parents, thus parents received benefits even if children left home, e.g. in order to study elsewhere.

Child benefit payments depend on the number of eligibly children. In 1995, i.e. under the old system, monthly payments for the first child were equal to 36 Euro, 66 Euro for the second, 112 Euro for the third and 123 Euro for the fourth and each further child.³ In 1996 payments were increased to 102 Euro for the first and for the second child, to 153 Euro for the third and to 179 Euro for each further child. In 1997 payments for the first and second child were increased further to 112 Euro. This change in child benefits led to a permanent increase in household income by a considerable amount and is much larger than any changes experienced after. The reform was due to an intervention of the federal constitutional court which decided in September 1992 that child benefits were too low. The change of the child benefit or at least the size of the increase was unanticipated by most households, because the German parliament did not decide on the changes before September 1995.

³ By then, Germany still used DM as currency. For ease of interpretation, all amounts have been converted to Euro.

In addition to these changes in benefit payments, which were most visible to the public, various other aspects related to the benefit payments changed as well, making comparisons between 1995 and 1996/1997 more complicated. Besides lump sum child benefit payments there was an increase in the tax exemption for children from 2098 Euro per year in 1995 to 3203 Euro in 1996 and further to 3534 Euro in 1997. While from 1996 on parents received either the child benefit or the tax exemption, before the reform they were receiving both. This implies that the net impact of the reform on household income depends on the parents' marginal tax rate. Comparisons are complicated further, as those parents who did not fully benefit from the tax exemption for children, i.e. low income households, received supplemental child benefit transfers of up to 33 Euro per child per month and high income households experienced reductions in child benefit payments until 1995. A summary of the regulations before and after the reform is provided in Table 1.

Table 1 – Child benefit reform in 1996

Aspect	Until 1995	1996/1997
Tax exemption for children (annual)		
• each child	2098 €	3203/3534 €
Amount child benefit (per month)		
• 1 st child	36 €	102/112 €
• 2 nd child	66 €	102/112 €
• 3 rd child	112 €	153 €
• 4 th + child	123 €	179 €
• low income (who do not fully benefit from tax exemption)	up to 33 € more per child	
• high income	benefit for 2 nd + child reduced to 36 €	
Coexistence	both	either benefit or tax exemption ¹⁾

Note: 1) Tax exemption is relevant if annual gross income is above 38,000 € for single parent or 75,000 € for couples, i.e. 95% of families receive child benefit and only 5% use tax exemption.

Source: BMF (2006)

Table 2 displays how the entire reform of the child benefit system affected net income of various types of households distinguishing by number of children and level of income. Overall, it becomes clear that households at the lower end of the income distribution and households with more children experienced larger absolute increases in net income than households with few children or households at the upper end of the income distribution. Having said this, the increase per child is larger for families with few children. In order to judge the size of the increase a comparison with median incomes of families is helpful. The median monthly net income of two adult families with children was around 2000 Euro in 1995. The median single parent family had slightly less than 1100 Euro per month.

Table 2 – Impact of child benefit and tax exemption for children on net income (in Euro)

Family type	Overall (annual) effect on net income in 1995	Overall (annual) effect on net income in 1996	Difference 1996 vs 1995	Difference 1997 vs 1995
Family with one child				
• low income (no income tax)	828	1227	+399	+522
• intermediate income (25% tax rate)	954	1227	+273	+396
• high income (45% tax rate)	1374	1441	+67	+217
Family with two children				
• low income (no income tax)	2025	2454	+429	+675
• intermediate income (25% tax rate)	2276	2454	+178	+423
• high income (45% tax rate)	2748	2883	+135	+433

3. Data and identification strategy

In the empirical analysis, we use data from the German Microcensus (MZ). The MZ is a repeated cross-section covering a representative sample of 1 percent of all households in Germany, which are about 390,000 households/830,000 individuals each year. Our analysis is based on the scientific use-file which contains 70 percent of the 1 percent sample. The information surveyed in the MZ focuses on employment and labor market outcomes. We have access to data from 1993, 1995 and 1997, i.e. to two points in time before the reform and to one point in time after.

This paper analyzes the labor market participation of adults with children and concentrates on three groups: (i) mothers with a working partner (secondary earner model), (ii) single fathers and (iii) single mothers. These groups are treatment groups as they are the ones benefiting from the reform in 1996/1997. The focus on single mothers and single fathers is guided by a high prevalence of poverty among these groups. By contrast, we focus on mothers with working partners as the labor market participation of this group has been shown to be highly responsive to financial incentives (e.g. Killingsworth 1983).⁴

We rely on changes over time to identify the response of these groups towards the reform. Since there may be other policy or economic shocks and underlying time trends in labor market participation we use control groups to isolate the impact of the child benefit reform on

⁴ In contrast to this Mroz (1987) reports estimates for the United States that do not indicate that female labour supply might be more sensitive to wage or income effects than men's. Results in Heim (2007) suggest that responsiveness of women might have decreased over time.

behavior from other factors. The control groups include women with a working partner, single men and single women respectively, who are not living together with children.

Similar difference-in-differences strategies comparing individuals with and without children have been used, for example, in Eissa (1995), Blundell et al. (1998), Eissa and Hoynes (2004), Blundell et al. (2005) and Hotz et al. (2006). The underlying assumption of this identification strategy is that there be no contemporaneous shocks to the relative labor market outcomes of the treatment group. While this assumption is very strong, especially as the average characteristics of individuals in the treatment and control groups might differ, it becomes more reasonable once we condition on observable characteristics. Still, if there were any specific shocks to the labor demand for parents then these changes would incorrectly be attributed to the child benefit reform.

In order to mitigate any such problems we exclude from the analysis households living in East Germany, households with children below age 7 and multi-generation households (i.e. families where children, parents and grandparents are living together in one household). The first group is left out of the analysis because the East German labor market had been plagued by the consequences of transition from a planned economy to a market economy during that time. The second group is excluded as the labor market attachment of mothers (and single fathers) with young children is highly restricted by access to child care facilities. We are not able to rule out changes in supply during that period. Furthermore there have been various changes in parental leave regulations at the beginning of the 1990s which might have changed participation rates of this group (Dustmann and Schönberg 2008, Merz 2005). The third group is left out because households with more than two adults might differ in behavior, e.g. grandparents might be household heads and contribute most to household income. In addition we restrict the sample to individuals aged 20 to 55 and leave out individuals from the control group who are below age 27 if they are within the educational system. The latter might indirectly benefit from the child benefit reform, as they might be eligible children and their parents (living in a separate household) might directly pass on benefits to them.

The outcome variables of interest are the employment status of the individual and the number of working hours of employed individuals.⁵ About working hours the MZ provides information on contracted hours and on actual hours during the week of survey. For the

⁵ We define those individuals as being employed who report a positive number of actual working hours during the week of survey instead of relying on the employment status directly provided in the MZ. This is due to changes in the official definition of employment used in the data which for example defines women taking maternity leave as being employed in some years, in others not. A similar strategy (i.e. to rely on positive working hours) has been followed e.g. in Geisler and Kreyenfeld (2005).

analysis both are used as outcomes. The participation decision is estimated using a probit model, the hours equation is based on OLS for the subgroup of individuals actually participating.⁶ In the empirical analysis we control for several important determinants of labor market participation. We include indicator variables for the number of children (one, two, three or more), indicators for the educational attainment of the individual, an indicator for foreigners and indicators for the size of the community. Furthermore we control for the impact of age by using a third-order polynomial and for the general economic situation by controlling for the unemployment rate on the regional level (we use specific rates for men and women measured on the level of federal states). For women with working partner we additionally control for the income of the partner (using a third-order polynomial for log earnings). We also generate an indicator variable equal to one for all years after the reform. An interaction term of this post-reform dummy with an indicator for living together with children provides the difference-in-differences estimate. Descriptive statistics of the variables are provided in Table A1 in the Appendix.

4. Labor market participation

In this section we present the results for the three treatment and comparison groups. After presenting the main results we provide results based on alternative identification strategies and analyze whether treatment effects are heterogeneous between specific groups.

4.1 Difference-in-differences analysis

Results in this subsection are separately presented for women with working partner, single men and single women.

Women in couple with working partner

The results displayed in Table 3 compare outcomes of women with working partner with or without children in 1995 and 1997. They show that children are important determinants of labor market participation. The employment probability is lower by 9 percentage points among women with one child compared to women without children. Among mothers with

⁶ The use of a two-part model for the hours equation instead of a Heckman selection model is due to lack of exclusion restrictions. As Puhani (2000) summarizes, these models are more robust than selection models without exclusion restriction if the inverse Mills' ratio is highly collinear with the other controls. R^2 of the regression of the inverse Mills' ratio against the other controls is above 0.984 and the condition number exceeds 290 in all of our cases. In addition, we are interested in actual working hours instead of potential hours, which the selection model focuses on. Having said this, none of the results hinges on the actual choice of model. In our case, results of a Heckman selection model are very similar to those of the two-part model.

two children it is lower by 16 percentage points and lower by 27 percentage points among mothers with three or more children. The level of education is important for employment as well. Most of the other covariates are significant and generally have the expected sign. The impact of individual characteristics on the number of working hours conditional on employment is similar in structure as on employment probabilities.

The DID estimate for women with working partner indicates that employment rates have been almost unchanged after the reform while working hours were falling by around 1 hour per week conditional on being employed. This suggests that the increase in child benefit transfers (together with other contemporaneous reforms or shocks) did not significantly affect participation of women with working partner at the extensive margin. There is however a significant decrease at the intensive margin.

Table 3 – Difference-in-differences estimates for women with working partner

Women with working partner	Participation		Contracted hours		Actual hours	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
DID	0.0021	0.33	-1.0262	-4.75	-1.0972	-4.90
Post-reform	0.0459	10.07	0.3611	2.78	0.3470	2.56
Children 1	-0.0932	-16.47	-5.1687	-28.78	-5.2214	-27.96
Children 2	-0.1647	-25.58	-8.2311	-40.75	-8.3233	-39.54
Children 3+	-0.2701	-25.15	-8.6174	-20.50	-8.8465	-20.80
Age	-0.0049	-0.45	0.2495	0.90	0.3964	1.37
Age ²	0.0003	1.21	-0.0097	-1.29	<i>-0.0131</i>	-1.66
Age ³	0.0000	-2.69	0.0001	0.90	0.0001	1.21
Education intermediate	0.1409	32.59	0.9532	5.93	1.0605	6.43
Education high	0.2205	42.01	4.3385	21.39	4.8901	23.14
Education missing information	0.0501	6.07	2.6805	7.88	2.7319	7.88
Foreigner	-0.1263	-18.32	1.7195	6.91	1.5591	6.16
Community 20,000-500,000 inhabitants	-0.0101	-2.77	-0.1476	-1.30	-0.0884	-0.75
Community 500,000+ inhabitants	<i>0.0090</i>	1.66	0.6074	3.84	0.7193	4.34
Regional unemployment rate	-0.0208	-19.09	-0.1426	-4.26	-0.1357	-3.90
Log earnings partner	1.8743	3.68	172.3414	9.75	169.1403	9.44
Log earnings partner ²	-0.2576	-3.74	-24.3522	-10.21	-23.9481	-9.88
Log earnings partner ³	0.0111	3.60	1.1086	10.43	1.0922	10.09
Information on earnings partner missing	0.5908	3.40	394.2225	9.11	386.2467	8.84
Observations	84714		57820		57820	
(Pseudo) R2	0.0749		0.1425		0.1366	

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community, regional unemployment rate and log earnings of the partner. Sample is restricted to West Germany and households without children below age 7.

Single men

For single men results are presented in Table 4. Here several of the indicators for the number of children are insignificant, indicating that the difference between single men with children and those without is much smaller than among women. The DID estimates show a positive impact on participation rates and a negative impact on working hours, all of them insignificant, however. This provides evidence that the child benefit reform did not reduce labor market attachment of single fathers. Having said this, we also have to admit that the number of single fathers is relatively small. Only about 1000 observation stem from single fathers, probably making identification weak.

Table 4 – Difference-in-differences estimates for single men

Single men	Participation		Contracted hours		Actual hours	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
DID	0.0295	1.14	-0.3642	-0.44	-0.1368	-0.15
Post-reform	-0.0043	-0.83	0.6580	4.40	0.5987	3.66
Children 1	0.0149	0.69	-1.3532	-2.09	-1.4721	-2.10
Children 2	0.0015	0.05	-0.3493	-0.35	-0.3290	-0.31
Children 3+	-0.1601	-2.47	-5.2728	-1.80	-5.0670	-1.57
Age	-0.0161	-1.32	-0.8441	-2.46	-0.2436	-0.64
Age ²	<i>0.0006</i>	1.75	0.0267	2.83	0.0104	1.00
Age ³	0.0000	-2.34	-0.0002	-2.89	-0.0001	-1.14
Education intermediate	0.1082	15.67	0.0957	0.42	0.5146	2.08
Education high	0.1819	27.07	2.0927	8.33	3.3302	12.16
Education missing information	0.0397	3.64	2.0333	4.50	1.8770	3.96
Foreigner	-0.0612	-7.46	-0.1266	-0.46	-0.3021	-1.04
Community 20,000-500,000 inhabitants	-0.0582	-10.68	-1.4680	-9.67	-1.3809	-8.33
Community 500,000+ inhabitants	-0.0714	-9.89	-1.3244	-6.43	-1.2293	-5.47
Regional unemployment rate	-0.0062	-5.12	-0.1196	-3.26	-0.1478	-3.67
Observations	33722		26385		26385	
(Pseudo) R ²	0.0416		0.0216		0.022	

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community and regional unemployment rate. Sample is restricted to West Germany and households without children below age 7.

Single women

Finally, comparisons of single women with or without children in 1995 and 1997 are presented in Table 5. They show that children have a similar impact on labor market participation and on working hours as for women with working partner. That is, single mothers have considerably lower participation rates and fewer working hours than childless women.

Table 5 – Difference-in-differences estimates for single women

Single women	Participation		Contracted hours		Actual hours	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
DID	0.0289	2.54	-0.8381	-2.10	-0.8344	-1.99
Post-reform	0.0092	1.62	0.3833	2.65	<i>0.3059</i>	1.90
Children 1	-0.0713	-7.02	-4.8585	-15.77	-5.0026	-15.34
Children 2	-0.1403	-9.98	-8.5061	-18.80	-8.8384	-18.83
Children 3+	-0.3139	-10.48	-10.5433	-8.18	-10.8010	-8.41
Age	-0.0790	-6.17	-0.9249	-3.01	-0.7216	-2.10
Age ²	0.0022	6.55	0.0292	3.43	0.0239	2.52
Age ³	0.0000	-7.16	-0.0003	-3.95	-0.0003	-3.03
Education intermediate	0.1361	20.92	1.8926	8.67	2.2558	9.74
Education high	0.1652	24.80	3.2032	12.86	4.1826	15.51
Education missing information	0.0507	4.64	2.1345	5.19	2.9396	6.53
Foreigner	-0.0538	-5.22	0.4855	1.57	0.4091	1.23
Community 20,000-500,000 inhabitants	-0.0393	-6.77	-0.0352	-0.23	-0.0830	-0.50
Community 500,000+ inhabitants	-0.0466	-6.54	0.1828	1.01	0.1798	0.90
Regional unemployment rate	-0.0113	-7.40	-0.2098	-5.17	-0.2193	-4.91
Observations	31184		24296		24296	
(Pseudo) R ²	0.0552		0.0747		0.0707	

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community and regional unemployment rate. Sample is restricted to West Germany and households without children below age 7.

Comparing behavioral changes between groups over time the DID estimate for single women indicates that employment rates have been rising by 2.9 percentage points after the reform while working hours have been falling by 0.8 hours per week conditional on being employed. This suggests that the increase in child benefit transfers clearly did not decrease participation of single mothers at the extensive margin. There is however a decrease at the intensive margin. Taken together, the changes at the intensive and the extensive margin imply an increase of the unconditional number of working hours by around 0.3 hours per week.

The findings for single mothers are highly surprising given that theory predicts a negative impact on participation. One possible explanation for the findings is that there have been other reforms specific to households with children. For example there has been a reform of the income tax system that took place parallel to the child benefit reform in 1996. Figure A1 in the Appendix shows that individual tax exemptions were increased by the tax reform as well as marginal tax rates at the lower end of the income distribution. While in principle the change of the tax system was equal for households with or without children, the response to the tax reform might differ. This might be the case, if the proportion of individuals at the

lower end of the income distribution is higher among single mothers than among single women without children. Then, the difference-in-differences estimates will measure the combined impact of the increase in child benefits and of the tax reform (and of any other contemporaneous reform with specific effects on parents).

4.2 Alternative identification assumption

Overall, results presented thus far suggest that the impact of child benefits on labor market participation is significantly negative at the intensive margin. The reform was followed by a reduction in working hours of between -0.8 and -1 hours per week for mothers with working partner and for single mothers. In contrast, there is no negative effect at the extensive margin. There is even evidence of a positive effect among single mothers.

As pointed out in Section 3 these results depend on the identifying assumption that relative labor market outcomes of treatment and comparison groups would have experienced similar changes without the reform. While this assumption is not testable, comparisons with changes between years not affected by reforms specific to parents or non-parents might increase the credibility of the assumption. Therefore a placebo test is provided for the respective treatment and comparison groups in Table 6. Here we compare changes in labor market outcomes between 1993 and 1995, which is a period where (to our knowledge) no child specific reforms took place. The first two columns of the table repeat the baseline DID estimates for the period 1995 to 1997 already presented before (cf. Tables 3, 4 and 5). Columns three and four present the estimates for a change between 1993 and 1995. Finally, columns five and six present results assuming that any relative trends observed between 1993 and 1995 were stable afterwards and where the DID estimates for a change between 1995 and 1997 represent deviations from this trend. This latter specification assumes that there is a time-invariant trend differing between treatment and control groups. Clearly, this time-invariant trend assumption is very strong as well.

For women with working partner and for single men the comparisons between 1993 and 1995 indicate that during this period no significant changes occurred between parents and non-parents. Consequently, under the time-invariant trend assumption the DID estimates (for a change between 1995 and 1997) is very similar to the baseline DID estimate for these two groups. That is, mothers with working partner display a reduction in working hours while no significant change occurs among single fathers.

Table 6 – Placebo test and time-invariant trend assumption

	1995 vs 1997		1993 vs 1995		1993, 1995, 1997 with trend	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
Women with working partner						
Participation						
DID	0.0021	0.33			-0.0079	-0.69
DID 93/95			0.0106	1.62		
Trend					0.0051	1.58
Hours contracted						
DID	-1.0262	-4.75			<i>-0.6651</i>	-1.79
DID 93/95			-0.3431	-1.60		
Trend					<i>-0.1783</i>	-1.66
Hours actual						
DID	-1.0972	-4.90			-0.8461	-2.18
DID 93/95			-0.2349	-1.05		
Trend					-0.1242	-1.11
Single men						
Participation						
DID	0.0295	1.14			0.0259	0.57
DID 93/95			0.0018	0.06		
Trend					0.0016	0.12
Hours contracted						
DID	-0.3642	-0.44			0.2747	0.19
DID 93/95			-0.6246	-0.78		
Trend					-0.3086	-0.77
Hours actual						
DID	-0.1368	-0.15			0.8828	0.57
DID 93/95			-1.0170	-1.15		
Trend					-0.5038	-1.13
Single women						
Participation						
DID	0.0289	2.54			0.0381	1.97
DID 93/95			-0.0107	-0.89		
Trend					-0.0052	-0.87
Hours contracted						
DID	-0.8381	-2.10			-0.0350	-0.05
DID 93/95			-0.8314	-2.09		
Trend					-0.4115	-2.07
Hours actual						
DID	-0.8344	-1.99			-0.0996	-0.14
DID 93/95			<i>-0.7626</i>	-1.82		
Trend					<i>-0.3761</i>	-1.79

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community, regional unemployment rate (and log earnings of the partner). Sample is restricted to West Germany and households without children below age 7.

For single women, however, comparisons between 1993 and 1995 indicate that already during the earlier period trends in labor market attachment of mothers differed significantly from those of women without children, displaying a relative decrease of working hours. Under the

time-invariant trend assumption the DID estimates (for a change between 1995 and 1997) now becomes insignificant for working hours of single mothers. That is, under this alternative assumption evidence that the increase in benefit transfers might have had any negative impact on labor market participation of single mothers becomes less likely.

4.3 Heterogeneity in response and robustness checks

As robustness check and in order to allow for heterogeneity in response towards the reform we now compare groups of women who are more similar in terms of observable characteristics than the groups compared thus far.

Results presented in subsection 4.1 indicate that the level of education is an important determinant of employment. Various studies have shown that during the 1990s the impact of technological change led to increasing differences between educational groups.⁷ Furthermore, Kluge et al. (2006) provide evidence that labor force dynamics induced by swings of the business cycle differ between educational groups, though, to smaller extend for West German women than for men. In order to allow for different changes over time between educational groups we compare outcomes between treatment and control groups separately by level of education.

Among women with working partner (Table A2 in the Appendix) those mothers with intermediate education show the largest changes compared to childless women. For them, working hours significantly decreased by around -1.3 and participation rates increased by 1.5 percentage points (significant at the 10%-level). Changes among women with low and with high education are insignificant (working hours decrease by -0.8 and -0.3 respectively, participation rates by -1.5 and -1.7 percentage point). Among single women with intermediate and with high education the DID estimate is somewhat smaller than among single women with low education. Among the latter mothers display a decrease in contracted working hours of around -1.1 (relative to women without children) and a parallel increase in participation rates by 5 percentage points. Yet, none of these estimates is statistically significant at any conventional level (Table A3 in the Appendix). For single fathers no such comparison separately by level of educational is manageable, due to small number of observations. In sum, there is weak evidence that DID estimates differ somewhat by level of education.

⁷ For example Dustmann et al. (2007) provides some evidence for wage inequality of men in Germany.

Since education is highly correlated with income this heterogeneity between educational groups might reflect differences in response due to differences in the increase in benefit transfers. As shown in Section 2 the overall change in transfer payments differed by level of income, generally being larger for low income households. To directly test for heterogeneity with regards to income we split the sample by level of earnings of the partner. This comparison is only feasible for women with a working partner. Overall, results hardly differ between women with low earnings partner and those with high earnings partner (Table A4 in the Appendix).

Finally, we allow the impact of the child benefit reform to differ by number of children. As presented in Section 2 the change in benefit transfers differed by number of children and thus might lead to different responses. In this case, heterogeneity is accounted for in the regressions by including interaction terms between the DID dummy and indicators for whether there is one or more than one child in the household. While the point estimates of the DID estimate are generally somewhat larger for women with two or more children than for women with one child (Tables A5 and A6 in the Appendix), none of the differences is statistically significant at any reasonable level. That is, there is no clear indication of heterogeneity in response by number of children.

5. Conclusions

The paper shows that children are important determinants of labor market participation at the intensive and the extensive margin. Women with children generally show lower participation rates and fewer working hours than women without children. Comparing changes in these outcomes between 1995 and 1997 we find a considerable decrease in working hours by around one hour per week of mothers with working partner relative to comparable women without children. For the group of women with working partner this result is fairly robust, i.e. alternative identification assumptions do not challenge the findings. In addition, we find slight evidence on heterogeneity in response to treatment with mothers with intermediate education displaying somewhat larger relative decreases in working hours than mothers with low or high education.

Overall this picture is in line with a negative income effect caused by the 1996/1997 increase in child benefit transfers for women with working partner. The average decrease by one hour is equal to 3.4 percent of working time of mothers with a working partner. Multiplied with

median earnings of this group of women which are around 750 Euro per month the expected income reduction for an average individual of the group is close to 300 Euro per year. This would imply that a very large part of the increase in child benefits is set off by a partial withdrawal from work. Having said this, it is not entirely clear, whether the observed withdrawal is exclusively caused by the child benefit reform or represents a combined effect of the transfer increase and other contemporaneous reforms.

For single mothers results are less clear. Estimates show that they experience a decrease in working hours by 0.8 hours per week and a parallel increase in participation rates by around 2.9 percentage points relative to women without children. While the decrease in working hours would be in line with a negative income effect, the increase in participation rates contradicts theoretical predictions. Assuming that this finding is exclusively caused by the benefit increase would imply that lump sum transfers are indeed a means to increase (the average) financial well-being among the ones most in need, i.e. children of single parents. However, for the group of single women there is evidence that the assumption does not hold. Firstly, there is evidence that trends in labor market participation of single women with and without children already diverged before 1996/1997. Secondly, we find that those subgroups of single mothers experiencing the largest increase at the extensive margin are the ones experiencing the largest decrease at the intensive margin (e.g. women with low education and those with more than one child). This pattern might result from a situation where additional women select into the labor market who differ from those already in before in terms of shorter working times. Such pattern might emerge from the 1996 tax reform that increased incentives to work at the lower end of the income distribution. If single mothers reacted differently towards this tax reform than single women without children, then the above change in outcomes is due to both reforms and does not represent the impact of the child benefit reform alone.

Overall, we conclude that lump sum transfers do not unfold their full potential to increase financial well-being of a large group of children as they lead to withdrawals from work of mothers (with working partner). For children of single parents findings are not conclusive as comparison groups do not appear appropriate (single mothers) or because the number of observations is small (single fathers). For them we can neither conclude that the financial situation improves nor that the situation deteriorates. Topics for future research are to analyze whether the reduction in working time of mothers with working partner is mirrored in an increase in time devoted to children and thus possibly adding to child well-being by other

means. In addition, it is unclear whether the income increase of those households not withdrawing from work is actually spent on children.

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Appendix

Figure A1 – Income tax reform in 1996

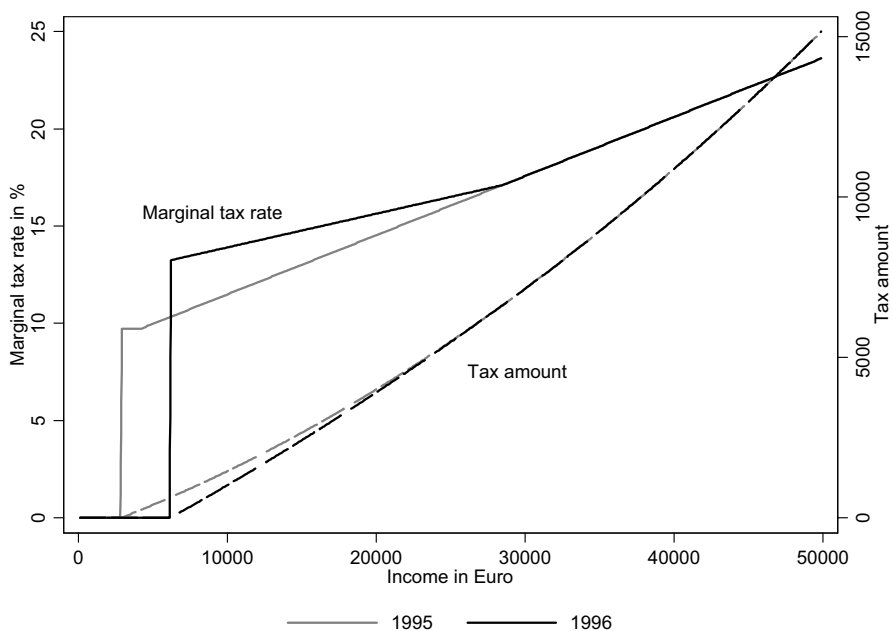


Table A1 – Descriptive statistics

	Mothers with working partner		Women with working partner		Single fathers		Single men		Single mothers		Single women	
	1995	1997	1995	1997	1995	1997	1995	1997	1995	1997	1995	1997
Employed ¹⁾	0.617	0.642	0.705	0.730	0.792	0.811	0.789	0.775	0.697	0.720	0.796	0.791
Hours contracted (if employed)	26.6	25.7	33.3	33.5	40.0	40.2	40.5	40.9	31.4	30.5	37.2	37.3
Hours actual (if employed)	27.0	26.0	33.6	33.9	41.0	41.3	41.7	42.1	31.8	30.8	37.8	37.9
Children 1	0.531	0.528	-	-	0.729	0.733	-	-	0.690	0.676	-	-
Children 2	0.390	0.389	-	-	0.221	0.227	-	-	0.264	0.272	-	-
Children 3+	0.080	0.083	-	-	0.049	0.040	-	-	0.045	0.052	-	-
Age	40.5	40.7	42.0	41.7	41.8	42.3	36.4	36.6	39.5	39.8	37.4	37.6
Education low ²⁾	0.211	0.191	0.201	0.181	0.174	0.118	0.115	0.116	0.232	0.225	0.143	0.143
Education intermediate ²⁾	0.611	0.622	0.639	0.642	0.544	0.574	0.594	0.582	0.582	0.575	0.618	0.605
Education high ²⁾	0.138	0.151	0.118	0.135	0.251	0.260	0.246	0.260	0.147	0.149	0.197	0.210
Education missing information	0.040	0.036	0.042	0.042	0.031	0.049	0.044	0.042	0.039	0.051	0.043	0.042
Foreigner	0.090	0.083	0.061	0.065	0.083	0.071	0.094	0.084	0.078	0.093	0.052	0.056
Community <20,000 inhabitants	0.473	0.471	0.413	0.413	0.423	0.410	0.300	0.297	0.336	0.345	0.260	0.263
Community 20,000-500,000 inhabitants	0.417	0.426	0.447	0.452	0.441	0.456	0.482	0.478	0.488	0.483	0.491	0.494
Community >500,000 inhabitants	0.110	0.103	0.140	0.135	0.136	0.134	0.219	0.225	0.176	0.172	0.249	0.243
Regional unemployment rate (in %) ³⁾	9.0	10.4	9.1	10.5	9.1	11.1	9.2	11.1	9.0	10.5	9.0	10.5
Earnings partner (DM per month) ⁴⁾	4131	4073	3703	3593	-	-	-	-	-	-	-	-
Earnings partner missing information	0.063	0.056	0.066	0.059	-	-	-	-	-	-	-	-
Observations	16754	16686	26546	24728	447	551	16127	16597	2552	2788	12956	12888

Notes: Sample is restricted to West Germany and households without children below age 7.

1) Employed (including self-employed) includes all individuals with positive number of actual working hours.

2) Education low includes individuals with *Hauptschul* or *Realschul* degree without any vocational degree. Education intermediate includes individuals with *Abitur* or a vocational degree. Education high includes individuals with university degree or *Meisterausbildung*.

3) Gender specific unemployment rate is measured at the level of federal states (*Länder*).

4) Earnings of partner generated from categorical information. Median value of each category (deflated by CPI) assigned to individuals.

Table A2 – Heterogeneity by education (women with working partner)

Women with working partner	1995 vs 1997		1993 vs 1995		1993, 1995, 1997 with trend	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
Education low						
Participation						
DID	-0.0175	-1.09			-0.0176	-0.64
DID 93/95			0.0013	0.08		
Trend					0.0004	0.06
Hours contracted						
DID	-0.7715	-1.31			-0.4126	-0.42
DID 93/95			-0.3383	-0.63		
Trend					-0.1762	-0.65
Hours actual						
DID	-0.9462	-1.58			-0.6475	-0.65
DID 93/95			-0.2929	-0.53		
Trend					-0.1511	-0.54
Education intermediate						
Participation						
DID	<i>0.0148</i>	1.86			0.0101	0.73
DID 93/95			0.0051	0.62		
Trend					0.0024	0.60
Hours contracted						
DID	-1.3084	-5.03			-1.1796	-2.59
DID 93/95			-0.1142	-0.43		
Trend					-0.0601	-0.45
Hours actual						
DID	-1.3988	-5.19			-1.3078	-2.76
DID 93/95			-0.0746	-0.27		
Trend					-0.0410	-0.29
Education high						
Participation						
DID	-0.0157	-1.03			-0.0306	-1.11
DID 93/95			0.0153	0.95		
Trend					0.0074	0.92
Hours contracted						
DID	-0.3288	-0.61			0.4239	0.44
DID 93/95			-0.7358	-1.28		
Trend					-0.3759	-1.31
Hours actual						
DID	-0.2726	-0.47			0.0609	0.06
DID 93/95			-0.2987	-0.49		
Trend					-0.1655	-0.54

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community, regional unemployment rate and log earnings of the partner. Sample is restricted to West Germany and households without children below age 7.

Table A3 – Heterogeneity by education (single women)

Single women	1995 vs 1997		1993 vs 1995		1993, 1995, 1997 with trend	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
Education low						
Participation						
DID	0.0511	1.62			<i>0.0936</i>	1.75
DID 93/95			-0.0483	-1.44		
Trend					-0.0232	-1.39
Hours contracted						
DID	-1.0951	-1.03			-1.4766	-0.79
DID 93/95			0.4293	0.41		
Trend					0.1869	0.36
Hours actual						
DID	-1.4644	-1.33			-1.8357	-0.95
DID 93/95			0.4151	0.38		
Trend					0.1915	0.35
Education intermediate						
Participation						
DID	0.0215	1.49			0.0387	1.59
DID 93/95			-0.0197	-1.24		
Trend					-0.0097	-1.25
Hours contracted						
DID	-0.5634	-1.14			0.8492	1.00
DID 93/95			-1.4382	-2.90		
Trend					-0.7204	-2.90
Hours actual						
DID	-0.6201	-1.21			0.6215	0.70
DID 93/95			-1.2721	-2.43		
Trend					-0.6369	-2.44
Education high						
Participation						
DID	0.0181	0.74			-0.0130	-0.29
DID 93/95			0.0298	1.28		
Trend					0.0161	1.27
Hours contracted						
DID	-1.0983	-1.17			-1.5958	-0.97
DID 93/95			0.4598	0.47		
Trend					0.2466	0.51
Hours actual						
DID	-0.2596	-0.26			0.0056	0.00
DID 93/95			-0.2855	-0.28		
Trend					-0.1346	-0.26

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community and regional unemployment rate. Sample is restricted to West Germany and households without children below age 7.

Table A4 – Heterogeneity by income (women with working partner)

Women with working partner	1995 vs 1997		1993 vs 1995		1993, 1995, 1997 with trend	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
Earnings partner low						
Participation						
DID	0.0133	1.30			-0.0018	-0.10
DID 93/95			<i>0.0164</i>	1.65		
Trend					0.0079	1.61
Hours contracted						
DID	-0.7143	-2.17			-0.6629	-1.20
DID 93/95			-0.0038	-0.01		
Trend					-0.0100	-0.06
Hours actual						
DID	-0.8165	-2.40			-0.8193	-1.42
DID 93/95			0.0448	0.14		
Trend					0.0163	0.10
Earnings partner high						
Participation						
DID	-0.0076	-0.83			-0.0166	-1.03
DID 93/95			0.0090	0.95		
Trend					0.0045	0.96
Hours contracted						
DID	-0.8917	-3.07			-0.6796	-1.34
DID 93/95			-0.2181	-0.74		
Trend					-0.1062	-0.72
Hours actual						
DID	-0.9383	-3.11			<i>-0.8732</i>	-1.65
DID 93/95			-0.0714	-0.23		
Trend					-0.0322	-0.21

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community, regional unemployment rate and log earnings of the partner. Sample is restricted to West Germany and households without children below age 7. Low earnings partner defined as up to 3000 DM per month; high earnings partner defined as more than 3000 DM per month.

Table A5 – Heterogeneity by number of children (women with working partner)

Women with working partner	1995 vs 1997		1993 vs 1995		1993, 1995, 1997 with trend	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
Participation						
DID_kid1	0.0086	1.06			-0.0004	-0.03
DID_kid2+	-0.0049	-0.58			-0.0159	-1.07
DID 93/95_kid1			0.0098	1.22		
DID 93/95_kid2+			0.0116	1.35		
Trend_kid1					0.0047	1.18
Trend_kid2+					0.0055	1.30
Hours contracted						
DID_kid1	-0.8661	-3.25			-0.4715	-1.03
DID_kid2+	-1.2216	-4.10			<i>-0.8957</i>	-1.73
DID 93/95_kid1			-0.3746	-1.42		
DID 93/95_kid2+			-0.3022	-1.00		
Trend_kid1					-0.1939	-1.47
Trend_kid2+					-0.1622	-1.07
Hours actual						
DID_kid1	-0.9326	-3.37			-0.6717	-1.41
DID_kid2+	-1.2980	-4.22			<i>-1.0506</i>	-1.95
DID 93/95_kid1			-0.2418	-0.88		
DID 93/95_kid2+			-0.2258	-0.72		
Trend_kid1					-0.1278	-0.93
Trend_kid2+					-0.1244	-0.79

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community, regional unemployment rate and log earnings of the partner. Sample is restricted to West Germany and households without children below age 7.

Table A6 – Heterogeneity by number of children (single women)

Single women	1995 vs 1997		1993 vs 1995		1993, 1995, 1997 with trend	
	Marginal effect	t-value	Marginal effect	t-value	Marginal effect	t-value
Participation						
DID_kid1	0.0219	1.61			0.0322	1.40
DID_kid2+	0.0421	2.36			0.0486	1.58
DID 93/95_kid1			-0.0117	-0.82		
DID 93/95_kid2+			-0.0086	-0.43		
Trend_kid1					-0.0057	-0.80
Trend_kid2+					-0.0041	-0.41
Hours contracted						
DID_kid1	<i>-0.7537</i>	-1.65			-0.2435	-0.31
DID_kid2+	<i>-1.0439</i>	-1.39			0.5881	0.44
DID 93/95_kid1			-0.5172	-1.15		
DID 93/95_kid2+			-1.6667	-2.15		
Trend_kid1					-0.2605	-1.16
Trend_kid2+					-0.8207	-2.11
Hours actual						
DID_kid1	<i>-0.7988</i>	-1.66			-0.3533	-0.42
DID_kid2+	<i>-0.9210</i>	-1.19			0.6268	0.46
DID 93/95_kid1			-0.4551	-0.95		
DID 93/95_kid2+			-1.5804	-1.98		
Trend_kid1					-0.2272	-0.95
Trend_kid2+					<i>-0.7781</i>	-1.95

Note: Marginal effects printed in *italics* indicate statistical significance at 10%-level, and Marginal effects printed in **boldface** indicate statistical significance at 5%-level. Regression also includes information on number of children, age, level of education, nationality, size of the community and regional unemployment rate. Sample is restricted to West Germany and households without children below age 7.