

Do Tax Deductions Affect Labor Supply Choices?:
Longitudinal Evidence for Lone Parents in Germany

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Abstract

The German tax reforms between 1986 and 1990 contained expansions of the tax deductions for single-parent households. I estimate the impact of the expansion on labor force participation by comparing participation changes of single parents who benefit from the expansion to those of childless adults. Single-parent households are of interest because of their growing size and high poverty rate. Results from a probit specification controlling for socio-economic characteristics provide no evidence that the tax deductions had an impact on labor force participation. Instead, participation is determined by family structure, human capital, and demographic factors such as age and marital status.

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Introduction

The German tax and welfare reforms between 1986 and 1990 provided substantial increases in the household deduction for single-parent taxpayers and in the child deductions for taxpayers with children. Given the distortionary impact of payroll and income taxes on labor supply, these larger tax deductions to single parents with children are predicted to have a positive impact on their labor force participation. I estimate the response of single-parent taxpayers to the tax incentives by considering the expansion in tax deductions as a treatment to single parents while childless single adults serve as a control group for this natural experiment.

Single-parent households are a particularly relevant group for empirical research. The economic situation of many single-parent families in Germany is not a promising one. Over the eighties, the proportion of single-parent families in Germany grew from eleven percent of all families with children in 1981 to fourteen percent in 1988, primarily because of higher divorce and separation rates.¹ Furthermore, the proportion of single-parent families in Germany that are poor is much higher than that of married families with children. Fischer and Hauser show that in 1983 between 23 and 38 percent of single-parent families fell below the 50-percent poverty line while the corresponding proportion for married couples with children was substantially lower with between 6 and 14 percent.² Put together, these trends imply that an increasing number of children grow up in relatively poor economic circumstances.

The current discussions of welfare reform in Germany and in the United States with its focus on cost reductions and the hazards of welfare dependency suggest that the reliance of single-parent families on welfare programs is likely to become increasingly difficult.³ In the United States, the discussion has led to a number of measures designed to "make work pay" and to move welfare recipients into the labor market such as large increases in the Earned Income Tax

Credit, term limits on welfare receipts, or work requirements for those receiving welfare.

Inducing single parents to enter the labor force is complicated for a variety of reasons. Financial barriers exist because the costs of child care are often high. Additionally, the complex German social welfare system results in reductions of social benefits in the case of income from employment, with replacement rates that can exceed one hundred percent. Non-financial barriers exist because child-care facilities are often not available or flexible enough to accommodate a working parent. Recent work on low-wage workers in the United States shows that the workplace as well may not be flexible enough to deal with the conflicting demands imposed by parenthood such as higher rates of absenteeism when the child is sick or when child care arrangement fall through at short notice.⁴

For the empirical work, I use longitudinal data from the German Socioeconomic Panel (GSOEP) from 1984 to 1990 to compare labor market choices of single parents to the choices made by a natural control group: single childless adults. Annual trends seem to indicate that in the years in which the increased deductions became effective labor force participation among single parents increased while that of single childless adults experienced slight declines. However, comparing changes in labor force participation in a probit specification controlling for relevant socio-economic factors provides no evidence that the tax deductions had an impact on labor force participation. Instead, labor force participation appears to be determined by family structure, human capital endowment, and demographic factors such as age and marital status.

Tax Treatment of Single Parent Families

The tax reforms between 1986 and 1990 responded to criticisms that tax-splitting favored marriage but provided no relief to less traditional families such as the growing number of single-

parent families.⁵ To mitigate this perceived imbalance, the reforms in the eighties contained provisions that favored families and children more directly. In this section I will sketch the main provisions to families, and the main features of the German tax and welfare system and of the tax reforms between 1986 and 1990.

Effective as of January 1986, child deductions were raised by 2,052 German mark (DM) for each child from DM 432 to DM 2,484 per year. By 1988, the child deduction was up to DM 3,924 per child. The household deduction for single-parent families was increased from DM 4,212 to DM 4,536 in 1986, to DM 4,752 in 1988, and to DM 5,616 in 1990. Thus, between 1985 and 1990, the household deductions to a single parent increased by DM 1,404 and the child deduction by DM 3,482 per child. It is the impact of these combined changes that I will estimate in the empirical part of the paper.

To get a feeling for the magnitude of these changes, consider a working single parent with two children who has a gross income of about DM 3,000 per month. With the marginal tax rates that applied in 1985, she owes about DM 4,800 in taxes. Keeping the same marginal tax rates but adjusting her taxable income to reflect the child and household deduction levels for 1990, her tax liability is reduced to about DM 3,600. Because of the changes in the tax deductions her net income increases by about DM 100 per month.

A number of additional provision exist for families with children that also impact single parent's labor supply choices. Single-parent families are eligible for a child-care deduction. Furthermore, there are a number of benefits, including maternity benefits for working mothers and child benefits that have a universal component and a means-tested component. As of 1986, all parents who rear their child by themselves and do not work more than 19 hours a week are entitled to child-rearing benefits. If a mother was employed prior to the birth of a child, the

employers must protect the mother's job for up to 12 months in 1986, up to 18 months in 1988 and up to 24 months in 1990.⁶

Identification of Effects

Standard labor theory predicts a positive effect of the expanded tax deductions on labor force participation. Post-tax income increases but only for taxpayers who qualify - single parents with earned income - inducing those with a reservation wage close to the margin to enter the labor force. The expansion of the tax deduction occurred simultaneous with a large number of other changes that affect labor supply choices. Over time, changes in society's attitudes about women and mothers in the labor force, reductions in the marginal tax rates across the board, and increases in the standard deduction for all taxpayers coincided with the expansion of the tax deductions, as did the tax treatment of some other sources of income. All of these factors influence labor supply and may confound the impact of the expansion in tax deductions.

However, because the increases in tax deductions are only available to single parents, it is possible to view the increase as a treatment to single parents and to let childless single adults serve as a control group for this natural experiment. The focus is on single adults and not on married parents who also benefit from the increase child deductions - though not from the household deduction - mainly for two reasons. As shown above, single parents are a vulnerable segment of the population that tends to rely heavily on welfare payments and that faces numerous constraints in their decision to enter the labor force. At a time in which the welfare system is under heavy attack, finding alternative ways for these households to sustain a minimum standard of living while acknowledging the difficulty of their choices is of particular importance. Secondly, single-adult households cannot reallocate resources within the household to maximize utility.

Thus I do not need to consider the joint decisions about work and child rearing that occur in households with more than one adult.

The empirical approach taken in this paper is closely linked to the work by Eissa and Liebman.⁷ Eissa and Liebman estimate the impact of expansions of the Earned Income Tax Credit in the United States by comparing changes in labor force participation over time of single mothers who are eligible for the tax credit to changes in labor force participation of single childless women who do not qualify for the credit. Eissa and Liebman find that single mothers' labor force participation increases 2.4 percent more than that of single childless women. When controlling for confounding demographic characteristics in a probit model, the treatment effect increases to around seven percent. In both specifications, the treatment effect is significant.

Data and Sample Selection

To estimate labor supply choices of single parents empirically, data from the German Socio-Economic Panel Data (GSOEP) are pooled over the years 1984 to 1990. The GSOEP is a representative longitudinal sample of persons and households in West Germany. The sample includes heads of households age 17 to 55 who are either never married, widowed or divorced, and it does not include any retired head. Furthermore, all those remaining in the sample live in a household by themselves or as the only adult in a household with children. I will refer to the first group as single childless adults and the second group as single parents.

Table 1 presents means and standard deviations for characteristics of all single adults, and then separately for single parents and single childless adults. Pooling the seven years results in a sample with 3397 observations of which 25.5 percent are single parents. The single parents have on average 1.54 children, eight percent have very young children of age three or less, and about

Table 1: Means and Standard Deviations for Single Adult Households

	All Adults		Single Parents		Single Childless Adults	
	mean	std. dev.	mean	std. dev.	mean	std. dev.
Single Parent	.255	.436	1.00	0.00	0.00	0.00
Male	.447	.497	.188	.391	.537	.499
Age (range 17 to 55)	36.0	10.2	39.8	8.69	34.6	10.4
Number of children	.394	.778	1.54	.776	---	---
Children age<4	.019	.137	.075	.263	---	---
Children age 4-6	.031	.174	.122	.328	---	---
Head is Divorced	.245	.430	.463	.499	.170	.376
Head is Widow(er)	.084	.278	.217	.412	.039	.194
Occupational disability	.185	.388	.185	.389	.185	.388
Education (7-18 years)	119	2.71	11.2	2.39	12.2	2.77
Univ./Vocational Degree	.764	.425	.717	.451	.780	.414
Part-Time/Irregular Work	.082	.274	.162	.369	.054	.226
Works Full-time	.693	.461	.503	.500	.758	.428
Apprenticeship Program	.019	.137	.003	.059	.025	.155
Gross Labor Income (earnings + bonuses)	31,179	24,764	23,338	22,770	33,871	24,853
Non-Labor Income	1,476	5,693	2,965	7,714	966	4,702
Lives in the North	.271	.445	.256	.437	.277	.447
Lives in the South	.300	.458	.309	.462	.297	.457
Lives in Central Germany	.429	.495	.435	.496	.427	.495
Observations		3397		868		2529

The data are pooled annual data from the German Socio-Economic Panel (GSOEP) covering the years 1984 to 1990. Means and standard deviation (in parenthesis) are presented for adults age 17 to 54 who are labeled in the GSOEP as single parents (Alleinerzieher) or as living in a household as the only adult.

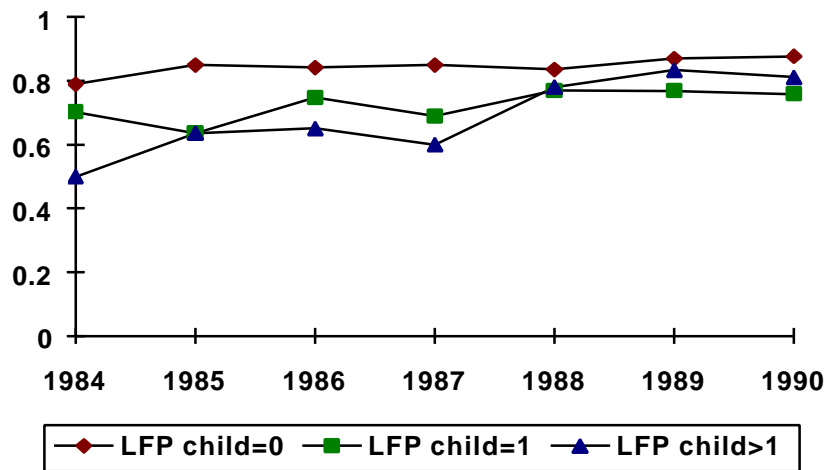
twelve percent have children age four to six.

The two groups in the sample show some interesting differences. Single parents tend to be older than single childless adults, and there are noticeably fewer men among the single parents: only nineteen percent of the single parents are male as opposed to 54 percent among the single childless. Furthermore, single childless adults have on average about one more year of education than single parents.⁸ In addition to years of education, I include whether the individual has finished an apprenticeship program or a university degree. In Germany, the employability of an individual is largely determined by certificates indicating that the adult not only attended university or participated in an apprenticeship program but also finished the program. Table 1 shows that 78 percent of all single childless adults possess such a certificate while single parents are on average about six percent less likely to have a certificate.

In this study, I am particularly interested in the employment status of the adult. Among all households with a single adult, 69.3 percent work full-time, eight percent part-time or irregularly, and about two percent participate in an apprenticeship. Among the single parents 50.3 percent work full-time and sixteen percent part-time or irregularly, while among the single childless adults 75.8 percent work full-time and only five and a half percent part time. Labor force participation for single parents is thus substantially lower with 66.8 percent compared to a labor force participation rate of 83.7 percent for childless adults.

Figure 1 shows what happened to labor force participation over the years for single-adult households without children, with one child and with more than one. Labor force participation for childless adults increased from 1984 to 1985 and remains rather stable in the following years at around 85 percent. For single parents with children there appears to be more of an upward trend over the years, particularly for households with several children, and 1986 and 1988 show

Figure 1: Labor Force Participation with different number of children



peaks in the general trend. Since 1986 and 1988 are the years of the increase in tax deduction, this provides some evidence of a positive impact on labor force participation of single parents with one. However, the declines in participation rates in 1987 and after 1988 seem to indicate that the incentives were too small to have a lasting effect.

Looking at single parents with more than one child who stand to benefit the most from the expansion of the child, the graph indicates that the changes in 1986 had no large impact but that the additional increase in 1988 may have had a more lasting positive impact on their labor force participation rates. The impression is that labor force participation rates are closer together post 1988 than they are prior to 1988, lending some support to the claim that the tax reforms had some positive impact on labor force participation of single parents.

A Probit Estimator for the Difference in Participation Rates

Because the two groups differ in important ways, we need to account for observable differences between the two groups that can affect their labor supply choices. Table 2 presents

results from a probit estimation with the following specification:

$$\Pr (LFP_t=1) = \Phi (\sum_j \beta_j X_{jt} + \gamma_t \text{Year}_t + \delta_t \text{SPR}_t * \text{Year}_t)$$

where LFP_t indicates participation in the labor force in year t , X_t is a vector containing socio-economic characteristics in year t , Year_t is a vector of indicator variables for the years, SPR_t indicates whether the adult is a single parent in year t , and Φ is the standard normal density function. While the year dummy variables account for common trends in labor force participation, the coefficients on the interaction terms between the years and the dummy for single parent, δ_t , capture the difference in differences between single parents and childless single adults.

Coefficients from a probit estimation are presented together with their standard errors and the marginal effects that capture $\partial E[y|x] / \partial x = \beta \Phi(X'\beta)$. The first three columns present estimation results from a specification without any controls other than the year dummy variables while the last three columns show the results with all relevant controls included.

Looking first at the uncontrolled results, the negative and significant coefficients for the interaction terms indicate that labor force participation of single parents is significantly lower than that of single childless adults. From 1985 to 1986, for example, the difference is reduced by 1.7 percent from 18.2 percent in 1985 to 15.5 percent in 1986. The results show that the difference drops in 1986 and 1988, the years in which the tax deductions were expanded. However, in other years the difference increases, not lending support to the hypothesis that the increases in the tax deductions for single adults had a lasting and measurable impact on their decision to enter the labor force.

Table 2: Probit Estimation (dependent variable: labor force participation)

	Marginal Effects	β	Standard ⁹ Error	Marginal Effect	β	Standard Error
Single Parent * 1984	-.133 **	-.485 **	.116	.050	.198	.158
Single Parent * 1985	-.182 **	-.663 **	.141	-.021	-.085	.180
Single Parent * 1986	-.155 **	-.563 **	.148	-.011	-.043	.160
Single Parent * 1987	-.176 **	-.690 **	.145	-.013	-.051	.196
Single Parent * 1988	-.108 **	-.393 **	.162	.078	.308	.218
Single Parent * 1989	-.122 **	-.443 **	.158	.034	.133	.204
Single Parent * 1990	-.142 **	-.516 **	.143	.024	.096	.196
Non-labor Income	----	----	----	-.002 **	-.008 **	.004
Male Head	----	----	----	.007	.029	.058
Age of Head	----	----	----	.028 **	.108 **	.027
Age ² (*100)	----	----	----	-.033 **	-.129 **	.035
Number of Children	----	----	----	-.041 **	-.160 **	.071
Youngest Child < 4	----	----	----	-.339 **	-1.337 **	.243
Youngest Child 4-6	----	----	----	-.194 **	-.767 **	.179
Divorced	----	----	----	-.052 **	-.207 **	.076
Widowed	----	----	----	-.187 **	-.737 **	.130
Occupational Disability	----	----	----	-.095 **	-.375 **	.068
Years of Education	----	----	----	-.003	-.001	.012
With Complete Degree	----	----	----	.152**	.599 **	.071
South Germany	----	----	----	-.078	-.306 **	.122
Central Germany	----	----	----	-.106 **	-.419 **	.069
State Unempl. Rate	----	----	----	-.018 **	-.071 **	.018
1984	.221 **	.803 **	.066	-.134	-.530	.484
1985	.256 **	.933 **	.074	-.106	-.403	.498
1986	.275 **	1.00 **	.073	-.090	-.355	.484
1987	.284 **	1.03 **	.089	-.082	-.324	.502
1988	.269 **	.979 **	.077	-.115	-.454	.505
1989	.309 **	1.126 **	.088	.084	-.332	.489
1990	.318 **	1.160 **	.082	-.086	-.338	.486
log likelihood	-1559			-1619		
Observations	3222			3222		

** Statistically significant at the 5 percent significance level

* Statistically significant at the 10 percent significance level

Adding socio-economic factors as controls eliminates any significance in the difference participation rates: an additional DM 1,000 of non-labor income increases labor force

between single parents and single adults: the magnitude of the coefficients for the interaction terms are closer to zero and no longer significant. When such factors as human capital endowment, age, marital status, location, gender, or income sources that are independent of work effort are allowed to vary across the two groups, labor force participation rates move along the same paths over time for both groups.

Labor force participation for all single adults is explained by the socioeconomic situation of the household. Age positively affects labor force participation rates but decreasingly so. Income sources that are unrelated to earnings have a significant though small effect on participation by .2 percent. Completion of a vocational training or university program significantly increases the probability that an adult works. Having more children and having children of pre-school age has a negative and large impact on labor force participation. A high unemployment rate in the state in which the adult lives lowers the probability of participation in the labor force. Finally, widows or widowers and divorced adults are less likely to participate in the labor market than adults who have never married. All of those factors have the expected sign and are statistically significant.

Results from this probit specification suggest that the financial incentives from the increased tax deduction did not induce single parents to enter the labor market. According to the results from the longer probit specification, any narrowing of the gap in labor force participation between single parents and single childless adults can be attributed to observable differences between the two groups. For example, over the years the share of divorced adults in the group of single parents has increased at the expense of the share of widowed adults. Such a change affects the labor force participation both because widows and widowers are less likely to participate in the labor force than divorced household heads, and because divorced parents tend to

be younger than widowed parents. Similarly, the number of male single parents has increased over the years. Since men tend to be better educated, single parents as a group may have gained over the years compared to single childless adults because of gains in the average education level.

Summary and Discussion of Results

We find little evidence that the adult's labor force participation is determined by financial factors such as tax deductions or the amount of income that is not related to employment. The picture that emerges is instead one in which labor force participation is related to the adult's marital status, her age, her human capital endowment, and the number and age of children in the household. At least in the eighties, the institutional environment and probably the lack of adequate child care appear to have dominated any financial constraints. Lowering the tax burden for single parents in an attempt to make work pay and to get single parents to enter the labor market to provide for themselves and their children through their own earnings would thus not appear to be a effective policy.

Though the results confirm the findings by Staat and Wagenhals¹⁰ that single mothers' labor supply in Germany is not determined by financial variables, Eissa and Liebman¹¹ find a more significant treatment effect when estimating the responses to an expansion of the Earned Income Tax Credit in the United States. It is not surprising that they find a larger impact for a number of reasons. First, the attitude toward parenting is quite different in the United States. While in Germany particularly mothers of small are encouraged to stay home with the children - as can be seen in generous maternity leave policies and universal child benefits - no such protection exists in the U. S. and working mothers are more the norm. Also, child care is more readily available to working mothers in the United States, reducing non-financial barriers to entry.

Secondly Eissa and Liebman investigate the impact of a rather substantial expansion of a refundable tax credit. When compared to the impact of a tax credit, tax deductions are more regressive. An increase in a tax deduction by \$2,000, for example, reduces tax liabilities by $\tau \cdot \$2,000$, where τ is the taxpayer's marginal tax rate. The higher the marginal tax rate, the higher the benefits from increasing the tax deduction. Moreover, a refundable tax credit of the same amount as a tax deduction increases post-tax income by a larger amount. Post-tax income increases for all working single parents by the full amount and not just by a fraction depending on their marginal tax rate. If the tax credit is refundable, working parents who do not owe taxes or owe less than the available credit receive a refund from the government and thus benefit fully.

Thus, though the empirical work in this paper does not show a significant impact of the expansion in tax deductions, tax relief in a form that looks more like the Earned Income Tax Credit may be a more effective policy, particularly if single parents preferences for work have changed and child care has become more easily available.¹² Tax credits or tax deductions are also desirable welfare tools because they do not have the problem of stigma that is common to other forms of support from the government, and that tends to lead to relatively low take-up rates. Blank and Ruggles estimate that in the United States, the participation rate for Aid to Families with Dependent Children (AFDC) is 62 to 72 percent and that for food stamps as low as 54 to 66 percent for the years 1986/87.¹³ With take-up rates as high as 80 to 86 percent for the Earned Income Credit, tax relief may in effect provide a tighter safety net for working poor single mothers than other more targeted transfer programs.¹⁴

Endnotes

- ¹ DIW Wochenbericht 42/90, Deutsches Institut für Wirtschaftsforschung, Berlin, 1990.
- ² Fischer, I. and R. Hauser (1988). "Lone-Parent Families in the Federal Republic of Germany." Arbeitspapier 275, Sonderforschungsbereich 3, J. W. Goethe Universität Frankfurt und Universität Mannheim.
- ³ Staat, M. and G. Wagenhals (1996). "Lone Mothers: A Review." Population Economics 9(2): 131-140.
- ⁴ Henly, J.R. , Y. Hasenfeld, and J. Handler (1997). "The Workplace Dynamics of Low-Wage Jobs: How Welfare Recipients, other Low-Income Women, and Employers Experience Work. ", Work presented at the 19th Annual Research Conference of the Association for Public Policy Analysis and Management, Washington, DC, November 1997.
- ⁵ Spahn, P. B., H. Kaiser, and T. Kassella (1992). "The Tax Dilemma of Married Women in Germany." Fiscal Studies 13 (2): 22-47.
- ⁶ The child-rearing benefits may run counter to the impact of the increase in tax deduction on single parents' labor supply. Since parents who rear their children are allowed to work 19 hours before losing eligibility for the child-rearing benefits, however, the impact of the tax deduction on labor force participation of single parents may not be influenced greatly by this concurrent change.
- ⁷ Eissa, N. and J.B. Liebman (1996). "Labor Supply Response to the Earned Income Tax Credit." Quarterly Journal of Economics : 605-637.
- ⁸ The German education provides a number of parallel tracks after four years of elementary school that lead to a variety of different degrees and allows for cross-overs and add-ons. Instead of creating a necessarily arbitrary ranking of these possible degrees and the paths taken to obtain them, I will capture an individual's school education by using a measure from the GSOEP that assigns the minimum number of years necessary to reach any level of schooling.
- ⁹ Standard errors are adjusted through bootstrapping to account for multiple observations from the same individual.
- ¹⁰ Staat, M. and G. Wagenhals (1994). "The Labour Supply of German Single Mothers: A Bivariate Probit Model. " DIW Vierteljahresbericht, Deutsches Institut für Wirtschaftsforschung.
- ¹¹ See footnote 7.
- ¹² The Earned Income Tax Credit (EITC) has some shortcomings as well, particularly related to the phase-out region of the credit that provides negative work incentives to higher income taxpayers. For a more extensive discussion of the EITC the reader is referred to the article by Scholz (see footnote 14).
- ¹³ Blank, R. and P. Ruggles (1993). "When do Women Use AFDC and Food Stamps? The Dynamics of Eligibility versus Participation." Mimeo, Northwestern University and The Urban Institute, Washington, DC.
- ¹⁴ Scholz, J. K. (1994). "The Earned Income Tax Credit: Participation, Compliance, and Anti-Poverty Effectiveness." National Tax Journal 47: 59-81.