

## Income Shocks, Intergenerational Transfers, and Human Capital in Germany\*

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### Summary

*This paper uses the GSOEP to analyze the impact of German reunification on financial transfers from parents to their adult children. A difference-in-differences approach is applied to estimate probability and amount of transfers. The analysis indicates that, across time, Easterners are less likely to make transfers than Westerners. Over time, the propensity to give to all children has decreased in the East, and the amount given has increased in the West. However, transfers to college-age children have increased in both regions. These results support a relevant role for liquidity constraints and human capital investments in the determination of parental transfers.*

### 1. Introduction

German reunification provides a unique natural experiment in economics: the integration of a formerly centrally planned economy into a market economy. The impact of reunification on the lifetime incomes of the population has been different across groups. In the Eastern regions, retirees have benefited from an increase in pension benefits and the younger generations have seen their incomes rise sharply because of reunification-induced policies. In contrast, the financial burden of funding subsidies to the East has fallen mainly on West Germans. If these changes result in differing burdens across generations, families can choose to reallocate their resources to mitigate the effect of transition.

Reunification has also changed the incentives to engage in further education or training both for Easterners and Westerners. After reunification, Easterners have a greater incentive to acquire market-specific human capital in order to adapt to the new market-oriented environment than they did under the previous regime. Westerners have an incentive to update their skills because of increased competition in the labor market. These incentives are stronger for the younger cohorts than for the older cohorts in both regions because the younger cohorts can reap the returns from their investment over a longer period of time. However, the younger cohorts are also more likely to be liquidity constrained. Financial transfers from parents could help to alleviate these liquidity constraints.

In this paper, I use the GSOEP data set for the period from 1989 to 1993 to analyze the impact of the reunification shock on transfers from parents to their adult children.

In particular, I investigate the extent to which windfall gains are shared within a family, and the extent to which parental transfers help alleviate liquidity constraints for adult children. I apply a difference-in-differences approach and compare the difference in transfer behavior between East and West Germans before and after reunification.

Financial transfers within families has been a topic of considerable interest among researchers in recent years.<sup>1</sup> Perhaps the most prominent strand of research builds on the altruism model introduced by Becker (1974) and Barro (1974). Becker and Tomes (1976) and Behrman, Pollack, and Taubman (1982) incorporate parental investment in children's human capital into this framework. Cox (1990) and Altonji, Hayashi and Kotlikoff (1997) explore the connections between parental transfers and liquidity constraints. Croda (2000) builds on these studies and develops a model in which, on one side, parental transfers are altruistically motivated and, on the other side, children are likely to be liquidity constrained early in adulthood and make their own human capital investment decisions. This model provides the theoretical background for the present paper.

This article contributes to the literature on intergenerational transfers and documents transfers from parents to their children in Germany. Despite their relevance, empirical studies of parental transfers in Germany remain scarce.<sup>2</sup> This paper is one of the first to use the GSOEP to address inter vivos transfers from parents to their children.<sup>3</sup>

Determining the nature and extent of intergenerational family exchanges is key to evaluating the effectiveness of government redistribution policies, the intergenerational transmission of inequality, and the degree of risk sharing. If family members share income from all sources, intergenerational transfers within families can neutralize most, if not all, of the government policies aiming at altering the intergenerational distribution of resources, like social security programs or public debt. Understanding the extent to which generations are willing to share their

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<sup>1</sup> A comprehensive review is provided in Dunn (1997). See also McGarry (1999).

<sup>2</sup> As far as western countries are concerned, most work addresses transfers in the United States and France.

<sup>3</sup> In a companion paper, Croda (1999), I analyze transfers from adult children to their elderly parents.

wealth is therefore crucial for the accurate evaluation of changes in social programs. Moreover, if young households want to invest in human capital to increase their future earnings but cannot borrow funds, insufficient investment in human capital may follow and the overall efficiency of the economy is affected. Parental transfers can modify this environment. Young households may be able to rely, at least in part, on the support of their parents to secure efficient human capital investment.

The remainder of the paper is organized as follows. The next section provides a brief background for the empirical analysis. Section 3 describes the data used in this study and presents summary statistics. Section 4 discusses the empirical specification. The results are analyzed in section 5. Finally, section 6 concludes.

## 2. Background

Monetary, economic and social reunification in Germany took place on July 1, 1990. At this time, the West German legal, fiscal, and social insurance systems were extended to the East. In particular, East German wages and pensions were converted to West German marks at an exchange rate of one for one.

In the labor market following reunification, the Western trade unions gradually took over the Eastern wage bargaining system, and the conversion to the Western system was accomplished in most industries within the next year. At the eve of reunification, average gross income from wages and salaries in the East was just about one-third of the West German level. By the end of 1992, East German employees were earning, on average, around two-thirds of West German gross income. In the following years, the gap has continued to narrow, but more slowly.<sup>4</sup>

Following reunification, the West German pension system was adopted in the East with minor exceptions and an adjustment period. On average, East German pensions increased by more than 60 percent between mid-1990 and the end of 1991. Since 1992, Germany has a unified public pension system. As wages converge rapidly to West German levels, so are pensions.

The reunification process has been financed mainly by government borrowing and, in part, by a number of tax increases (including a solidarity surcharge of 7.5 percent on the income tax). Subsidies from the Western states to the Eastern ones have been estimated at 4 to 5 percent of West German GDP for every year since 1991, and they made up more than 50 percent of East German GDP in 1991, down to about 40 percent in 1993.

Against this institutional background, I expect Eastern children to be wealthier over their lifetimes than their parents and vice versa for Western children. From a pure 'altruism model' perspective, financial transfers to children

would then be expected to decrease in the East and increase in the West. However, reunification has also increased the incentives to invest in human capital in both regions, especially for the younger cohorts of the population. Unfortunately, the younger cohorts are those that are more likely to be liquidity constrained. Parental transfers could help children overcome these liquidity constraints. From this perspective, I would expect transfers to younger children to increase in both regions. A model of altruistic parents and liquidity constrained children, like the one developed in Croda (2000), allows for an increase in parental giving even though children are expected to be wealthier than their parents, if the children are constrained in the financial markets. On the other hand, if children are not liquidity constrained, Croda (2000) predicts that transfers will depend on the relative income of children and their parents.

The empirical analysis will shed light on these hypotheses.

## 3. Data

The data analyzed in this study are drawn from the GSOEP, a continuing longitudinal survey of individuals in private households in Germany. When appropriately weighted, the GSOEP is representative of the non-institutionalized population residing in Germany. The survey began in 1984 in the former West Germany. The first wave in the Eastern states was administered in June 1990, the month before the monetary, economic and social union came into effect. Since several questions in the survey refer to the previous calendar year, the 1990 wave allows cross-sectional comparisons between East and West for the period preceding reunification. Moreover, since respondents are followed over time, it is possible to compare the behavior of Easterners and Westerners before and after reunification. The GSOEP is therefore quite well suited for the analysis of the impact of changes such as those triggered by German reunification. It is also well suited for studying intergenerational transfers between living people. In fact, it collects information on transfers both to the generation above and the one below the reporting generation, and some information on the children of every woman in the sample, thus allowing me to control for characteristics of recipients in the analysis.<sup>5</sup>

Because the goal of this paper is to shed light on the impact of the reunification shock on parental transfer behavior, I focus on the survey years 1989 through 1993,

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<sup>4</sup> These wage increases have been accompanied by widespread unemployment, previously not experienced in the East. However, overall, the disposable income of unemployed workers has also been higher than before reunification, even after job loss, because unemployment benefits are tied to the average wage level.

<sup>5</sup> See Wagner, Burkhauser and Behringer (1993) for more information.

and I use two data points before and two data points after reunification. Data from the survey year 1992 (and 1994) are omitted from the analysis because questions about transfers were not asked in the relevant questionnaires. The present study uses the data as repeated cross-sections.<sup>6</sup> The empirical analysis adopts the perspective of the respondents as parents, and investigates the financial transfers given to non-coresident adult children. Restricting the sample to parents (plus their spouses, if present) who have at least one child older than 18 years of age and not residing with them, generates a data set of 6,705 parent records, with 13,549 eligible children, which constitutes the basic sample for this project. About one-third (30 percent) of the families in the sample reside in the East.<sup>7</sup> About half (56 percent) of the records refer to the post-reunification period.

Table 1 reports means and standard errors of selected variables, disaggregated by region. Overall, Western and Eastern families have reasonably similar demographic characteristics. Western parents are on average 63 years old, about 3 years older than their Eastern counterparts. There are more married parents among Easterners than among Westerners. Westerners have spent on average 11 years in school, half a year less than Easterners. Western and Eastern families in the sample have approximately the same number of children living outside the home. However, Eastern parents seem to have younger children, consistent with the parents themselves being younger. The gender composition of the children is very similar across regions.

The direction of the income and wealth differences between Easterners and Westerners is basically as expected.

However, the magnitude of the gap is striking. Only 34 percent of East Germans own their own home, compared to 57 percent of West Germans. Labor earnings, homeownership, and income from assets are much higher for West Germans than for East Germans. Average labor earnings in the West are about 27,500 DM and 18,000 DM in the East. The corresponding amounts for social security are 14,500 DM in the West and 4,900 DM in the East, and for income from assets about 800 DM in the West and 300 DM in the East (amounts are in constant 1991 prices).<sup>8</sup>

Table 2 shows the patterns of transfer behavior by region: 13 percent of Western parents and 10 percent of Eastern ones report having given money to children (and children-in-law) not living with them at some time over the

<sup>6</sup> Only the West German and the East German subsamples of the GSOEP are used. Individuals are allocated to the two groups, East and West, according to where they resided when they were first surveyed. Hence, both East and West German groups may include people who since entering the survey (and in particular since 1990) have migrated between East and West, as well as persons who commute to their jobs in either direction.

<sup>7</sup> Throughout the data analysis, the term *family* refers to parents and all their children, living with them or not, including adult children. The term *household* denotes the nuclear group of related persons who share the same living quarters. A household may be an individual, a married couple, or one or two parents living with dependent children sharing living quarters. A family can be made up of more than one household.

<sup>8</sup> Throughout the paper, a different deflator is used for East and West. In the comparisons of the 1990 amounts, an exchange rate of one to one is used. For the following years there is one unified currency.

Table 1

Means of Selected Variables by Region

Variable	All Mean	(N = 6705) Std Error	West Mean	(N = 4703) Std Error	East Mean	(N = 2002) Std Error
<b>Demographic Variables</b>						
Age of head	61.90	(0.138)	62.89	(0.166)	59.58	(0.243)
Head married or w/ partner	0.70	(0.006)	0.68	(0.007)	0.73	(0.010)
Head years of schooling	11.12	(0.028)	10.96	(0.031)	11.51	(0.056)
Number of children outside the household	2.02	(0.014)	2.02	(0.018)	2.02	(0.025)
Minimum age children	30.88	(0.132)	31.31	(0.159)	29.87	(0.236)
Number male children younger than 18	0.05	(0.003)	0.04	(0.003)	0.05	(0.005)
Number female children younger than 18	0.04	(0.003)	0.04	(0.003)	0.06	(0.006)
Number male children over age 18	1.18	(0.012)	1.21	(0.015)	1.13	(0.022)
Number female children over age 18	1.14	(0.012)	1.14	(0.015)	1.12	(0.021)
Closest child lives in town	0.59	(0.006)	0.58	(0.007)	0.60	(0.011)
Head employment status	0.44	(0.006)	0.41	(0.007)	0.51	(0.011)
Fam home ownership	0.50	(0.006)	0.57	(0.007)	0.34	(0.011)
<b>Income variables</b>						
Household labor earnings	24604	(422)	27445	(572)	17929	(401)
Household social security income	11676	(186)	14552	(245)	4921	(154)
Household income from assets	648	(26)	785	(37)	327	(12)
Source: Author's calculations using GSOEP 1989–1993. Parents-based sample. Amounts are in constant 1991 prices. A different deflator has been used for East and West.						

Table 2

## Transfers from Parents to Children or Children-in-Law

Survey year	1989	1990	1991	1993	1989–1993
Parents with eligible children	1 129	1 831	1 913	1 832	6 705
— East Germans	—	659	680	663	2 002
— West Germans	1 129	1 172	1 233	1 169	4 703
<b>East</b>					
Number of donors	—	72	68	56	196
Percentage of donors	—	11.10%	10.10%	8.50%	9.90%
Average amount given DM > 0 (Std Error)	—	2518 (393)	2492 (287)	2016 (351)	2 364 (202)
<b>West</b>					
Number of donors	154	158	164	138	614
Percentage of donors	13.80%	13.70%	13.60%	12.20%	13.30%
Average amount given DM > 0 (Std Error)	4567 (476)	4506 (420)	4930 (392)	4793 (462)	4 699 (218)

Source: Author's calculations using GSOEP 1989–1993. Parents-based sample.  
Amounts are in constant 1991 prices. A different deflator has been used for East and West.

four survey years.<sup>9</sup> Among those who give, Westerners give on average about 4,700 DM, almost twice as much as Easterners. The pattern of giving follows a common trend in both regions and the relative regional difference in the amounts appears to be stable over time. There is a decrease both in the propensity to give and in the amount given over time, especially in 1993, but the changes before and after reunification are not substantial. The median amounts (not shown) follow this same pattern.

The differences between donors and non-donors (not shown) are basically as expected. In particular, donors are wealthier than non-donors, and they report higher labor earnings and higher income from assets.

#### 4. Empirical Implementation

The empirical approach consists of examining two aspects of transfer behavior: the propensity to make a transfer, and the amount given.

To identify the impact of the reunification shock on transfer behavior, it is necessary to apply a procedure that allows for both economy-wide trends in giving that are independent from reunification, and region- and time-specific unobservable factors that capture differences in giving between East and West, and within East and West over time. The difference-in-differences approach satisfies these requirements and allows for differential economy-wide trends in transfer behavior between East and West.

The idea is to estimate the following type of relationship:

$$(6) \text{Transfer Outcome}_{it} = \mathbf{b}_0 + \mathbf{b}_1 \text{EAST}_i + \mathbf{b}_2 \text{UNIF}_{it} + \mathbf{b}_3 [(\text{EAST}_i) * (\text{UNIF}_{it})] + \mathbf{Z}_{it}' \mathbf{g} + \mathbf{e}_{it}$$

for each transfer outcome. Parents' households are indexed by  $i$ , and time is indexed by  $t$ .  $\text{EAST}_i$  is an indicator variable assuming the value 1 for East Germans and 0 for West Germans;  $\text{UNIF}_{it}$  is an indicator variable that equals 1 if the observation comes from after the reunification and 0 otherwise;  $(\text{EAST}_i) * (\text{UNIF}_{it})$  represents their interaction; and  $\mathbf{Z}_{it}$  is a set of observable family characteristics, most notably income and wealth variables. Parental resources enter in the form of (logarithm of) total income and an indicator for home ownership. Years of schooling of the head of the parents' household, another possible proxy for lifetime resources, also appears in  $\mathbf{Z}_{it}$ . In addition,  $\mathbf{Z}_{it}$  contains other socio-demographic variables that may affect transfer behavior: age, sex interacted with marital status, and employment status of the head of the household, an indicator of satisfaction with health status, number of children younger and older than 18 interacted with their gender, age of the youngest child, number of living parents of the potential donors, an indicator for whether there are children living in the same town as their parents. Finally, the error term  $\mathbf{e}_{it}$  represents those forces determining the transfer outcomes that are unobservable and is assumed to satisfy  $E[\mathbf{e}_{it}] = 0$ .

<sup>9</sup> In Croda (1999), I find that 2 percent of Eastern households and 5 percent of Western ones in the GSOEP make transfers to elderly parents over the same time period. The sample used in that article refers to households with eligible elderly; hence it is different from the one used here.

In this framework, UNIF and EAST control for the impact on transfer behavior of the time effect and the effect of being East German, respectively, and their interaction (EAST)\*(UNIF) captures the changes in transfer behavior for East Germans relative to West Germans before and after reunification. The estimate of  $\beta_3$  indicates whether the propensity to give for East Germans changed more after reunification than it did for West Germans.

For each outcome, I apply ordinary least squares estimation on the pooled sample. In the equation for the propensity to give, the dependent variable is an indicator that takes the values of 1 if the parent household reports having made a transfer in a survey year, and 0 otherwise. In the amount equation, the dependent variable is the (logarithm of the) amount given.

### 5. Estimation Results

Table 3 reports regression results for the probability of making a transfer and for the amount given. The first two columns present estimates obtained using all the obser-

vations in the basic sample. However, children are more likely to be credit constrained if they are still investing in human capital. To investigate the role of liquidity constraints, I select a subsample of parents with all children between the age of 18 and 25, and another with all children older than 25. The second and third pair of columns in Table 3 present estimates for these subsamples.

As expected, the incidence of giving is different in the three groups: 12 percent of parents give in the basic sample, compared to 20 percent of parents of younger children, and to 10 percent of parents of older children (not shown). The estimation results are broadly in accordance with prior expectations and with results available for the United States. The sign patterns in the probability and amount regressions are quite similar. The effects of the respondents' characteristics are consistent with intuition. More educated (with more years of schooling), wealthier (in terms of total income and homeownership) parents are more likely to make a transfer.<sup>10</sup> The age of

<sup>10</sup> The coefficients on parental income and on homeownership have an unexpected sign in the subsample of the younger children.

Table 3

**OLS Estimates of the Probability and of the Amount of Transfer**

	At least one child > 18		All children 18 to 25		All children older than 25	
	Probability	Amount	Probability	Amount	Probability	Amount
Intercept	-0.151 (0.070)	6.044 (0.754)	-0.022 (0.450)	11.195 (2.158)	-0.027 (0.083)	6.001 (0.927)
EAST GERMANY DUMMY (EAST = 1)	-0.039 (0.016)	-0.486 (0.173)	-0.09 (0.063)	-1.831 (0.344)	-0.03 (0.019)	-0.289 (0.243)
REUNIFICATION DUMMY (AFTER = 1)	-0.005 (0.008)	0.093 (0.090)	0.023 (0.047)	0.042 (0.317)	-0.018 (0.010)	0.148 (0.117)
INTERACTION EAST*REUNIF	-0.007 (0.014)	-0.073 (0.188)	-0.019 (0.068)	0.409 (0.437)	-0.007 (0.018)	-0.238 (0.254)
age of head/10	0.001 (0.011)	0.152 (0.095)	0.001 (0.040)	0.383 (0.325)	0.002 (0.013)	0.183 (0.128)
head single female	0.011 (0.014)	-0.293 (0.146)	-0.003 (0.062)	-0.65 (0.478)	0.02 (0.016)	-0.211 (0.175)
head married (omitted)	—	—	—	—	—	—
head years of schooling	0.024 (0.003)	0.043 (0.018)	0.038 (0.011)	0.02 (0.042)	0.013 (0.004)	0.030 (0.025)
minimum age children	-0.003 (0.001)	-0.002 (0.010)	0.005 (0.014)	-0.112 (0.077)	-0.004 (0.001)	-0.012 (0.013)
homeownership	0.007 (0.012)	0.284 (0.106)	-0.008 (0.046)	0.076 (0.285)	0.019 (0.013)	0.375 (0.131)
log real total household income	0.015 (0.003)	0.044 (0.045)	-0.01 (0.021)	-0.065 (0.109)	0.016 (0.004)	0.042 (0.050)
Number of observations	6 562	791	425	77	4 283	429

Source: Author's calculations using GSOEP 1989–1993. Standard errors adjusted for clustering on parents households in parentheses. Regressions include the following additional variables: number of living parents and parents-in-law of the household head, number of male children older than 18, number of female children older than 18, number of male children younger than 18, number of female children younger than 18, and indicators for health satisfaction of the head (and his spouse if present), employment status of the head, whether a child lives in the same town, missing total household income, missing distance where closest child lives, missing number of parents and parents-in-law of the head, and imputed income from assets.

Table 4

## Summary of difference-in-differences results (adjusted regressions)

<b>PANEL A : Regional differences, East vs West</b>				
	Probability of giving		Amount given   T>0	
	Before	After	Before	After
At least one child >18 years old	-0.039 (0.008)	-0.045 (0.012)	-0.486 (0.090)	-0.559 (0.148)
All children between 18 and 25 years old	-0.09 (0.063)	-0.109 (0.054)	-1.831 (0.317)	-1.422 (0.334)
All children > 25 years old	-0.03 (0.010)	-0.037 (0.013)	-0.289 (0.117)	-0.528 (0.190)
<b>PANEL B: Differences over time, After vs Before</b>				
	Probability of giving		Amount given   T>0	
	West	East	West	East
At least one child >18 years old	-0.005 (0.008)	-0.012 (0.012)	0.093 (0.090)	0.02 (0.167)
All children between 18 and 25 years old	0.023 (0.047)	0.004 (0.047)	0.042 (0.317)	0.451 (0.351)
All children > 25 years old	-0.018 (0.010)	-0.025 (0.015)	0.148 (0.117)	-0.091 (0.230)
<b>PANEL C: Difference-in-differences [(East After-East Before) — (West After-West Before)]</b>				
	Probability	Amount   T>0		
At least one child >18 years old	-0.007 (0.014)	-0.073 (0.188)		
All children between 18 and 25 years old	-0.019 (0.068)	0.409 (0.437)		
All children > 25 years old	-0.007 (0.018)	-0.238 (0.254)		
Source: Author's calculations from regressions in Table 3. Standard errors adjusted for clustering on parents households in parentheses.				

children is negatively correlated with the likelihood that a transfer has taken place, and with the transfer amount, consistent with transfers being targeted toward liquidity constrained recipients.

Next, I focus the attention on the coefficients of the dummy variables EAST, UNIF and of their interaction (EAST)\*(UNIF). The EAST dummy has a negative coefficient across the different samples both in the probability and in the amount equation. The UNIF dummy has always a positive coefficient in the amount equation. In the probability equation it has a negative coefficient both in the basic sample and in the sample of older children, but it has a positive coefficient in the sample of younger children. The interaction between EAST and UNIF has a negative coefficient across samples and across transfer outcomes, except for the amount equation in the sample of younger children.

Table 4 summarizes in three separate panels the results obtained after rearranging these coefficients in difference-in-differences matrices for both transfer outcomes.<sup>11</sup> The top panel addresses the regional differences in giving between Easterners and Westerners, before and after reunification. The middle panel focuses on the differences over time in both regions. Finally, the bottom panel displays the differences-in-differences. The regional differences (panel A) for both outcomes are always negative, across time, and across samples. The differences between East and

However, they are also not statistically significant at the conventional levels, and the sample size in this sample is much smaller than in the other subsamples. See Croda (2000) for further discussion.

<sup>11</sup> The difference-in-differences matrices are not reported here because of space limitations, but are available from the author upon request.

West in all the three subsamples are negative both before reunification (−0.039, −0.09, −0.03 for the probability, and −0.045, −0.109, −0.035 for the amount) and after reunification (−0.045, −0.109, −0.037, and −0.559, −1.422, −0.528). These estimates indicate that both before and after reunification, East Germans are less likely to make a transfer with respect to their Western counterparts, and when they give, they give less. This is consistent with the fact that in the East there is less of a history of giving, most likely because of the existence of strong state support programs. The differences in giving over time show that in both regions there is a decline in the propensity to give to all eligible children, and to older children. However, the probability of giving to children in the 18–25 age range has increased over time in both regions. The amount given has increased over time across regions and across samples, except in the East for the sample of older children.<sup>12</sup> Finally the differences-in-differences in the last panel provide evidence that these effects have had a larger impact on East Germans, compared to West Germans.

## 6. Conclusions

The results presented here indicate that, across time, East Germans are less likely to give than West Germans. Over time, the propensity to give to all children, overall, has decreased in the East, and the amount given has increased in the West. However, transfers towards college-age children have increased in both regions, even though in the East, these children are expected to be wealthier over their lifetimes than their parents. These findings are consistent with the theoretical model proposed in Croda (2000) and support a relevant role for liquidity constraints and human capital investments in the determination of parental transfers.

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<sup>12</sup> However, the estimate is not statistically significant at the conventional levels.

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