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The Effect of Social Benefit Reform on Educational Inequality

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Abstract
Cross-country research argues that the design of welfare states and social protection systems shapes the intergenerational transmission of inequality. Studies that examine this relationship within a country are however lacking from the literature. Based on a quasi-experimental research design using difference-in-differences estimation and data from the Socio-Economic Panel, I analyse whether the educational disadvantage of children of long-term unemployment assistance recipients increased after changes to eligibility criteria, benefit levels, and conditionality were introduced in Germany in 2005. I find that differences in the probability to enter the academic secondary school track between children of parents receiving long-term unemployment assistance one year before the transition and children of parents not receiving unemployment or social benefits increased by 13 percentage points. In part, this was driven by the introduction of means-testing that changed the composition of unemployment assistance recipients. However, further decreases in the financial conditions of these already disadvantaged families following reductions in benefit levels appear as the main driver of the observed effect. Changes in parental subjective wellbeing due to increased benefit conditionality and stigma do not seem to play a significant mediating role. The findings highlight the important contribution of social policy to social mobility and equality of opportunity.

1. Introduction

To date, research struggles to pinpoint the degree to which the design of welfare states and social protection systems compensates or reinforces the degree to which disadvantage is transferred from parents to children. Most studies adopt comparative, cross-national designs to investigate the association between public institutions

and the intergenerational transmission of inequality (Beller and Hout, 2006; Esping-Andersen, 2014; Bukodi et al., 2018; Lindemann and Gangl, 2020). Still, these do not allow for a robust estimation of causal relationships given issues of unobserved heterogeneity. The small number of studies that exploits exogenous variation is limited to assessing the impact of educational systems (Pischke and von Wachter, 2008; Sturgis and Buscha, 2015; Betthäuser, 2017). Whether and how characteristics of social protection systems determine opportunities for intergenerational social mobility remains therefore unclear.

During the early 2000s, Germany's labour market and social protection system underwent radical reorganisation that led to an unprecedented shift from conservative Bismarckian principles of social insurance towards greater activation and employment flexibilization. These so-called 'Hartz reforms' formed part of wider efforts towards labour market deregulation and welfare state retrenchment observed in other European countries around the same time. Studying their effects thus generates insights about the potential implications of similar policies for the intergenerational transmission of disadvantage. The last of these four reforms, simply known as 'Hartz IV', received particularly attention. Raising concerns about social justice, it still figures in public discourse (e.g. Süddeutsche Zeitung, 2019) and has been put under close scrutiny regarding its economic, political as well as distributional consequences (e.g. Bradley and Kügler, 2019; Fervers, 2019; Goebel and Richter, 2007). While Hartz I-III comprised the introduction of new and the reform of existing active labour market policies in 2003 and 2004, Hartz IV modified unemployment and social benefit regulations in 2005. Its main feature was to merge unemployment assistance for the long-term unemployed and social assistance for those in need into one benefit scheme. As a result, individuals who are unemployed for more than a year lose their insurance-based claim to earnings-related benefits. Long-term unemployment assistance is now only provided if household incomes fall below subsistence level and has become highly conditional on active job search and participation in active labour market programmes.

The German Hartz IV reform thus offers a unique opportunity to study the impact of the social protection system on the intergenerational transmission of inequality based on a natural experiment. By removing earnings-related benefits for the long-term unemployed and increasing benefit conditionality for those in need, it seems likely that the reform not only affects the generation of current workers but also the outcomes and opportunities of their offspring. Still, we lack evidence on such intergenerational effects of the reform. These effects might be particularly detrimental and arguably unjust, since children who experience parental unemployment form already a disadvantaged group. Consistent evidence shows that children of unemployed parents have lower levels of educational attainment compared to children of parents who work (Coelli, 2011; Kalil and Wightman, 2011; Brand, 2015; Lohmann and Groh-Samberg, 2017; Lindemann and Gangl, 2019). Lower educational attainment, in turn, translates into poorer labour market outcomes and life chances more broadly. It is therefore vital to know whether the reform reinforced the transmission of disadvantage across generations, thereby widening inequalities within the child's generation.

By taking up this task, this study makes two contributions. Firstly, it expands the existing literature on the reform's effect on unemployment levels and duration

(Krause and Uhlig, 2012; Launov and Wälde, 2013; Hochmuth et al., 2019), job matching efficiency (Hertweck and Sigrist, 2012), and wages (Bradley and Kügler, 2019) by analyses that focus on inequality-generating processes that occur within families rather than the labour market. Investigating the outcomes of children of benefit recipients allows to identify long-lasting social consequences, which might have neither been anticipated nor intended when the reform was first devised.

Secondly, the study sheds further light on the role of public institutions in fostering social mobility and equality of opportunity. Past research suggests that social policies can work as an institutional moderator of the association between social origin and social destination. Employing hierarchical modelling techniques to analyse data from 21 countries, Lindemann and Gangl (2020) show that generous unemployment benefits mitigate the negative effect of parental unemployment on children's transition into tertiary education. However, by using a quasi-experimental approach, it is possible to pinpoint even more precisely how characteristics of the unemployment and social protection system shape inequalities in education and life chances. Focussing on the specific case of the Hartz IV reform therefore not only advances understanding of one of the most drastic welfare state transformations in Germany's recent history. It also importantly adds to the wider literature on the welfare state and social inequality from an intergenerational perspective.

Did the educational disadvantage of children whose parents receive long-term unemployment assistance increase after the implementation of the Hartz IV reform?

In Germany, the transition from primary to secondary school around age 10-12 constitutes a critical moment in children's educational careers. Due to rigid and highly stratifying tracking practices, secondary school track has long-lasting consequences on overall academic achievements and subsequent labour market trajectories (Neugebauer et al., 2013). Being adversely affected by parental unemployment before this transition can therefore be highly detrimental for future training and labour market opportunities. For this reason, secondary school track is chosen as children's outcome of interest. Investigating the reform's effect on later transitions, such as from secondary to tertiary education, is unfortunately not possible with the data at hand.

The next section outlines in greater detail Germany's unemployment and social benefit system before and after the reform. I then elaborate on why the reform likely led to lower educational outcomes for children of unemployment assistance recipients. The subsequent section describes the analytical strategy followed by the presentation of the empirical findings. A discussion of their implications for future research and policymaking is provided in the final section.

2. The German unemployment and social benefit system before and after 2005

In the comparative welfare state literature, Germany is considered a key representative of the conservative welfare state regime (Esping-Andersen, 1990). Organised based on the principle of social insurance, its welfare institutions centre around the
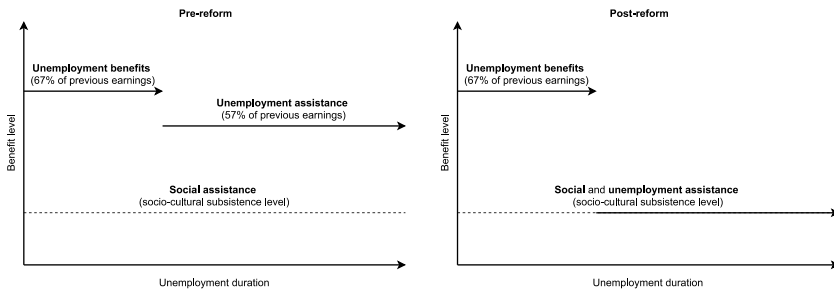
Figure 1. Benefit schemes and benefit levels by unemployment duration, pre- and post-reform.

worker and are underpinned by strong tripartite partnerships between employees, employers, and the state.

Until the early 2000s, Germany's protection of the unemployed consisted of two pillars (Hassel and Schiller, 2010). Both aimed at safeguarding the individual from experiencing a drop in living standards due to unemployment. The first pillar was 'Arbeitslosengeld', i.e. *unemployment benefits* from social insurance. These were generally paid for 12 months to individuals with social insurance contributions of at least 12 months before becoming unemployed. Depending on overall contributions, older individuals could even receive benefits for up to 36 months. Benefit levels were equivalent to 67 and 60 percent of previous earnings for individuals with and without children, respectively. The second pillar was 'Arbeitslosenhilfe', i.e. tax-funded *unemployment assistance*. Transfers from unemployment assistance were principally unlimited and paid to individuals whose claim to unemployment benefits expired. They were therefore also conditional on social insurance contributions. Replacement rates amounted to 57 and 53 percent for individuals with and without children, respectively. Payments only ceased if recipients repeatedly refused to accept work that was comparable to their previous employment or current benefit levels (Bäcker and Koch, 2004).

Implemented on January 1, 2005, the Hartz IV reform combined the second pillar of unemployment protection with means-tested basic income support. Before the reform, 'Sozialhilfe', i.e. tax-funded *social assistance*, provided all individuals in need who were not covered by unemployment insurance with a minimum social security net. Its main purpose was to reduce poverty and guarantee a legally defined socio-cultural subsistence level within households. Thus, individuals received social assistance only upon passing a means test. Refusal to take up work was strictly sanctioned with benefit cuts. There was hence a clear difference in benefit generosity and conditionality for individuals whose entitlement to social benefits was based on previous employment and social contribution records vis-à-vis financial hardship. After the reform, this distinction eroded. Since 2005 entitlement to earnings-related benefits ends with the expiration of unemployment benefits, which older workers can now receive for a shorter maximum duration of 18 months (Bäcker, 2017). Individuals who remain unemployed longer are only eligible for

means-tested basic income support. Figure 1 illustrates how benefit schemes and levels change by unemployment duration before and after the reform.

The main objective behind this dramatic policy shift was to reduce long-term unemployment and welfare dependance (Jacobi and Kluve, 2006). During the 2000s, the proportion of long-term unemployed among all unemployed had increased to almost 40 percent (Bundesagentur für Arbeit, 2019). For this purpose, the reform also redefined the category of people in need and divided them into two groups based on their ability to work (Goebel and Richter, 2007). Individuals who can work for at least 3 hours per day need to apply to the newly created unemployment assistance scheme called 'Arbeitslosengeld II' (ALGII).

Importantly, ALGII is accessible to individuals without employment as well as those on low incomes as an in-work benefit (Eichhorst and Marx, 2011). Individuals who cannot work for at least 3 hours per day, and who do not share a household with someone eligible for unemployment assistance, continue to receive social assistance. While benefit levels are similar, the main difference between the two schemes is that unemployment assistance is now highly conditional on active job search and participation in activation measures as well as related labour market programmes. Accordingly, harsh sanctions for non-compliance were introduced for recipients of unemployment assistance. By contrast, sanctions for recipients of social assistance were omitted after the reform as they are no longer subject to labour market integration. Appendix Table A1 gives an overview of the main characteristics of the unemployment and social benefit schemes that were in place before and after the reform.

3. Hartz IV and educational inequality

Over the past decades, levels of education have greatly increased in Germany due to vast educational expansion (Pollak and Müller, 2020). Nevertheless, family background is still a strong predictor of academic achievements (Shavit and Blossfeld, 1993; Blossfeld, 2018) and social mobility low by international comparison (Bukodi et al., 2020). The reform might have contributed to these persisting inequalities by reducing the educational outcomes of children of unemployment assistance recipients against concurrent efforts towards greater educational equalisation.

Two mechanisms are conceivable through which the reform reduced educational outcomes for children living in families that receive unemployment assistance. First, the reform changed the composition of unemployment assistance recipients towards the more disadvantaged by altering eligibility criteria. Second, the reform adversely affected parental resources and wellbeing by altering benefit levels and benefit conditionality.

As described in the previous section, the introduction of strict means-testing implies that a smaller group of the long-term unemployed is eligible for unemployment assistance since 2005. Only those receive the benefit, whose incomes fall below subsistence level. Families that can maintain a higher level of income, e.g. because one parent is still employed and earns sufficiently well, are excluded. Families receiving unemployment assistance after the reform could therefore form a more

socio-economically disadvantaged group than families receiving unemployment assistance before the reform. Specifically, the proportion of low educated, working class, or single parents could be higher. Consequently, a decline in the transition rates into the academic school track among children of unemployment assistance recipients might be observed.

However, there is evidence that the reform also had a direct impact on family resources and wellbeing. Goebel and Richter (2007) show that more than 50 percent of individuals who switched unemployment assistance schemes in 2005 experienced a loss in income following changes in benefit levels. In the first year of the reform, two in three households receiving unemployment assistance had incomes below 60 percent of median income, and the poverty gap was with 18.5 percent almost twice as high as the poverty gap for households receiving unemployment assistance one year before.

These reductions in the financial resources of unemployment assistance recipients could lead to lower education in the second generation by affecting their performance in school as well as choices regarding educational careers (Boudon, 1974). On the one hand, parents have fewer means to advance their children's learning through buying additional material such as books and computers. They are also less likely to afford private tutoring lessons or summer schools (Duncan and Brooks-Gunn, 1997; Kaushal et al., 2011). On the other hand, their ability to finance longer periods of education and training is reduced, even if their children performed well in school. They are hence less likely to opt for the academic educational trajectory that takes significantly more time to complete than the vocational qualification route. The former requires at least three additional years of school even before starting university.

Moreover, the reform turned the receipt of unemployment assistance into a more taxing experience, aggravating the well-documented negative effects of unemployment on subjective wellbeing (Clark, 2003; Oesch and Lipps, 2013). Deter (2021) reports that the reform led to lower levels of life satisfaction among the long-term unemployed. As explained earlier, recipients of unemployment assistance are now strictly monitored by public employment agencies in their efforts to find work and are required to participate in active labour market programmes. Additionally, policymakers used language of blame and contempt, creating a dooming narrative around social benefit recipients, when introducing the Hartz reforms (Fohrbeck et al., 2014).[1] Over and above the psychological costs of lower incomes (Kahneman and Deaton, 2010), parents receiving unemployment assistance after the reform are therefore exposed to greater stress and stigmatisation compared to parents receiving unemployment assistance before the reform.

This in turn can lead to poorer academic performance among their children. Parental emotional wellbeing creates a stable home environment for children's flourishing development (Kalil, 2013) and ensures parents' capacity to offer effective help with homework and other school-related activities (Murray et al., 2006). Thus, given the detrimental effects of lower benefit levels and stricter benefit conditionality on family resources and wellbeing, children of unemployment assistance recipients might be less likely to transition to academic secondary school after the reform.

In some part, I hence expect negative selection to account for lower educational outcomes among children of unemployment assistance recipients. Nevertheless, this

process is to be considered an integral part of the reform. As the pool of eligible families is restricted to those on low incomes, the reform's potential negative consequences on family resources and wellbeing are exclusively channelled towards the most disadvantaged and economically vulnerable, worsening their conditions even further. If this is the case, the reform increased educational inequality by reinforcing the intergenerational transmission of disadvantage at the very bottom of society.

4. Analytical strategy

4.1. Data

All analyses are based on the Socio-Economic Panel (SOEP, 1984-2017 v34; Goebel et al., 2019), which is Germany's largest representative, longitudinal survey. Since 1984, around 30,000 individuals in ca. 11,000 households are interviewed every year on different aspects of their life including education, labour market participation, economic conditions, and family composition. The main analytical sample consists of children who transitioned from primary to secondary school between 2001–2010 and is split symmetrically into a pre- and post-reform group. Children who made the transition between 2001-2005 belong to the pre-reform group and children who transitioned between 2006-2010 form part of the post-reform group. For 2,467 children this transition is directly observed. Using information on average transition age by birth year and state of residence, I further impute year of transition for another 333 children, who were already in secondary school by the time of the survey.[2]

4.2. Key variables

As discussed in the introduction, the transition from primary to secondary school is a crucial moment in the educational career of German children. This transition usually takes place after grade 4 around age 10, except for two federal states (Berlin and Brandenburg), where children transition two years later. Traditionally, three types of secondary schools exist in the German educational system. The lower (Hauptschule) and intermediate (Realschule) secondary schools provide vocational education, whereas the upper secondary school (Gymnasium) focusses more on academic education. However, over the past decades, this three-track system increasingly moved towards a two-tiered system that was accompanied by the creation of comprehensive schools offering different school leaving degrees under the same roof (Becker et al., 2017). Following previous research (Lohmann and Groh-Samberg, 2017; Müller et al., 2017), I therefore measure children's secondary school track using a binary variable that takes the value 1 if they enter upper secondary school, and 0 if they attend any of the other secondary schools, comprehensive schools included. Despite recent changes to Germany's school structure, the upper secondary school has kept its status and prestige and exists in all federal states as the only school that exclusively offers the university entrance exam. It therefore provides direct access to tertiary education and is also increasingly required for more demanding post-secondary vocational programmes.

Parental benefit receipt one year before children transition to secondary school is the key explanatory variable. I thus focus on changes in the immediate, short-term

association between parental benefit receipt and children's chances to enter the academic track. As the effect of parental benefit receipt might take longer than one year to fully materialise, this is a conservative measure of the association between parental benefit receipt and children's educational outcomes. However, measuring parental benefit shortly before the transition allows to focus on cohorts that entered secondary school directly after the reform's introduction. If more time was allowed for the effect to develop, later cohorts would need to be used and observed changes in educational inequality could be less confidently attributed to the reform.

Parental benefit receipt is measured using information on benefit type and total number of months the benefit was claimed each year. I distinguish between four categories: (1) no benefits, (2) unemployment benefits, (3) unemployment assistance, and (4) social assistance. Since the new unemployment assistance scheme is not only accessible to the unemployed but also to workers on low incomes, I use information on past benefit receipt to assign recipients of ALGII the relevant benefit category, i.e. unemployment assistance or social assistance. Recall that before the reform, unemployment assistance was only paid to those whose claim to unemployment benefits expired.[3] Parents who reported unemployment benefits immediately before receiving ALGII are therefore comparable to recipients of the old unemployment assistance scheme. Accordingly, ALGII is coded as unemployment assistance if it was directly preceded by unemployment benefits or the old unemployment assistance scheme during the previous three years.[4] Parents who did not receive unemployment benefits or the old unemployment assistance scheme during this period before obtaining ALGII are identified as recipients of social assistance.

Parents might receive benefits from multiple schemes during a year. Also, they can receive different benefits at the same time because transfers from unemployment insurance are paid as an individual-level benefit, whereas basic income support is targeted at the household. I therefore measure parental benefit receipt on the household level. Parents are considered receiving social assistance if it was claimed for at least three months regardless of any other benefit received in the same year. Parents are considered receiving unemployment assistance if unemployment assistance was received for at least three months and social assistance was not reported for more than two months. Similarly, parents are considered receiving unemployment benefits if these were received for at least three months, and none of the other benefits were reported for more than two months. Children are considered living in no-benefit households if social assistance, unemployment assistance, or unemployment benefits were not received for more than two months. Periods of benefit receipt of less than three months appear rather transitional and are therefore unlikely to significantly affect children's education. The four benefit categories are hence mutually exclusive, comparable across the pre- and post-reform period, and comprise all children who made the transition from primary to secondary school during the stated observation window.

4.3. Modelling

To identify the effect of the reform on changes in the probability to enter the academic school track for children of unemployment assistance recipients, I adopt a quasi-experimental research design based on difference-in-differences estimation

(Angrist and Pischke, 2008). Although the reform was implemented simultaneously across Germany affecting the entire population at the same time, it seems plausible that families that did not receive any of the benefits discussed were least affected by the reform. Children living in such families are therefore taken as reference group against which pre- and post-reform differences in transitions to the academic track of children with parents receiving unemployment assistance are compared. For completeness and to account for potential spill-over effects, I also compare pre- and post-reform differences between children living in families, where parents do not receive benefits and where parents receive unemployment benefits or social assistance.

For unbiased identification, the difference-in-differences estimator rests on the so-called 'common trends assumption'. This assumption states that in the absence of treatment, trends in the outcome of interest are similar for the two groups that are compared against one another. Accordingly, the probability to enter the academic track for children of benefit recipients and those who do not receive benefits should follow a similar trend before and after the reform. Besides visually inspecting these trends, I formally scrutinise the validity of this assumption using two placebo identification tests. The first assumes that the reform was already implemented in 2001. Prior to the 2005 Hartz reform, Germany's unemployment and social benefit system was modified for the last time in 1997. Children who transitioned to secondary school between 1998-2001 (N=1,113) are hence identified as pre-treatment group, whereas children who transitioned between 2002-2005 (N=1,206) form the post-treatment group. As mentioned earlier, Hartz IV was part of an entire reform package. This placebo test thus also inspects whether changes in educational inequalities could be ascribed to any of the other three reforms that were introduced before. Analogously, the second placebo analysis assumes that the reform was not implemented until 2009. Children who transitioned to secondary school between 2006-2009 (N=1,004) are now assigned to the pre-treatment group, and children who transitioned between 2010-2013 (N= 2,057) are chosen as post-treatment group. Comparing these cohorts examines whether observed changes in educational inequality might be driven by some event other than the reform, which occurred after 2005 (e.g. financial crisis).[5] As shown in appendix Table A2, I do not find indication for a violation of the common trends assumption as the placebo reform interactions are all statistically insignificant and negligible in size. Similarly, appendix Figure A2 shows that raw transition rates into the academic track of children of unemployment assistance recipients and children of parents who did not receive benefits ran in parallel before and after the reform.

Using ordinary-least-squares regression, I estimate linear probability models of the following form:[6]

$$\pi_{it} = \alpha + \beta_b BEN_{ibt-1} + \sigma REFORM_{t-1} + \lambda_b (BEN_{ibt-1} \times REFORM_{t-1}) \\ + \varphi X_{it-1} + \phi (X_{it-1} \times REFORM_{t-1}) + \tau_{t-1} + \varepsilon_{it}$$

where π_{it} stands for the probability for child i to enter the academic track in year t. BEN_{ibt-1} denotes a set of dummies for parental benefit receipt b in year $t-1$, i.e. one year before the child's transition. $REFORM_{t-1}$ is a dummy that indicates whether parental benefit receipt is observed before or after the reform. It takes the value 0 if parental benefit receipt is observed in year $t-1 < 2005$, and 1

otherwise. $BEN_{ibt-1} \times REFORM_{t-1}$ identifies whether the association between children's transition to the academic track in t and parental benefit receipt b in $t-1$ changed after the reform relative to children whose parents did not receive any benefits. X_{it-1} and $X_{it-1} \times REFORM_{t-1}$ denote a vector of covariates and their interaction with the reform dummy. The interaction is included to model potential changes in the association between these covariates and secondary school transitions across the two periods. τ_{t-1} is a year fixed-effect that takes note of other trends occurring during the same period, such as the rise in comprehensive schools.[7] ε_{it} stands for the error term.

The baseline model includes controls for the child's sex, age at the transition from primary to secondary school as well as the state where the transition took place[8]. I then add a term for net equivalised household income minus transfers from unemployment and social assistance in $t-1$. Controlling for pre-benefit household income allows to examine how far observed changes in the probability to transition to the academic track for children of unemployment assistance recipients are driven by the introduction of strict means-testing, and thus selection. To take account of further differences between families receiving unemployment assistance before and after the reform, controls for a range of socio-demographic characteristics are added to the model. These are the number of children younger than 15 in the household, whether living with a single parent, mean parental age (squared), parental migration background, parental education, and parental social class in $t-1$. Social class is measured using the European Socio-Economic Classification (Rose and Harrison, 2007). In cases where mother's and father's education or class position differ, the higher is taken according to the dominance approach (Erikson, 1984).[9]

To precisely estimate the short-term association between parental benefit receipt and transitions to the academic track, I further control for benefit duration by adding a term that measures the number of consecutive years parents received the benefit during their child's primary education, i.e. whether the benefit had been received for one, two, three or four years. Where parents did not receive benefits one year before the transition, the number of consecutive years spent without benefits is counted.[10]

Next, I include terms for total net equivalised household income as well as parental life satisfaction in $t-1$. I do so to test for the mediating effects of changes in family resources and wellbeing due to reduced benefit levels and increased benefit conditionality. Parental life satisfaction is measured on a scale from 0 to 10, where higher values indicate higher life satisfaction. In cases where mother's and father's life satisfaction differ, the lower value is taken. Unfortunately, the SOEP does not provide more detailed information on parents' stress level and parent-child interactions for the observation period in question. Table 1 displays the distributions of all variables included in the analysis, separately for the pre- and post-reform groups.

5. Empirical findings

Table 2 presents OLS estimates for children's probability to transition to the academic school track between 2001 and 2010 in Germany. Column (1) shows the main effects of parental benefit receipt, accounting for the reform dummy and

Table 1. Descriptives

	Pre-reform		Post-reform			Pre-reform		Post-reform	
	Percent / Mean	SD	Percent / Mean	SD		Percent / Mean	SD	Percent / Mean	SD
Child characteristics					**Parental characteristics**				
Academic secondary school	33.35		38.63		Benefit receipt				
Year started secondary school					No benefit receipt	86.35		87.29	
2001	24.81				Unemployment benefits	4.86		3.26	
2002	19.26				Unemployment assistance	5.30		2.59	
2003	20.26				Social assistance	3.49		6.86	
2004	17.83								
2005	17.83				Benefit duration				
2006			24.00		1 year	24.50		12.88	
2007			22.83		2 years	14.46		8.78	
2008			20.57		3 years	11.85		7.86	
2009			16.56		4 years	49.19		70.48	
2010			16.05						
					Education				
Federal state					Primary	7.17		6.27	
Schleswig-Holstein	2.99		2.34		Lower secondary	43.27		39.80	
Hamburg	1.25		1.59		Upper secondary	20.45		24.58	
Lower Saxony	10.41		9.95		Tertiary	29.11		29.35	
Bremen	0.44		0.50						

Table 1. (*Continued*)

	Pre-reform		Post-reform			Pre-reform		Post-reform	
	Percent / Mean	SD	Percent / Mean	SD		Percent / Mean	SD	Percent / Mean	SD
North Rhine-Westphalia	20.76		21.82		Social class				
Hesse	7.42		8.36		Salariat	41.77		47.41	
Rhineland-Palatinate	6.98		6.69		Intermediate class	24.88		25.50	
Baden-Württemberg	14.59		14.21		Working class	30.86		24.50	
Bavaria	17.02		16.89		Never worked	2.49		2.59	
Saarland	1.37		1.09						
Berlin	2.81		1.67		Age	39.07	5.03	40.06	4.89
Brandenburg	3.74		2.42		Single parent	8.92		12.21	
Mecklenburg-Vorpommern	1.50		1.59		Migration background	25.02		24.24	
Saxony	3.74		5.69		Life satisfaction	25.00	1.69	24.25	1.72
Saxony-Anhalt	2.62		2.09						
Thuringia	2.37		3.09		**Household characteristics**				
					Number of children age 0-14	1.89	0.87	1.86	0.88
Age at transition	10.61	0.77	10.46	0.70	Pre-benefit income (2005€)	18,328	9,690	18,764	11,560
Female	48.63		48.41		Total income (2005€)	18,598	9,403	19,264	11,099
N	1,604		1,196		N	1,604		1,196	

Source: SOEP 1984-2017, v.34.

set of baseline controls. Living in families that received unemployment or social benefits is associated with substantively lower chances to transition to the academic track. On average, children whose parents received unemployment benefits are 16 percentage points less likely to transition to the academic track than children whose parents did not receive benefits. For children of unemployment and social assistance recipients the gap amounts to 26 and 31 percentage points, respectively.

These large differences, which are statistically significant at 1 percent, are not surprising. Whether parents receive benefits or not depends on their position in the labour market and financial situation. Both are known to be highly predictive of children's educational attainment (Becker and Nietfied, 1999; Lohmann and Groh-Samberg, 2017). Moreover, the observed gradient in the probability to transition to the academic track corresponds to differences in the characteristics and target groups of the three benefit schemes. Given that recipients of unemployment benefits enjoy more generous replacement rates and are exposed to shorter periods of unemployment than recipients of unemployment assistance, educational disadvantages are plausibly smaller for children of the former. Conversely, families that claim social assistance generally struggle the most with financial hardship and poverty. It is thus reasonable that the greatest disadvantage is observed for children of social assistance recipients.

In column (2), the interaction with the reform dummy is included. The main effects for parental benefit receipt now denote average differences in the probability to transition to the academic track during the pre-reform period, and the interactions with the reform dummy identify changes in these differences after the reform. Their sums hence indicate post-reform inequalities in the probability to transition to the academic track. In line with expectations, I observe a sizable drop in the probability to enter the academic track for children of unemployment assistance recipients that is statistically significant at 10 percent. For children who made the transition before, 2006, parental unemployment assistance receipt is associated on average with a 22 percentage-point lower chance to enter the academic track relative to having parents that do not receive benefits. After the reform, this gap increased to 35 percentage points. Differences in the probability to attend the academic track between children of unemployment assistance recipients and children living in families, where no benefits were claimed, thus increased by 13 percentage points (see appendix Table A3 for predicted probabilities). As discussed earlier, this could be the result of changes in the composition of unemployment assistance recipients, decreases in family resources and wellbeing due to lower benefit levels and stricter benefit conditionality, or all three mechanisms combined.

By contrast, the interaction terms for the other two benefit types are much smaller. The coefficient for parental unemployment benefit receipt is negative and the coefficient for parental social assistance receipt is positive. This suggests that inequalities for children of unemployment benefit recipients also increased, while inequalities for children of social assistance recipients somewhat declined. However, both coefficients are not statistically significant.

In columns (3) and (4), terms for net equivalised household income before transfers from unemployment and social assistance as well as further socio-demographic characteristics are added. I thereby control for potential differences between unemployment assistance recipients before and after the reform that arise from the

Table 2. Transition to academic secondary school track (OLS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline	+ Reform interaction	+ Pre-benefit HH income	+ Socio-demographics	+ Benefit duration	+ Total HH income	+ Parental life satisfaction
Parental benefit receipt (ref.: No benefits)							
Unemployment benefits	−0.164***(0.040)	−0.131**(0.052)	−0.060(0.049)	−0.005(0.045)	0.029(0.048)	0.029(0.048)	0.036(0.048)
Unemployment assistance	−0.256***(0.035)	−0.224***(0.043)	−0.067(0.045)	−0.055(0.046)	−0.030(0.047)	−0.052(0.066)	−0.038(0.065)
Social assistance	−0.308***(0.028)	−0.334***(0.034)	−0.141***(0.038)	−0.124***(0.045)	−0.107**(0.046)	−0.127*(0.066)	−0.125*(0.065)
Reform	0.042**(0.018)	0.311**(0.134)	0.323**(0.128)	0.754(0.711)	0.747(0.713)	0.729(0.714)	0.664(0.718)
Unemployment benefits × Reform		−0.094(0.079)	−0.093(0.076)	−0.102(0.073)	−0.111(0.079)	−0.092(0.079)	−0.087(0.079)
Unemployment assistance × Reform		−0.128*(0.066)	−0.101(0.071)	−0.099(0.069)	−0.119*(0.071)	−0.016(0.093)	−0.015(0.092)
Social assistance × Reform		0.058(0.056)	0.047(0.062)	0.044(0.068)	0.037(0.068)	0.145(0.097)	0.156(0.097)
Total HH income						0.008(0.016)	0.008(0.016)
Total HH income × Reform						−0.031(0.019)	−0.031(0.019)

(*Continued*)

Table 2. (*Continued*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Baseline	+ Reform interaction	+ Pre-benefit HH income	+ Socio-demographics	+ Benefit duration	+ Total HH income	+ Parental life satisfaction
Parental life satisfaction							0.015**(0.007)
Parental life satisfaction × Reform							−0.000(0.010)
Year- and state-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	2,800	2,800	2,800	2,800	2,800	2,800	2,800

Note: * p<0.10, ** p<0.05, *** p<0.01. Pre-treatment cohorts: 2001-2005, post-treatment cohorts: 2006-2010. Robust standard errors in parentheses. Total HH income in thousands (2005€). All models control for child's sex, age at transition from primary to secondary school, state- and year-fixed effects. Socio-demographic controls include number of children age 0-14 in the household, living with single parent, parental age(-squared), parental migration background, parental education, and parental social class one year before transition. Full results shown in appendix Table A4.
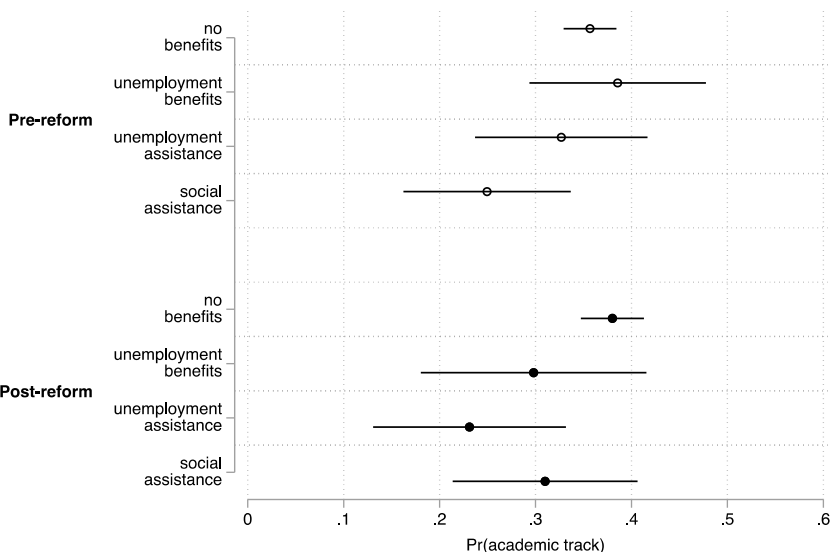*Source:* SOEP 1984-2017, v.34.

Figure 2. Predicted probabilities to transition to academic secondary school track by parental benefit receipt, pre- and post-reform.
Note: Based on Table 2, column (5). Predicted probabilities calculated at mean values of covariates. 95 per cent confidence intervals shown.

introduction of means-testing. The interaction between the reform dummy and parental unemployment assistance decreases by almost one fourth. Although somewhat imprecisely estimated (p=0.16), the magnitude of the coefficient indicates that inequalities in the probability to transition to the academic track still increased by 10 percentage points. The post-reform gap in academic track attendance for children of unemployment assistance recipients now amounts to 15 percentage points, whereas the pre-reform gap shrinks to less than 6 percentage points and is no longer statistically significant.

Accounting for benefit duration in column (5) further reduces pre-reform differences between children of unemployment assistance recipients and parents that did not receive benefits. The size of the interaction between the reform dummy and parental unemployment assistance slightly increases and is again statistically significant. This is because the association between benefit duration and the probability to transition to the academic track becomes negative after the reform (see appendix Table A4), while the association between parental unemployment assistance receipt and benefit duration remains negative across the two periods[11] (parents tend to receive unemployment assistance for a shorter period than not receiving any benefits). Estimated post-reform differences between these two groups therefore remain at similar levels as in column (4).

For better illustration, Figure 2 plots the predicted probabilities to transition to the academic track by parental benefit receipt before and after the reform based on column (5). Controlling for observed levels of pre-benefit income, socio-demographic characteristics and benefit duration, children of parents receiving

unemployment assistance one year before the transition to secondary school had a probability of 33 percent to enter the academic track before the reform, corresponding to a less than 3 percentage-point gap compared to children of parents not receiving any kind of benefits. After the reform, this probability declined to 23 percent and translated into a 15 percentage-point gap, which is statistically significant at 5 percent.

Hartz IV thus shifted the composition of unemployment assistance recipients towards the more disadvantaged, which in turn accounts for more than 20 percent of the estimated reform effect on inequalities in secondary school track attainment. This change in the composition of unemployment assistance recipients is an important observation. It means that it is the most disadvantaged families who are affected by the reform's potential adverse consequences on family resources and wellbeing. If so, the reform perpetuated the intergenerational transmission of inequality at the very bottom of society.

Indeed, adding a term for total net equivalised household income in column (6) drastically reduces the interaction coefficient to less than minus 2 percentage points. I therefore no longer observe meaningful pre- and post-reform differences in the gap to enter the academic track between children of unemployment assistance recipients and those living in no-benefit families. Controlling for parental life satisfaction in column (7) does not change the overall picture further. Although the conditional association between parental life satisfaction and the probability to enter the academic track is positive and statistically significant at 5 percent, a lack of change in the interaction between parental unemployment assistance receipt and the reform dummy between columns (6) and (7) makes it unlikely that parental life satisfaction plays a substantive mediating role. Rather a worsening in family's financial resources following reductions in benefit levels appears as the main driver given the substantial reduction in the interaction coefficient between columns (5) and (6). Although the association between household income and academic track attendance is small after controlling for pre-benefit income, socio-demographic characteristics, and benefit duration, the coefficient for household income and its interaction with the reform dummy are not informative about the underlying driver of the reform effect. Instead, it is the decline in the interaction between the reform dummy and parental unemployment assistance that provides evidence for the importance of reductions in families' financial resources for observed increases in educational inequality.

6. Discussion

This study examined how far radical and still contested changes to Germany's unemployment and social benefit system affected educational inequality. Exploiting exogenous variation induced by the Hartz IV reform, which altered eligibility criteria, benefit levels, and conditionality for long-term unemployment assistance in 2005, it overcame methodological limitations of prior work that relied on the comparison of different countries to determine the impact of the welfare state and social protection system on the intergenerational transmission of inequality.

I find that children of unemployment assistance recipients experienced a 13 percentage-point decrease in their probability to enter the academic secondary school track after the reform was implemented. To some extent, this effect was brought about by alterations of eligibility criteria and the introduction of means-testing, which shifted the composition of unemployment assistance recipients towards the more socio-economically disadvantaged. The main driver, however, appears to be a further worsening in the financial conditions of these already disadvantaged parents after the reform replaced earnings-related benefits with means-tested basic income support for those who remained unemployed for more than a year (Goebel and Richter, 2007). Although past studies document a negative effect of the reform on the subjective well-being of these long-term unemployed (Deter, 2021), changes in parental life satisfaction do not seem to mediate the observed decline in children's chances to transition to the academic track.

The results are in line with the existing, albeit small, literature on the capacity of generous social policies to alleviate the adverse effects of parental unemployment on children's education (Lindemann and Gangl, 2020). They show that even in Germany, where education is generally free of charge, benefit generosity is an important instrument by which the welfare state can effectively protect workers as well as their children against the detrimental consequences of unemployment. More attention therefore needs to be directed towards the role played by social protection systems and the welfare state in moderating the intergenerational relationship.

For researchers, this means to extend the present analyses to different contexts and settings. By focussing on a single country, this study significantly complements comparative, cross-country research on the impact of social protection systems on the intergenerational transmission of disadvantage. Nevertheless, this study comes with its own challenges and limitations. To take full advantage of the quasi-experimental method, changes to unemployment assistance would ideally have been implemented in different federal states at varying times. Moreover, data limitations do not allow to look at other educational outcomes and follow children until their final educational attainment. Finally, life satisfaction is only a crude measure of parents' psychological resources and does not precisely capture parenting styles and behaviour. Future research may therefore benefit from scrutinising whether similar increases in educational inequality are observed following social benefit reforms across different countries and time periods. Extending the analysis to other outcomes of children that go beyond education seems likewise important as well as the inclusion of more comprehensive measures of emotional wellbeing to determine the significance of parental psychological resources (or the lack thereof) more precisely.

For policymakers, the findings highlight that decisions about the design of welfare systems and benefit schemes have far-reaching consequences. Replacing earnings-related with means-tested long-term unemployment assistance undermined the protective function of the conservative welfare state, leading to the reinforcement of disadvantage at the very bottom of society in Germany. Some may consider this problematic. Whether overall reductions in long-term unemployment and welfare dependence can justify the observed increase in educational inequality for such a vulnerable group is therefore subject to moral and political deliberation.

The present analyses act as an important reminder that changes to public institutions that directly affect people's livelihoods require careful consideration. Balancing trade-offs may go beyond a single generation.

Notes

1 In colloquial language, the term 'hartzen' developed, referring to people being lazy, free-riding, and passively dependent on social welfare.

2 The proportion of children for whom year of transition is imputed in the pre- and post-reform group is 13.53 percent and 9.70 percent, respectively.

3 The right to receive unemployment assistance under certain conditions without receiving benefits from unemployment benefits beforehand ('originäre Arbeitslosenhilfe') was abolished in 2000.

4 For most children, this period spans the entire time spent in primary education. It therefore seems plausible that changes from unemployment benefits to unemployment assistance have the greatest impact on secondary school transitions during this period. Furthermore, parents who receive ALGII continuously for more than four years, regardless of whether this was preceded by unemployment benefits or not, seem to constitute a rather specific group and more comparable to recipients of social assistance than unemployment assistance.

5 Appendix Figure A1 gives an overview of the different transition cohorts used as pre- and post-treatment groups in the main and placebo analyses.

6 OLS is preferred over logistic regression for two reasons: First, coefficients from nested logistic regression models cannot be straightforwardly compared, because their underlying scale depends on the number of covariates included (Breen et al., 2013, 2018; Mood 2010). Since OLS is unaffected by this issue, changes in the interaction between parental unemployment assistance receipt and the reform dummy across columns (2)–(7) in Table 2 directly quantify by how much the observed reform effect is mediated by changes in families' socio-demographic characteristics, household income, or parental life satisfaction. Second, coefficients from logistic regression are to be interpreted in terms of log odds ratios and therefore limited in providing substantive information about the magnitude of the estimated effects. Reassuringly, however, when rerunning the models using logistic regression and calculating predicted probabilities from these, results reveal the same pattern (appendix Tables A5 and A6). This corresponds to Cox and Wermuth (1992), who demonstrate that when response categories contain between 20 and 80 percent of observations, the two methods yield almost identical results.

7 To achieve identification of the reform dummy, the sums of coefficients referring to the pre-reform period (2000–2004) and of the coefficients referring to the post-reform period (2005–2009) are constrained to zero.

8 For children, for whom year of transition is imputed, state of residence for the year that comes closest to the transition is used.

9 To further ensure that the observed reform effect is not driven by compositional change, I re-run all models on a restricted sample that only includes children of unemployment assistance recipients who would be eligible for unemployment assistance according to post-reform criteria. I hence exclude children living in families in which unemployment assistance is reported but which have higher pre-benefit household income than the 2005 subsistence level. The latter was defined to be 345€ (West) and 331€ (East) per month for the

first adult, 80 percent of this sum for any additional adult or child above age 14, and 60 percent for younger children in the household. Housing and heating costs were additionally considered (Bäcker and Koch, 2004). As shown in appendix Table A7, the results remain unchanged when applying this restriction that excludes seven children from the pre-reform group and one child from the post-reform group. This minimal change in the sample suggests that for the social group studied here, concerns about selection are in fact less relevant as most families would also be eligible for unemployment assistance after the reform. Thus, families with children around age 10 and who receive unemployment assistance seem to be a socio-economically disadvantaged group both before and after the reform. I thank an anonymous reviewer for suggesting this robustness check.

10 Additional analyses show that long-term parental benefit receipt is more strongly associated with educational disadvantage than short-term parental benefit receipt, and particularly so since 2005 (appendix Table A8). The unconditional gap in the probability to enter the academic track between children whose parents received unemployment assistance for three years and those whose parents did not receive benefits amounts to 27 percentage points before the reform and 56 percentage points after the reform. Controlling for compositional changes in the socio-demographic characteristics of long-term unemployment assistance recipients, this pre- and post-reform difference remains at 30 percentage points and is statistically significant at 5 percent. There is hence some evidence that the reform also reinforced the negative effect of parental long-term unemployment assistance receipt on children's educational outcomes. Again, reductions in benefit generosity seem most likely to account for the observed change.

11 This has been verified by regressing benefit duration on parental unemployment assistance receipt with all controls included in column (5) of Table 2.

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