Equality of Opportunity: East vs. West Germany

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Abstract

The case of German reunification has been subject to extensive research on earnings inequality and labor market integration. However, little is known about the development of equality of opportunity (EOp) in East- and West-Germany after 1990. Using German micro data, we empirically analyze how circumstance beyond the sphere of individual control explain inequality in East- and West-Germany. Despite the well known fact that the East is lacking behind the West in almost every economic indicator, our results show that EOp is larger in East-Germany.

JEL Codes: D63, H2, J62, J7

Keywords: Equality of Opportunity; Earnings Inequality; Germany; Family Background

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1 Introduction

The fall of the Berlin Wall and the opening of the intra-German border made politicians talk about the prospect of "blossoming landscapes" in Eastern Germany providing individuals with many new opportunities. However, higher unemployment in the East and rising inequality today question this promising economic perspective. Prior to the German reunification, the western part of Germany featured a higher importance of the so called middle class, with a classic role model of the male breadwinner and relatively higher importance of family background, e.g. with regards to educational decisions (Rosenfeld et al. 2004). In contrast, the socialist system in the former German Democratic Republic featured higher full-time employment rates of women as well as an intensive child care system. Furthermore, the was much less dependence on parental resources in order to get access to higher education. In such a communist society, social and family background is expected to be of less importance for children's outcomes. With the German reunification, this system was abolished within a short period if time. Essentially, the West-German institutional structure was implemented in East-Germany in the process of reunification, with the exception of higher child care rate and a higher share of public employees (ZUMA. Abteilung Soziale Indikatoren 2004). While there has been extensive research on earnings inequality and labor market integration after German reunification, little is known about individual opportunities in West- versus East Germany. Trappe and Sørensen (2005) analyze labor market participation rates and job opportunities for men and women in both parts of Germany after 1990. Their findings suggest remarkable differences in the labor market structure at the time of reunification. Despite some trend of convergence, structural differences remain.

Empirically assessing equality of opportunity (EOp) is not a trivial task. While the traditional notion of equality of outcomes refers to an equal distribution of economic outcomes (e.g. consumption or income), the EOp theory, in contrast, is interested in the sources of inequality and separates the influences on the outcomes of an individual into circumstances and effort.[1] Circumstances are defined as all factors beyond the sphere of individual control, for which society deems individuals should not be held responsible – such as parental education or gender. Effort, on the other hand, comprises all choices within individual responsibility for which society holds the individual (partially) accountable, e.g. schooling or labor supply decisions. Income inequalities due to differences in effort are deemed acceptable, whereas inequalities due to endowed characteristics are not.

[1] See Roemer (1998), Van de Gaer (1993) and Fleurbaey (1995) for seminal contributions and Roemer and Trannoy (2013) for a recent survey.

The aim of this paper is straightforward. We estimate inequality of opportunity (IOp) following the approach suggested by Ferreira and Gignoux (2011) and Niehues and Peichl (2013) for Germany as a whole as well as separately for East and West Germany. This allows us to analyze whether opportunities differ between the two parts of the country. We employ a rich panel data set for the years 1991-2011 and can hence also look at potential convergence over time.

Our results suggest that equal opportunities in Germany have grown since German reunification. What is remarkable: The chances to obtain a higher income through personal effort are significantly higher in Eastern Germany than in the West. One reason for this finding is the relatively strong middle class in West-Germany.

The setup of the paper is as follows: In Section 2, we introduce the conceptual framework of IOp and couples. Section 3 describes the data. Section 4 presents the results of our empirical analysis. Section 5 concludes.

2 Conceptual Framework and Methodology

2.1 Measuring IOp: a simple model

We follow standard practice to define our theoretical and empirical approaches. In accordance with Roemer (1998), we distinguish between two generic determinants of individual outcome y_{is} of individual i at time point s. First, circumstances C_i are characteristics outside individual control (think of race, gender, family background) – and hence a source of inequitable inequalities in outcomes. Second, effort E_{is} is representing all factors affecting earnings that are assumed to be the result of personal responsibility. Following Ferreira and Gignoux (2011), we assume that the outcome variable of interest depends both on exogenous, time-invariant circumstances C_i as well as time-varying personal effort E_{is}, which can be shaped by C_i.

We employ the ex-ante approach of EOp and partition the population of agents $i \in \{1, ...N\}$ into a set of disjunct types $\Pi = \{T_1, T_2, ...T_k\}$, i.e., subgroups of the population that are homogeneous in terms of their circumstances. The income distribution within a type is a representation of the opportunity set which can be achieved for individuals with the same circumstances C_i by exerting different degrees of effort. Perfect EOp is achieved if the mean advantage levels μ are identical across types, i.e., $\mu^k(w) = \mu^l(w), \forall l, k | T_k, T_l \in \Pi$. Measuring IOp thus means capturing the extent to which $\mu^k(w) \neq \mu^l(w)$, for $k \neq l$. To compute a measure of IOp, Checchi and Peragine (2010) suggest constructing a hypothetical smoothed distribution: $\mu^k(w)$, which is obtained when each individual outcome w_i^k is replaced by the group-specific mean for each type

$\mu^k(w)$.

Based on this smoothed distribution, we compute for any (scale invariant) inequality index I the absolute inequality of opportunity level (IOL) $\theta_a = I(\{\mu_i^k\})$. The relative share of total inequality that can be attributed to circumstances, i.e. the inequality of opportunity ratio (IOR) is defined as $\theta_r = \frac{I(\{\mu_i^k\})}{I(w)}$. As Niehues and Peichl (2013), we use the mean log deviation (MLD) as inequality measure I since it respects all necessary axioms for a decomposable inequality measure.

2.2 Empirical strategy to estimate IOp

In our empirical estimation approach, we use the same parametric specification as Niehues and Peichl (2013) to estimate IOp.[2] Relying on a parametric approach allows us to estimate the impact of numerous circumstance variables even in the presence of small sample and cell sizes – which, unfortunately, is the case in the data that we use for our empirical analysis.[3] The empirical specifications reads:

$$\ln w_{is} = \alpha C_i + \beta E_{is} + u_{is}, \tag{1}$$

$$E_{is} = \kappa C_i + v_{is}. \tag{2}$$

Equation (1) represents the direct effect of circumstances on income while equation (2) models the indirect effect of circumstances on income through effort. Since it is unlikely that we will observe all relevant circumstance and effort variables that shape individuals' outcomes, estimating this model will likely yield biased estimates. However, in order to compute IOp shares, it is not necessary to estimate the structural model and to derive causal relationships. By substituting the effort equation (2) into the earnings equation (1), we obtain the following reduced-form relationship:

$$\ln w_{is} = \underbrace{(\alpha + \beta\kappa)}_{\psi} C_i + \underbrace{\beta v_{is} + u_{is}}_{\eta_{is}}. \tag{3}$$

This reduced-form equation can be estimated by OLS to derive the fraction of

[2] In empirical estimations of EOp, it is impossible to observe all characteristics that constitute individual's circumstances (e.g. innate talent or ability). Hence, existing estimates of IOp are only lower bound estimates of the true share of unfair inequalities due to circumstances (Ferreira and Gignoux (2011)). An exception is Niehues and Peichl (2013) who also suggest an upper bound estimator.

[3] In contrast, non-parametric methods avoid the arbitrary choice of a functional form on the relationship between outcome, circumstances and effort (e.g. Lefranc et al. (2008), Ferreira and Gignoux (2011) or Aaberge et al. (2011)). However, this approach has the drawback that considering more than one circumstance variable is difficult due to practical reasons in the presence of small cell sizes which is usually the case in survey data. Access to large-scale administrative panel data with information on circumstances (family background), which is not available in Germany, would allow to estimate IOp also non-parametrically.

variance which is explained by circumstances. Including all observed circumstances C^K in equation (3), the estimates $\widehat{\psi}$ measure the overall effect of circumstances on labor earnings, combining both, the direct and indirect effects. Based on this, we can construct a parametric estimate of the smoothed distribution:

$$\widetilde{\mu} = \exp[\widehat{\psi} C_i^K + \sigma^2/2]. \tag{4}$$

As we replace earnings outcomes by their predictions (with σ^2 being the estimated residual variance in the earnings equation, see Blackburn (2007)), all individuals with the same circumstances necessarily have the same advantage levels. Thus, in the case of absolute EOp, i.e. no income differences due to (observed) circumstances C_i^K, all predicted earning levels would be identical. Consequently, IOp can then be measured as the inequality of these counterfactual earnings levels, where differences are only due to differences in circumstances.

3 Data

We use the latest version of the German Socio-Economic Panel (SOEP) v29 for our estimations. The SOEP is a representative panel study of households and individuals in Germany that has been conducted annually since 1984.[4] For our analysis, we use information from 1992 until 2012, i.e. the years after German reunification.

In line with the previous literature, the units of our analysis are individuals aged 25-55 with non-missing data on parental background. The dependent variables are log real (gross or net) labor earnings, adjusted by consumer prices indices. Inequality measures are based on the corresponding absolute levels of earnings.

As circumstance variables, we include gender, a dummy whether the individual was born in a foreign country, categorical variables of the occupation and education of the father, the degree of urbanization of the place where the individual was born as well as the height and year of birth of the individual. We include a dummy if the individual was born in East Germany. Summary statistics are reported in table A.2 in the appendix.

[4] A detailed overview of the SOEP is provided by Wagner et al. (2007). Issues concerning sampling and weighting methods or the imputation of information in case of item or unit non-response is well documented by the SOEP Service Group.

4 Empirical results

We begin our analysis by regressing the log earnings for each year on all available circumstance variables which are expected to have an impact on labor earnings (equation 3; results available upon request). Using the baseline case, we find the well-known gender wage gap in gross and net wages. Although it is slightly declining over time, women have significantly lower wages compared to men. Being an immigrant or born in the eastern part of Germany before 1989 yields a negative impact on wages. Individuals with highly educated fathers or parents working as civil servants have higher wages compared to blue-collar workers or self-employed parents. Living in larger cities also is associated with higher wages compared to living in the countryside. The educational degree of the father has a strong but ambiguous effect.

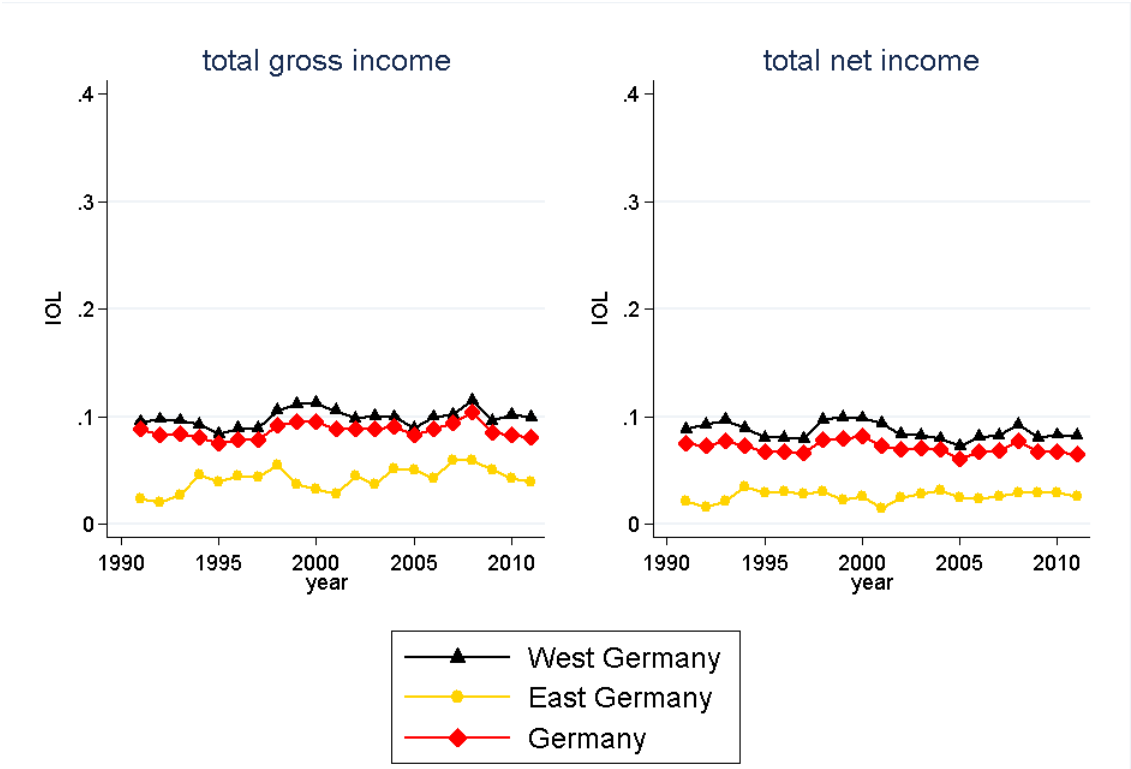
Mean earnings are higher for West-Germany compared to the East. However, gross earnings' inequality in East-Germany is considerably lower compared to the West - see Figure A.1 in the Online Appendix. Figure 1 shows the IOL for East- and West-Germany in gross and net earnings. IOL is always lower in East- compared to West-Germany. However, there is no clear trend visible for either region and the levels remained fairly constant over the whole period. Furthermore, the differences between net and gross income are negligible. That is, redistribution through the tax benefit system does not affect inequality of opportunity.[5] Since the values of IOL are not so easy to interpret, we directly look at IOR.

Figure 2 shows the IOR for East- and West-Germany, as well as Germany, in gross and net earnings. IOR in East-Germany is generally lower compared to West-Germany, with values of 15.2 and 36.1 in 1991 and 13.0 and 27.6 in 2011, respectively. However, while there is a decreasing trend in IOR in West-Germany (with a small spike in 2008)), we find mixed results for East-Germany. Here, IOR is increasing after the German reunification, with a peak in 1994 of 23.6 for gross income. This increase may partly be attributed to the process of convergence between the two formerly separated parts of Germany. After 1998, IOR is decreasing until 2001, slightly increasing until 2008 and then decreasing. IOR is slightly larger for both East- and West-Germany when looking at net earnings suggesting that the tax benefit systems slightly worsens opportunities.[6]

[5] One reason for this is that tagging, i.e. the use of exogenous circumstances to determine tax liabilities and benefit eligibility, is usually not explicitly used in existing tax benefit systems due to anti-discrimination laws.

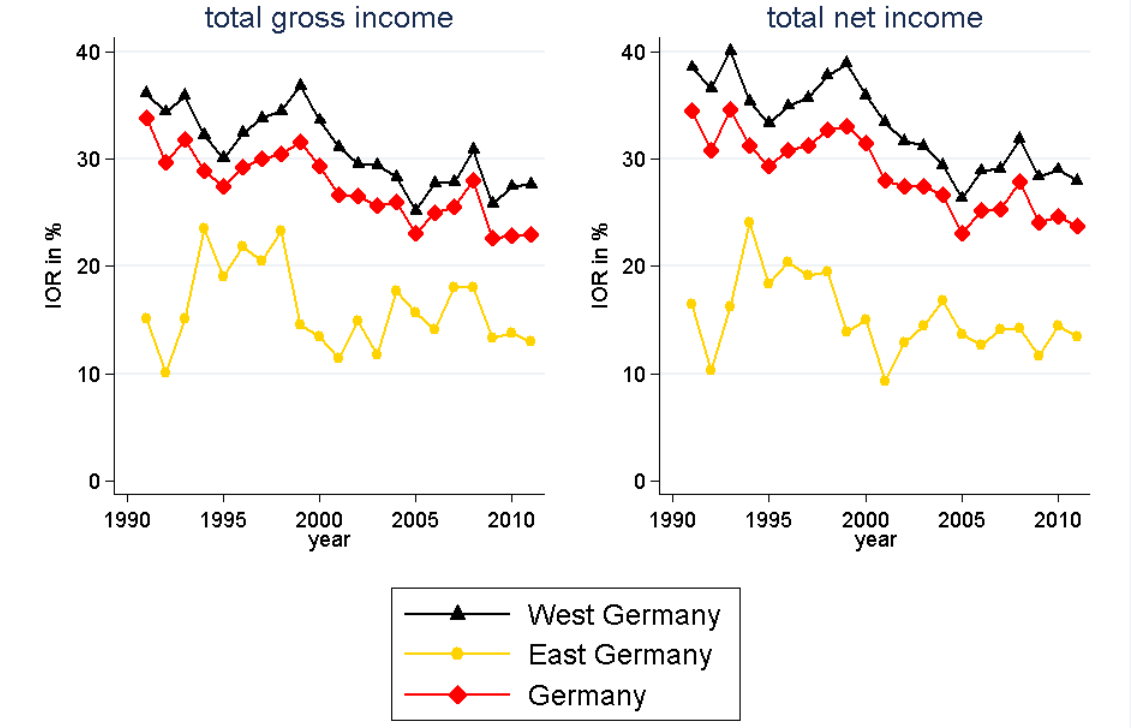
[6] This is not surprising given that the tax benefit system reduces income inequality levels but not IOL.

Figure 1: IOL for annual income - gross vs. net



Source: Authors calculation based on SOEP

Figure 2: IOR for annual income - gross vs. net



Source: Authors calculation based on SOEP

5 Conclusion

Our results show that, in Western Germany, equality of opportunity, i.e. the chances to gain a higher income through personal effort, to live a success story leading, at best, from rags to riches, is smaller than in Eastern Germany. There are several reasons for the East-West disparities. First, the gender wage gap is less pronounced in Eastern Germany than in the West, which has a positive effect on equal opportunities. Second, parents' education, income and socio-economic status have a far greater impact on children's education and income in Western Germany due to a stronger established middle class. Another important factor is the better availability of (full-day) childcare in Eastern Germany leading to a higher labor force attachment of women. It is one of the major policy challenges in Germany to increase equal opportunities by introducing reforms to the education system, expanding childcare and improving the integration of migrants into society.

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A Online Appendix

A.1 Descriptive Statistics

Table A.1: Descriptive Statistics for Basic Variables

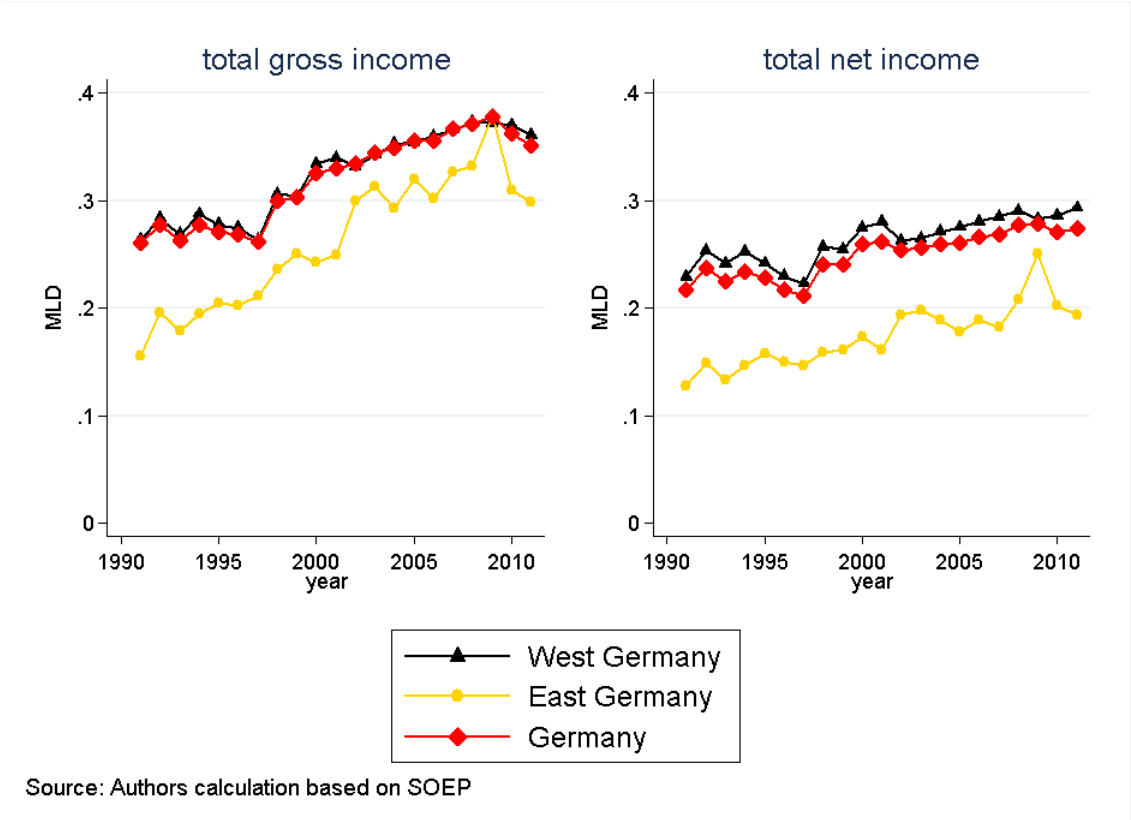
Variable	*Mean*	*Sd*	*Min*	*Max*
Real Gross Earnings	29490.88	23164.12	25	1269829
Real Net Earnings	21707.94	14993.4	22.15	748994.1
Gender	.46	.5	0	1
Ethnic	.06	.24	0	1
East Germany	.19	.39	0	1

Table A.2: Descriptive Statistics for IOp Measures

Year	*Observations*	*MLD gross*	*MLD net*	*IOR gross*	*IOR net*
1991	2893	.26	.22	33.81	34.53
1992	2959	.28	.24	29.66	30.83
1993	2964	.26	.22	31.85	34.54
1994	2986	.28	.23	28.94	31.25
1995	3017	.27	.23	27.48	29.33
1996	3025	.27	.22	29.22	30.77
1997	3398	.26	.21	30.05	31.27
1998	3531	.3	.24	30.49	32.69
1999	6322	.3	.24	31.54	33.07
2000	6446	.33	.26	29.35	31.43
2001	7483	.33	.26	26.62	27.96
2002	7275	.33	.25	26.57	27.46
2003	7038	.34	.26	25.6	27.39
2004	6642	.35	.26	26.01	26.61
2005	6820	.36	.26	23.12	23.1
2006	6558	.36	.27	24.92	25.16
2007	6229	.37	.27	25.52	25.31
2008	5746	.37	.28	27.95	27.92
2009	5264	.38	.28	22.57	24.1
2010	5291	.36	.27	22.8	24.68
2011	4911	.35	.27	22.94	23.77

A.2 Figures

Figure A.1: MLD for annual income - gross vs. net



Source: Authors calculation based on SOEP