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Did the pattern of poverty in West Germany change because of the reunification?

A cross-sectional study of poverty in West
Germany



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Abstract

The reunification of West Germany and East Germany occurred in 1990 and had a great impact on the country. This essay investigates the impact that reunification had on the poverty structure of West Germany on the long-run. The results indicate that reunification had a negative impact on poverty since it increased the poverty rate by 4.88 percentage point in 2000 and by 6.16 percentage point in 2005. The structure of the poor population slightly changed the year following the reunification. Five years later, the structure of the poor population was similar to what it was before the reunification. However, during this period, the income transfer became more efficient since it decreased poverty by 6 percentage point to 16 percentage point more after reunification than it used to do before.

Key words

Poverty rate, poverty structure, West Germany, reunification, transfer income, difference-in-differences, linear probability regression.

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1 Introduction

The World Bank and United Nations aim to fight poverty. The motto of the World Bank is to create a world free of poverty while the United Nations declared the fight against poverty as one of the eight millennium development goals. Poverty is a social and political issue presents in poor and rich countries. Even though poor countries tend to have higher poverty and extreme poverty rates, developed countries such as Western ones are not free of it. Western policymakers create anti-poverty policies via income redistribution (transfer income and tax refund). Poverty is a sensitive matter and is taking more space in the public debate. Furthermore, since the 1990s, income inequalities as well as poverty are becoming one of the biggest social and societal issue (see Vacas-Soriano and Fernández-Macías, 2018). The European Union aimed to rebuild peace thanks to an economic union. However, recent enlargements of the European Union integrated poorer countries. Richer members are positioning themselves against new enlargements, arguing that the addition of poorer countries will impoverish the entire union. The German reunification of 1990 can be perceived as the addition of a poorer region to a wealth and economically developed OECD country. Germany is one of the founding members of the European Union and East Germany is a former member of the soviet bloc. Hence, reunification can be comparable to the addition of an East country to the European Union. Evaluating the impact of reunification on the structure of poverty in West Germany could support or erode this argument.

This essay aims to investigate the impact of Reunification on the structure of poverty in West Germany. Interestingly, the previous literature appears to be mainly focused on the impact of reunification on the macroeconomic situation of East Germany (level of production, growth rate, wage, inflation, poverty and employment level). The origin of the lack of attention for that question seems to be politics (Carlin, 2007). The main concern about reunification was the possible poverty explosion in East Germany which would have result in an overuse of welfare by Eastern Germans. The main reason behind the risk of increased poverty was mainly due to the adoption of the Deutsche mark by Eastern Germany and its inflation related risk (Dornbush and Wolf, 1992). Carlin (2007) investigated the economic impact of Reunification on German workers and Industry, highlighting a lower productivity of Eastern factories and workers compared to Western ones. The wage differential between East Germany and West Germany as well as the attractiveness of West Germany created migration flows of East Germans (*Übersiedler*) and Eastern Europeans to West Germany after reunification. Before the



reunification, the migration flows from the Eastern bloc were low since there were no freedom of movements outside of the soviet bloc. Every month before reunification, there were over 50 000 East Germans migrated to Western Germany (Zielinski, 2011). The share of foreign born in Germany has increased from 1 percent in 1951 to 8,9 percent in 1996 (Riphahn, 1998). Furthermore, since East Germans were on average less productive, their higher likelihood to face unemployment could increase the size of the population at risk of poverty in West Germany (Fuchs-Schündeln and Izem, 2009).

The social aid funds would then decrease for poor of West Germany (Zielinsky 2004). However, the German reunification allowed trade between Eastern and Western Germany which increased the national consumption of West goods and services. Indeed, East Germans were consuming mainly products from West Germany since they were considered as higher quality goods (Akerlof et al, 1991). Sweden will be used in the following essay to analyze more precisely the impact of reunification on poverty in West Germany. Sweden and Germany were trading partners so they both export goods in the other country. This essay is organized as follows. The second section summarizes previous literature about poverty and income inequality in Germany. The third section provides a description of the historical context surrounding the German Reunification. The theoretical framework is presented in the fourth section while the fifth and sixth sections describe the dataset and the method used. The seventh section provides the results and analyze. Finally, the eight section is a summary of the essay.

2 Literature review

During the Cold war, Germany was separated into two parts: the Eastern and the Western. Most studies on poverty in Germany do not focus on the post-reunification period but rather on the 2000s and the 2010s. However, some economists have tried to explain the differences in terms of economic structures and poverty patterns in East Germany. The impact of the reunification on West Germans has not been studied a lot even though was used as a control group for East Germany. The following literature review will highlight the economic impact that reunification had on poverty and income inequalities in East Germany and West Germany.

2.1 Poverty in East and West Germany after the reunification

Poverty is a multidimensional concept so it could be defined in multiple ways. According to the definition chosen, the approach and the measurement will change. Indeed, some authors would prefer to work with the income distribution, while other would work with the social



aspects of poverty such as deprivation or social exclusion. According to the approach chosen, there exist different definitions of poverty. For instance, some authors prefer to study the social aspects of poverty and they use the definition of deprivation, while others prefer to have an economic aspect and they use in this case, the definition relative to the income distribution. Even when authors used the same definition of poverty, they could have a different approach according to the aspect of poverty studied (long-duration poverty, poverty rate, dynamic of poverty, probability to exit poverty or the structure of the poor population).

Otto and Siedler (2003) studied the evolution of the poverty rate and the probability of re-entering in poverty in East Germany and West Germany after the reunification between 1992 and 2000. Two definitions of poverty were used. They first defined the poverty line as 60 percent of the regional median income, finding a higher poverty rate in West Germany than East Germany. Secondly, they defined the poverty line as half of the average national income which led to a higher poverty rate in East Germany than West Germany. The differences of poverty rates were due to the market structures. Indeed, a planned economy led to a less unequal income distribution than capitalism. The first definition was based on the income distribution so having an income distribution concentrated on the left side could deform the economic reality. 87 percent of the West former poor remained out of poverty the year following their experience of poverty whereas seven years later, only 67 percent of West Germans were still out of poverty. The rate of fall back in poverty is lower in East Germany. Seven years after experiencing poverty, 83 percent of the former East poor remained above the poverty line. It is more difficult to stay out of poverty after having experienced it in West Germany than in East Germany (Otto and Siedler, 2003).

Groh-Samberg (2007) studied the evolution of the poverty rate in Germany during the period 1984-2005. This large period of analysis shows more accurately the evolution of poverty. The definition of poverty was related to the idea of deprivation, hence extreme poverty meant severe deprivation. More than 8 percent of the population was living in persistent poverty¹ and their income was about 43 percent of the average income.

Regarding the distribution of poverty in West and East Germany, the unstable prosperity regularly declined in both parts over the period 1984-2005 while extreme poverty increased since 1990. Moreover, persistent poverty increased in both West and East Germany since the

¹ Persistent poverty is a poverty episode which lasts at least 5 years.



reunification. Unskilled and skilled workers of West Germany followed the same trend of a continuous increase of persistent poverty. West unskilled workers had a higher persistent poverty risk than East ones: in 2005 the persistent poverty risk was 5 percentage point higher in West Germany. Globally, across all the social groups, the risk of persistent poverty was higher in West Germany than East Germany and a social class distinction was occurring (Groh-Samberg, 2007).

The social class distinction increased the risk of persistent poverty of individual in East and West Germany *ceteris paribus*. The deterioration of unskilled jobs' quality increased even more the social distinction. Amoroso and Witte (1998) investigated the role of Active Labour Market policies (ALMP). The point was to help the East to catch up with the West economy thanks to subsidies and investments paid by the Western citizens under the clause of solidarity contribution. ALMP were a set of policies such as employment training, job-search assistance and employment subsidies for direct job creation (ABM) in order to lower long-spell unemployment. Before the reunification, ALMP were used in West Germany at the end of the 1980s and had a positive impact on employment. However, the proportion of long-term unemployed across the unemployed population doubled during this period, going from 12,6 percent up to 30 percent. The ALMP helped the West newest unemployed workers but not the long-term ones whereas they were the most at risk of poverty. The reunification created a great risk of poverty boom and social exclusion in East Germany. During the transition from a state-controlled economy to a market economy, the productivity differences appeared clearly: the Eastern production decreased by half in 1990 and 340 000 skilled workers migrated to the West of Germany in 1990. Between 1989 and 1994, almost 75% of the East Germans benefited from one of the ALMP measures.

Kyzyma (2014) focused her study on the long duration of poverty in Germany between 1992 and 2009 according to Stevens (1999) dynamic approach. The aim of this paper was to follow the evolution of the structure of the poor population over time. Each individual was studied according to individual and household observed and unobserved characteristics. Two different types of individual were pointed out the non-poverty type and the pro-poor type. The non-poverty type described an individual with unobserved characteristics (individual or household) that decreased the probabilities of entering or re-entering in poverty spell whereas pro-poor type had unobserved characteristics that increased these probabilities.



The share of pro-poor type increased in Germany over time, suggesting that poverty was becoming more persistent. Kyzyma continued Otto and Siedler (2003)'s work and studied the probability of re-exiting poverty. This probability was declining, and the average poverty spell length increased over time. The probability of re-entering in poverty was lower for a household headed by German and or tertiary graduated whereas it increased for individuals living in a household headed by a lone parent, a disabled person or headed by a low educated individual (primary degree). A similar conclusion can be drawn for individuals older than 55 years old. Since the probability of re-entering into poverty was higher for households that were more likely to be welfare recipients, the efficiency of the welfare system seemed to decrease. However, changes in the labor market structure could also explain the increase of the poverty risk. Kyzyma findings suggested that poverty increased in the late 1990s in terms of duration and recurrence.

2.2 The connection between poverty and income inequalities in West Germany

Schwarze (1996) and Grabka et al (1999) investigated the evolution of the income inequalities between Eastern and Western Germany respectively in the short run (1990-1992) and the long run (1990-1997). Schwarze (1996) investigated the impact of transfer payments on East and West Germany. The transfer income was meant to reduce the income inequalities between East Germany and West Germany and income inequalities within the East. No particular attention was given to income inequalities within West Germany and the Kohl's government was not transparent about the cost of the transfer income. Inequalities within the region were lower in East than in West Germany right after the reunification. It was due to the former market organizations. Indeed, the state-planned economy aims to reduce income inequalities whereas the free market has the tendency to increase them.

The reunification was political, monetary and social so reducing income inequalities was one of the main concerns for Germany as a modern economic power. The economic convergence of the East of Germany toward the West had a great likelihood to increase income inequalities in the East. In both papers, economists found that income inequalities between the two German regions was decreasing. Schwarze (1996) found that the inequalities between states decreased from 29 percent to 22 percent. The decrease was even greater in 1997 since the income inequalities between states fell down to 3 percent (Grabka et al., 1999). However, the "capitalization" of the East led to greater inequalities within the state: income distribution before redistribution became larger from 11 percent to 20 percent in 1997 (Grabka et al 1999). The East welfare was mainly funded by West Germany fiscal revenues up to 10 percent of the



disposable West income and it represented over 60 percent of the East disposable income. The anti-poverty policies reduced income inequalities in West Germany after redistribution (Schwarze, 1996). However, in the long run, Grabka et al. (1999) exhibited that the income inequalities after transfer income was smaller in East Germany than West Germany, proving the existence of Eastern oriented welfare policies.

Biewen (2000) studied the income inequalities in East and West Germany during the 1980s and the 1990s. West and East Germany followed opposite trend since the income inequalities decreased in West Germany over the time period 1985-1996 and increased significantly in East Germany. Nevertheless, income inequalities and mean income were higher in West Germany than East Germany. Income inequalities increased in Germany after reunification because two forces were taking place. The first was the increase of income inequalities in the entire Germany and the second was the increase of inequalities within East Germany because of the economic convergence toward West Germany.

Biewen (2005) continued his analyze of the increase of income inequalities between 1990 and 1998 by focusing his attention on the persistence of poverty. Income inequalities were decomposed into permanent and transitory components. The permanent differences were differences in individual characteristics and human capital (education, employment, wage, and living arrangements) while the transitory components highlighted income mobility. Furthermore, the permanent and transitory components cannot be reduced thanks to the same policies. ALMP were used first in West Germany and later on, in East Germany in order to reduce permanent differences due to wage and employment status (see Amoroso and Witte, 1998). However, the anti-poverty policies were national, but they were made according to the East Germans situation in the early 1990s. Since income inequalities in East Germany was mostly transitory at the beginning of the decade, the policies were not adequate to West Germany income inequalities. Great attention from policy-makers was needed for both East and West especially for subgroups exposed to a higher poverty risk as individuals in lone-mother households and households affected by unemployment.

The income inequalities due to permanent differences between individual were lower (20%) in the East than in the West (52%) because of the East socialist past. However, in 1998, the East caught up with the West since 72 percent of income inequalities were due to a permanent component. It increased for the West as well, and the permanent differences were the reason of 69 percent of income inequalities. The average length of poverty spell increased



until reaching two years in West Germany. The increase of the duration of poverty was important since Headey et al. (1993) found that in the 1980s, 60 percent of the poverty experiences lasted for a year or less and 90 percent lasted for less than three years.

3 Historical framework²

The importance given to poverty is highly correlated with the political structure. After reunification, Germany had to merge the population coming from both liberalism and communism. The Federal Republic of Germany (FRG) in the West was following the liberal market-oriented regime of the United States and the Democratic Republic of Germany (DRG) was following the Communism regime of the socialist block. Capitalism is the market structure of liberalism which is a political ideology based on the individual and market freedom. In that way, the government should interfere as less as possible on markets because every intervention will move the equilibrium away from the natural equilibrium. Establishing minimum wage or taxation and redistribution is not compatible with the ideology of liberalism which is problematic for capitalist policymakers since they divest themselves from using tools to fight poverty. Moreover, capitalism is more likely to lead to greater income inequalities than communism. On the other side, communism lays on the assumption that free markets do not work and can only lead to inequalities and social classes struggles. The market organization of communism is command Economy (Heywood, 2017).

The Berlin Wall Fall led to migration flows from East to West which increased the Western labor supply. The Reunification became official the third of October of 1990 after the approval of the international community.

Since 1990, many reforms have been put in place in order to respond to the political and macroeconomic shock (Schündeln et al, 2010). Socialism impoverished East Germany so there was a high risk of poverty boom in Eastern (Dornbush and Wolf, 1992). In order to help East Germany, massive transfers occurred from West Germany to East Germany (Schwarze, 1996). Poverty in West Germany will be investigated in order to know if the reunification has led to a lower, higher or stable poverty rate after the addition of East Germany. Moreover, since migration flows occurred, the structure of the West German population changed which could have some repercussions on the poor population. One can expect poverty to decrease since

² The source of the historical framework is Solsten's book *Germany: a country study* (1995)



income inequalities can be reduced with appropriated taxation and transfer income (under the assumption that the government is efficient and not wasteful). However, most of the post-reunification policies were designed for East Germany, which could make the poor of West Germany less likely to fit in with the targeted recipients.

4 Conceptual framework

Unlike most of the macroeconomic indicator such as the gross, the innovation or the settling of wage, poverty has not been theorized. Poverty is an empirical matter which can take different forms. From an economic perspective, it is mainly related to the income but in other field like sociology for instance, it can be studied from the social exclusion. Hybrid approaches can integrate the idea of deprivation (Groh-Samberg, 2007) or capability (Sen, 1979). As seen in the literature review, in European countries the poverty is defined relatively to the income distribution³. This essay aims to study the impact that reunification had on poverty in West Germany through redistribution. Since Germany is considered as a conservative regime according to Esping-Andersen's welfare states classification, the social protection mainly relies on the Family and State assistance⁴. Since poverty is different in every country and also depends on the structure of the labor market and the level of intervention of the State, there is no possibility to theorize the fight against poverty. Germany uses mainly income transfer to reduce poverty. The taxation revenue was maintained constantly around 35% of the GDP. Since East Germany was poorer than West Germany, the needs were higher in East and the means lower. Between 1991 and 1998, the total amount of transferable income increased by 45% which is equivalent to a 5,5% of annual increase. In 1998, it represented 620 billion of deutschmark according to the Bundesbank's monthly report of December 1999. However, during this period, the annual growth of household disposable income was 3,4%. The disposable income increased by 26% between 1991 and 1998.

The aim of this essay is to study the change of the poverty structure after the reunification. In order to analyze the efficiency of the transfer income, poverty before and after redistribution will be considered. Two hypothesis will be tested. The first one will be that the decrease of the amount of the transfer income per capita increased poverty in West Germany after the

³ The absolute definition of poverty of the World Bank is 1 dollar per day and per person

⁴ The three institution for social protection are the family, the public institution and the market of goods. According to the major institution, the regimes are either liberal, social democratic or conservative



reunification. The second hypothesis is that the populations the most at risk of poverty were more affected than the less at risk of poverty populations by the reunification. According to previous literature on poverty in developed countries, the most at risk individuals are the young individuals, the unemployed, the low skilled, females and individual of lone parent household,

5 Data

This essay used microdata from the LIS database (Luxembourg income study). LIS is a platform that gathers data collected by national statistics institutions. German data are collected by the Deutsches Institut für Wirtschaftsforschung (DIW) in order to produce national data sets such as the German Socio-Economic Panel (GSOEP). GSOEP is a longitudinal survey so the collect of data across time is made at the personal and the household level. The survey is a set of questionnaires send to randomly selected individuals⁵. Longitudinal surveys are used to study a phenomenon or an evolution across time. Since GSOEP is also used by policymakers to measure the effectiveness of their policies, the DIW has to have large samples. A larger sample is statistically more likely to be closer to the Economic reality which lowers the probability of over or underestimate the evolution of poverty after Reunification. Swedish Microdata come from the Living Condition Survey (LCS) made by Statistics Sweden (SCB)⁶. The LCS is also a longitudinal survey of randomly selected individuals. Data of the GSOEP were collected through computer assisted personal interview (CAPI) and paper-and-pencil personal interviews (PAP) during 8 months. Data of the LCS were collected via a telephone interview and if there was no response an interviewer visited the household. For both surveys, no information about the answer rates were given.

The German sample includes six waves of data (1987, 1989, 1991, 1995, 2000 and 2005) while the Swedish one is restricted to four waves (1987, 1995, 2000 and 2005). In order to have a continuous dataset, data about individuals living in Eastern regions⁷ and Berlin region are excluded. Berlin is excluded because it contains information about individual living in West Germany in 1987 and 1989, while, after the Reunification, Eastern individuals are included in the region of Berlin. Eastern regions are not in the dataset before the Reunification because

⁵ The questionnaire is different according the age of the individual. Since only individual at least aged of 16 years old are kept in the sample, it refers to the SOEP questionnaire available at:

<http://www.diw.de/soepsurveypapers>

⁶ The questions and the different answers are available at:

https://www.scb.se/contentassets/c2d3661d55394b799b4e66c1beac7d51/ulf_definitioner_ssd_2018_eng.pdf

⁷ Eastern Regions are Brandenburg, Mecklenburg, Saxony, Saxony-Anhalt and Thuringia.



Microdata were collected by the Federal Republic of Germany which did not recognize the Democratic Republic of Germany. The availability and the construction of the dataset depends on the national legislations. For instance, Sweden is one of the most protecting country regarding individual data. The access to data is conditional to German and Swedish laws of data protection. In order to provide data that are not identifiable, GSOEP provides only 95% of the dataset. Moreover, LIS is protecting the individual data by forbidding the access to the entire dataset (Burkhauser et al. 1997).

Appendix A1 provides descriptive statistics of the datasets used. The sample includes individual data about individuals older than 16 years old with at least one type of income (labor, capital, transfer or benefits incomes). Individuals with only windfall income are rejected since it is neither a reliable nor a regular type of income. Two different incomes will be considered: the labor income and the disposable income. The labor income combines wage income and self-employment income. The disposable income is the sum of the labor and capital incomes after taxation and redistribution. Redistribution aggregates pensions, childcare allowance and unemployment benefits

The final German sample is composed of 9922 individuals in 1987, 9496 individuals in 1989, 9514 individuals in 1991, 9548 individuals in 1995, 16971 individuals in 2000, and 17677 individuals in 2005. Since all age categories do not face the same poverty risk, the sample is divided into three categories: young (16-24 years), adult (25-64) and old (65-+). West German and Swedish samples gather populations that follow the same path. Indeed, the Swedish average age increases from 43 in 1987 to 48 years old in 1995 while the German average age increases from 41 years old in 1987 to 47 years old in 2005. The share of older people increases from 10% in 1987 to 20% in 2005 in Germany and from 10% to 23% in Sweden. However, the share of young population is following different trend since the share of young decreases from 21% to 13% in West Germany but increases from 13,5% to 14,5% in Sweden.

Education is divided into three categories: low, medium and high. Low education means that the individual has the primary education level, medium is the secondary education level and high is the tertiary education level. German and Swedish samples contain different population since the majority of the Germans have a medium education level whereas the three fifth of the Swedish sample is low educated. High education is evenly shared in Sweden and Germany.



Labor force status is a self-assessed status⁸. The person self-assessed as out of labor force are individual that are not unemployed, in education, retired or homemaker. Until 2005, the share of self-assessed employed in Germany is relatively stable and is located around 56 % to 58%. The share of self-assessed employed in Swedish sample decreases from 77% in 1987 to 56%. However, the method of collection of data could explain the evolution of employed workers in Sweden. The number of missing observations is important and not all the different labor status are available (in 1987, individuals are either employer or not in the labor force). The categorization is different for both countries since not in labor force also includes homemakers in Sweden whereas it represents to distinct categories in Germany. Nevertheless, the Swedish sample might not be representative enough due to the lack of important data as unemployment before 2005. Moreover, the financial crisis of 1992 that hit most of the European countries could be a concern since it led Sweden to a recession. Even if Sweden was more impacted than Germany, both countries are still comparable (see Appendix A2). As this crisis could bias results, a measurement error will be used in order to test the robustness of the method and the dataset.

The marital status is divided into four categories: married, never married, separated and widowed. The separated category refers to people separated and divorced. The repartition of the marital status is stable over time in German sample. The variable household composition is closely related to the marital status but connect the individual with his/her household composition. An individual can live either alone in a one-person household, with a partner or with non-relatives (other household). Living with a partner includes married and unmarried couple. This variable is different if the couple lives with or without kid.

Immigrants are individuals who either self-define them-selves as immigrants, are citizen of another country or were born in another country. The number of immigrants is stable whereas the size of the sample is increasing. Hence, the proportion of immigrants decreases. East German migrants are not considered as immigrants since they were already citizen of Germany.

⁸ GSOEP differentiates six status: employed, unemployed, not in labor force, in education, retired and homemaker.

SCB differentiates:

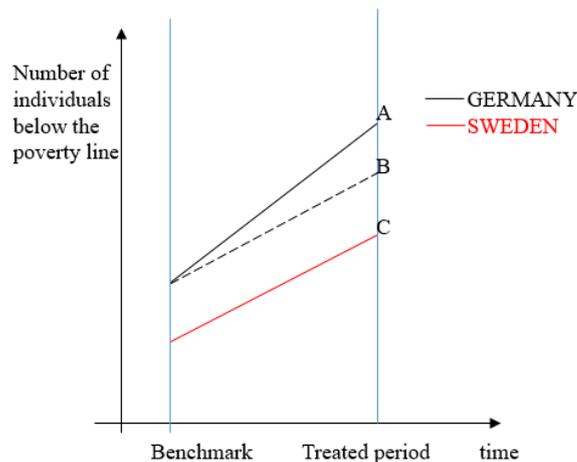
- two status in 1987: employed or not in labor force
- four status in 1995 and 2000: employed, not in labor force, in education and retired
- six status in 2005: employed, unemployed, not in labor force, in education, retired and disabled.



6 Method

This essay includes two regressions with the same outcome (*i.e. whether being poor or not*). One is a difference-in-differences used to study the evolution of poverty in West Germany due to the reunification. If the hypothesis that Sweden and Germany are similar is considered as true, the difference-in-differences highlights the only effect of the reunification. The outcome of the second regression is a binary variable hence, a linear probability regression will be used to investigate a possible change in the structure of the poor population in West Germany. Two poor population will be considered. The first one being the poor population before government's action (income transfer) while the second one being poor population after government's action.

Figure 1: DID scheme



Source: own graph inspired by free resources of the World Bank

Difference-in-differences (DID) is a statistical approach that measures the impact of a particular event on a specific group called the treatment group. In order to only study the impact of the event on the treatment group, a second group called the control group is used. Treatment and control groups should be similar before the event studied. West Germany is the treatment group and Sweden is the control group. The particular event studied is the reunification of Germany and the outcome is the fact that a particular individual is below the poverty line which is defined as 60 percent of the median income. The income chosen is the disposable income since it represents the income that the individual can dispose of after the addition of transfer income and the subtraction of taxes. The year 1987 is the benchmark and the years 1995, 2000 and 2005 are the treated periods.

The DID is the difference of two differences. The first one is the observed difference between the German and the Swedish poverty rates in the treated time period. The German and



the Swedish poverty line are relative to the national income distribution; hence they are different. This is the difference $A - C$ in the figure 1. The second difference is the difference between the Swedish actual poverty rate and the German poverty rate if the reunification did not happen (it is the fictional poverty rate). It is the difference $B - C$ in the figure 1. The second difference controls for an external macroeconomic shock that could have impacted the poverty such as financial crisis, unemployment increase or rise in prices. The DID is computed with the next equation: $(A - C) - (B - C) = A - B$

The difference $(A - B)$ is the increase or decrease of the number of individuals below the poverty line due to the Reunification. The figure 1 is an illustration of the DID and should not be interpreted as the actual result of the DID of the poverty rates of Germany and Sweden. The DID relies on the assumption that poverty in West Germany follows the same trends as poverty in Sweden. Appendix A2 provides macroeconomics data⁹ about Sweden and the Federal Republic of Germany. Sweden and Germany are countries with similar economic structure since both of them are integrated into capitalism. They show similar trends for unemployment and GDP per capita. The income distribution of Germany and Sweden are similar since they have roughly the same GINI Index (see Appendix A2). Furthermore, the poverty rate of Sweden and Germany follow the same trends as it is visible in the graph of the Appendix A3. The data come from Eurostat so the year of collection is not the year of the observation. The true time period represented is 2004-2016.

It is relevant to use Sweden as a control group for Germany because both countries are trading with the member of the European Union. Furthermore, they have similar growth rates, market regulation and competitions laws.

The outcome is a dummy variable equal to 1 if the individual's income is below the poverty line and 0 otherwise. The explanatory variables are dummy variables that control for the group of belonging (G_i) of the individual i , the Time period of the observation (T) and the interaction between the two first explanatory variables (I_i).

The group is equal to 1 if the individual lives in West Germany and 0 otherwise. The time variable will be equal to 0 if the observation occurred before Reunification (in 1987) and 1 if it

⁹ Data about unemployment rates in the Appendix A2 are from the International Monetary Fund



occurred after (1995, 2000 or 2005). I is the product of the time and the group of belonging of the individual (1).

$$(1) \text{ Poverty}_i = \alpha_0 + \alpha_1 T + \alpha_2 G_i + \alpha_3 T \cdot G_i + \varepsilon_i = \alpha_0 + \alpha_1 T + \alpha_2 G_i + \alpha_3 I_i + \varepsilon_i$$

I_i is equal to 1 only if the observation occurred in West Germany after Reunification (see Appendix A4). The coefficient attached to the estimator of I_i will show the change in poverty due to reunification *ceteris paribus*. In order to compare poverty between countries and over time, poverty rate will be used rather than the number of poor.

The second regression is a linear probability which estimates the impact of individual and household factors on the individual's poverty situation in 1989, 1991, 1995 and 2000. The explanatory variables are age, gender, education level, employment, marital status and the fact of being foreign-born. The outcome of the model is again the fact that an individual has an income below the poverty line. Two definitions of the poverty line are used. The first one is 60% of the Western median labor income and the second one is 60% of the Western median disposable income. Both incomes are at the individual level and not the household level. The first definition of poverty used is referred to as the "pre-government poverty" while the second one is referred to as the "post-government poverty". This regression is based on the following equations:

$$(2) \text{ Poverty}_i = \alpha + \beta_0 \text{Age}_i + \beta_1 \text{Age}_i^2 + \beta_2 \text{Gender}_i + \beta_3 \text{Education}_i + \beta_4 \text{labor status}_i + \beta_5 \text{marital status}_i + \beta_6 \text{Immigrant}_i + \varepsilon_i$$

$$(3) \text{ Poverty}_i = \delta + \gamma_0 \text{Age}_i + \gamma_1 \text{Age}_i^2 + \gamma_2 \text{Gender}_i + \gamma_3 \text{Education}_i + \gamma_4 \text{labor status}_i + \gamma_5 \text{household composition}_i + \gamma_6 \text{Immigrant}_i + \varepsilon_i$$

Two regressions are computed in order to understand if there is a difference of the poverty situation when the marital status or the composition of the household are considered. The household composition might give a clearer understanding of the poverty since some transfer incomes depends on the household composition. Poverty is a dummy variable equals to 1 if individual i is poor, and 0 otherwise. All explanatory variables are dummy variables defined in section IV. Age appears as age and age^2 since the relationship between age and income is not perfectly linear since the effect of age can be positive during adulthood and negative during the old age. The age^2 is added to the model since the definition of poverty used is income based. However, other approaches to poverty exist such as social exclusion (Mood & Jonson, 2015) or the capability (Sen, 1979 and Nussbaum, 2000).



The DID used the year 1987 as the control year instead of the year 1989 because data were not available for Sweden for that year. However, since it is better to use the year 1989 to analyze the impact of reunification, this year will be used instead of the year 1987 for the second and third regressions.

7 Results

Table 1 shows the results of the difference-in-differences. Poor refers to individuals with an income below the poverty line which is 60% of the regional median income. The income used is the personal disposable income. The poverty rate computed are the one of the samples. Moreover, since the samples are restricted to individual older than 16 year old with at least one type of income and living in one of the ten länder of West Germany (Berlin land being excluded) The estimates of row 1 are the changes in poverty rate between Swedish and West German residents, keeping time as fixed effect. The estimates of row 2 are the changes in poverty rate between the year studied and 1987 without considering the residency. Finally, the last row is the one of interest since it represents the coefficient of the difference-in-differences. This coefficient should be interpreted as the change of the poverty rate if the reunification did not happen. In order to compare whether the number of poor changes over several years, this table is separated into three years: 1995, 2000 and 2005.

Table 1: Difference-in-difference of poverty in Germany after reunification

	(1) Poverty rate in 1995	(2) Poverty rate in 2000	(3) Poverty rate in 2005
German resident	0.0540*** (11.32)	0.0540*** (12.53)	0.0540*** (12.44)
Time	-0.0215*** (-5.76)	-0.102*** (-30.34)	-0.0983*** (-29.70)
Interaction	-0.0108 (-1.64)	0.0488*** (8.95)	0.0616*** (11.36)
_cons	0.169*** (57.77)	0.169*** (63.94)	0.169*** (63.49)
N	62552	70195	74211
R-square	0.0051	0.0287	0.0296

t statistics in parentheses

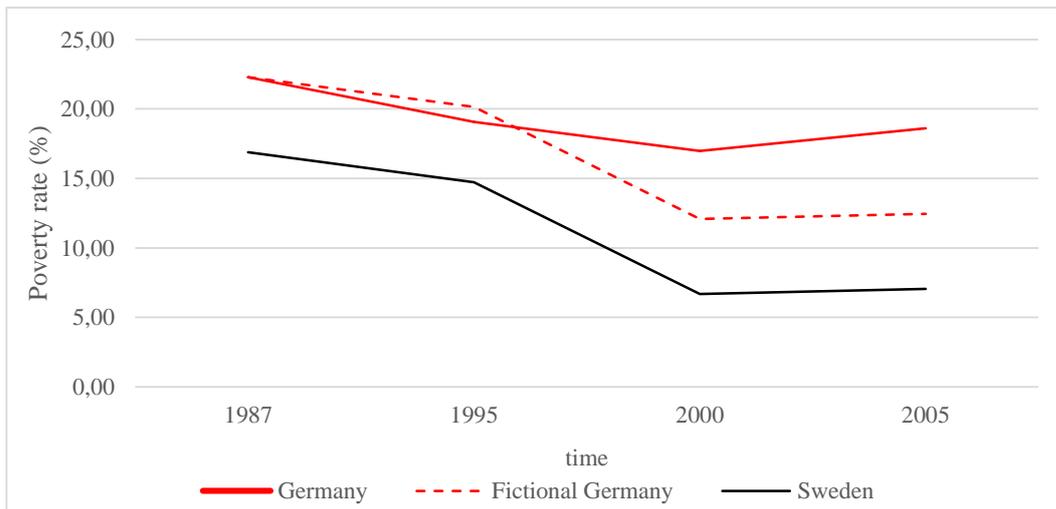
* p<0.05, ** p<0.01, *** p<0.001

Source: LIS 2019 own calculation



Figure 2 represents the evolution of poverty rates in the sample of Sweden and Germany between 1987 and 2005. The black line is the Swedish poverty rate trend which is the control group. The poverty rate decreases over time in Sweden from 16.88% to 12.45%. The poverty rate is not the one of the entire population but only the one of the restricted sample. It only includes individuals over 16 years old. The red line illustrates the German poverty rate while the red dashed line represents the evolution of the German fictional poverty rate. The fictional German poverty rate is the assumed poverty rate of Germany if reunification did not happen. The production of this curve relies on the assumption that poverty in Germany would have followed the Swedish poverty trend. The gap between the two red lines is the treatment effect. The impact of reunification includes multiple events related to the reunification such as structural reforms, migration flows, inflation related to adoption of deutschmark by East Germany or labor market transformations. A negative interaction coefficient means that the poverty rate decreases thanks to reunification. A positive interaction coefficient means that the poverty rate increases in the year considered because of the reunification. In 1995, the reunification had a positive impact on poverty since it decreases the poverty rate by 1,08 percentage point. However, the coefficient is not statistically significant. The lack of statistical significance for the year 1995 might be due to samples. The Swedish, the German or both samples could misrepresent the German or the Swedish national trend.

Figure 2: Poverty rates in Germany and Sweden between 1987 and 2005



Source: LIS 2019 own calculation

In 2000 and 2005, the interaction coefficients are statistically significant at a 0,1% level. Both are positives, so the reunification had a negative impact on poverty and increased it. In 2000, the reunification increases poverty by 4,88 percentage point. In 2000, the fictional poverty rate would have been equal to 12.09% whereas the current German poverty rate in the



sample is equal to 16.97%. In 2005, the reunification increases poverty by 6,16 percentage point. The figure shows that the trend of poverty rate increases to 18.61% while the fictional poverty rate increases to 12,45%. The poverty should have only increased by 0,36 percentage point between 2000 and 2005. Furthermore, the actual increases for this period was 1,64 percentage point. Hence, the reunification increased poverty in Germany in 2000 and 2005 with a greater strength. The empirical result of the difference-in-differences is not generalizable to the entire Germany. The first hypothesis is then confirmed. The following table investigates whether the population of poor changed after reunification.

Table 2 exhibits the weight of age, gender, education, employment status, immigrant status and marital status on individual's poverty likelihood while table 4 shows the weight of age, gender, education, employment status, immigrant status and household composition on individual's poverty likelihood. Both regressions explain similarly poverty since the R-square are similar. Regressions models explain 58% to 86% of poverty in West Germany between 1989 and 2000. The number of observations is slightly higher for the regression including the household composition instead of the marital status because the number of missing observations is lower for the variable household composition than the marital status. Both tables have similar results and similar standard errors of coefficient associated to the explanatory variables such as age, gender, employment status and immigration.

The poverty is computed at the individual level with a pre-government income and a post-government income for all the years studied. Except for explanatory variables immigrant and age, all the coefficients associated to other variable are relative to a specific reference variable visible in the Appendix A5. The sign of the result indicates whether the factor increases or decreases the poverty likelihood of the individual. If the sign is positive, then factor increases the likelihood to be poor whereas a negative factor decreases the likelihood to be poor according to the reference category. Last but not least, the following tables show the evolution of the poor population before and after the Government's intervention. It is not possible to attribute all the changes of the poverty structure to the reunification since other events could have impacted the poor population or the population at risk of poverty.



Table 2: linear probability regression of poverty before and after income redistribution in Germany between 1989 and 2000 using the marital status

	(1) 1989		(2) 1991		(3) 1995		(4)2000	
	Pre-gouv	Post-gouv	Pre-gouv	Post-gouv	Pre-gouv	Post-gouv	Pre-gouv	Post-gouv
Age	-0.00146 (0.00083)	0.00386*** (0.00075)	-0.00225* (0.00088)	0.00658*** (0.00079)	-0.000541 (0.0010)	0.0116*** (0.0010)	0.000394 (0.00060)	0.00833*** (0.00061)
Age ²	0.0000391*** (0.0000091)	-0.0000274*** (0.0000071)	0.0000470*** (0.0000095)	-0.0000436*** (0.0000073)	0.0000421*** (0.000011)	-0.00009*** (0.000010)	0.0000203*** (0.0000059)	-0.0000632*** (0.0000057)
Female	0.0112** (0.0040)	-0.00426 (0.0031)	0.0125** (0.0039)	0.00458 (0.0031)	0.0106* (0.0042)	-0.000459 (0.0039)	0.00597* (0.0026)	0.00184 (0.0022)
Medium	0.00424 (0.0055)	-0.00625 (0.0052)	-0.00289 (0.0055)	-0.0146** (0.0055)	-0.00956 (0.0062)	-0.0227*** (0.0066)	-0.0158*** (0.0040)	-0.0187*** (0.0047)
High	-0.00922 (0.0069)	-0.0211** (0.0064)	-0.0131 (0.0070)	-0.0322*** (0.0070)	-0.0148* (0.0072)	-0.0253*** (0.0075)	-0.0261*** (0.0049)	-0.0297*** (0.0053)
Employed	-0.670*** (0.030)	-0.613*** (0.031)	-0.682*** (0.031)	-0.586*** (0.032)	-0.649*** (0.024)	-0.566*** (0.025)	-0.635*** (0.021)	-0.559*** (0.022)
Retired	0.191*** (0.033)	-0.633*** (0.032)	0.179*** (0.033)	-0.637*** (0.033)	0.175*** (0.026)	-0.599*** (0.026)	0.253*** (0.022)	-0.600*** (0.022)
Out of labor force	-0.287*** (0.049)	-0.281*** (0.048)	-0.288*** (0.059)	-0.206*** (0.059)	-0.315*** (0.051)	-0.236*** (0.051)	-0.296*** (0.047)	-0.236*** (0.047)
Homemaker	0.200*** (0.032)	0.220*** (0.033)	0.158*** (0.032)	0.146*** (0.035)	0.172*** (0.026)	0.112*** (0.028)	0.219*** (0.022)	0.129*** (0.024)
Immigrant	0.0113* (0.0052)	0.0148** (0.0051)	0.00807 (0.0055)	0.0200*** (0.0056)	0.0168** (0.0057)	0.0262*** (0.0062)	0.0112** (0.0041)	0.0165*** (0.0047)
Never married	0.00187 (0.0066)	0.0316*** (0.0063)	-0.00420 (0.0065)	0.0399*** (0.0065)	0.00436 (0.0067)	0.0510*** (0.0067)	0.0124** (0.0044)	0.0345*** (0.0047)
Separated	-0.0111 (0.0091)	0.00616 (0.0078)	-0.00685 (0.0085)	-0.00138 (0.0080)	-0.00653 (0.0085)	0.00824 (0.0084)	-0.0105 (0.0060)	-0.00844 (0.0057)
_cons	0.655*** (0.037)	0.506*** (0.038)	0.692*** (0.038)	0.401*** (0.039)	0.601*** (0.035)	0.263*** (0.036)	0.594*** (0.027)	0.343*** (0.027)
N	8165	8165	8077	8077	8177	8177	14782	14782
R-square	0.836	0.749	0.835	0.671	0.811	0.591	0.866	0.630
Transfer Income	NO	YES	NO	YES	NO	YES	NO	YES

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Source: LIS 2019 own calculation

For instance, in 1989, a female is 1,12% more likely to be poor than a male before transfer income and taxes. The results are not statistically significant when the post-government is considered so it is not possible to conclude anything from these results. After the reunification, females are more likely to be poor than male by 0,13%. However, on the long-run, the relative likelihood to be poor for female decreases. It is positive in 2000 in the table 2 at a level of significance of 5% and the table 4 but without being statistically significant. The strength of the coefficients associated to the variable gender and the significance are low so even if the gender matter, it is not the most important factor. It follows the theory since female poverty is higher than male poverty *ceteris paribus* but in a small extent.

Age is always associated to a positive factor which means that every additional year increases the poverty risk. The results are statistically significant only for the post government



income. The age increases the probability of being poor by at the maximum 0,4% to 1%. The effect of age doubles after reunification which means that aging increases the individual's poverty likelihood after redistribution over the lifetime. The increase of the weight of age in poverty likelihood is durable. However, even if the factor is statistically significant, the effect is very low and could be considered as null. In the theoretical predictions, it has been expected to find that gender and age will increase the individual's likelihood to be poor before and after income transfer. From the German sample, it is true but only in a small extent. Nevertheless, in the post reunification period, the coefficients associated to age and gender are both getting more important, suggesting that the poor population is getting slowly feminized and older. Since the German population is aging¹⁰, it is not unusual that the poor population is aging as well and getting more feminine¹¹.

The coefficients associated to the educational level are negatives which means that low educated individuals have a higher poverty risk. Yet, not all of them are statistically significant. It is not possible to conclude on the evolution of poverty after reunification for individual with secondary degree since the results for pre-government and post-government are not statistically significant in 1989. High educated individuals are 2,11% to 2,13% less likely to be poor than low educated individuals after transfer income before the reunification. After it, the coefficients keep decreasing which means that high educated are less and less likely to be poor relatively to low educated after income distribution. The same trend is visible for medium educated individual even though it is in a lesser degree. The reunification had an impact on high educated because the likelihood to be poor relatively to low educated after transfer income jumped from -2,11% to -3,22%. In 2000, both pre-government and post-government coefficients are statistically significant for medium and high educated at a 0,1%. However, since no results are statistically significant in 1989, it is not possible to conclude on a particular shock for medium educated caused by the reunification. The likelihood to be poor relatively to low educated is smaller before and after for both groups. Furthermore, the likelihood to be poor decreases with income transfer for medium educated and high educated. That means that redistribution reduces poverty likelihood among medium educated and high educated. It is a result that suggests that welfare system is protecting a large spectrum of the population. The low educated are getting

¹⁰ In the descriptive statistic, the mean age is increasing.

¹¹ In 1990 in Germany the life expectancy was 78,56 for female and 72,06 for male. Available on: Perspective monde, University of Sherbrooke, Québec, Canada, 2019.
<http://perspective.usherbrooke.ca/bilan/servlet/BMListeStatSpecifique?codetheme=1>



more and more likely to be poor and so represents a bigger part of the poor population after reunification.

The employment status is one of the most important factors of poverty in West Germany and one of the most significant since the standard errors are low, giving significant results with a confidence interval of 99,9%. Employed individuals are 67% less likely to be poor than unemployed in 1989 before income transfer and taxation. The shield of employment against poverty is crumbling over time. The income redistribution includes both transfer income and taxation and the working population is one of the main contributors to income taxes. Hence, employed individual see their likelihood to be poor comparatively to unemployed decrease slightly when the disposable income is used instead of the wage income. However, no change in the trend of poverty among workers is visible after reunification.

Retired are former workers who perceive pension as major income. Pensioners are 18% to 25% more likely to be poor than unemployed before redistribution and 63% to 60% less likely to be poor than unemployed after redistribution. However, the probability to be poorer than unemployed before income transfer is decreasing. Moreover, according table 3, 98% of the pensioner that were poor before income redistribution are not poor after income redistribution and taxation. This result is close to the reality since pension is a transfer income. After transfer income, retired are less likely to face poverty spell than employed worker by 2 to 5 percentage point¹². In the short and middle run, reunification did not have a particularly huge impact on West German pensioners.

Table 3: Repartition of poverty according to pre-government and post-government income distribution between 1989 and 2000 in West Germany

individuals below the poverty line

	1989				1991				1995				2000			
	pre-gov	post-gov	diff (%)	share of poor*	pre-gov	post-gov	diff (%)	share of poor*	pre-gov	post-gov	diff (%)	share of poor*	pre-gov	post-gov	diff (%)	share of poor*
employed	1	1	0,00	0,08	7	7	0,00	0,66	6	6	0,00	0,55	11	7	36,36	0,44
unemploy	160	146	8,75	11,55	153	133	13,07	12,55	269	237	11,90	21,70	345	304	11,88	18,99
retired	1328	1	99,92	0,08	1368	1	99,93	0,09	1408	27	98,08	2,47	3144	5	99,84	0,31
not in labo	68	59	13,24	4,67	41	40	2,44	3,77	34	33	2,94	3,02	43	40	6,98	2,50
homemak	1123	1057	5,88	83,62	1019	879	13,74	82,92	970	789	18,66	72,25	1556	1245	19,99	77,76
total	2680	1264	52,84	100	2588	1060	59,04	100	2687	1092	59,36	100	5099	1601	68,60	100
total indiv	8282	8282			8215	8215			8312	8312			15237	15237		

*the percentage of poor is computed according the post-government poverty

Source: LIS 2019 own calculation

¹² To have this result one should subtract the coefficient of post-government income poverty for retired to the coefficient of post-government income poverty for employed. For the year 1989, it will give a difference of -0,633 - (-0,613) = -2 percentage points



The individual not in the labor force have a lower probability to fall into poverty than unemployed since all the coefficient associated are negative. However, no specific trend is visible before 1991. In 1989, the probabilities to be poor before and after redistribution and taxation are -28%. Individual out of labor force are 28% less likely to face poverty than unemployed. While the probability to be poor for out of labor force individual is similar before and after income distribution before-reunification, the gap between individual out of labor force and unemployed decreases when the post-government income is used. If the post-government income is used instead, they are in average 6 to 8 percentage point more likely to be considered as poor than when the pre-government income was used. After reunification, individuals out of labor force are less likely to benefit from transfer income than unemployed. Several tracks can explain it. First, this category gathers different type of individual and some of them can be capital owner or heir. Second, since they do not work¹³, they cannot recipient of social insurance such as unemployment benefit but only welfare allowance like recipient for family benefits, sickness and work injury pay, general assistance and housing benefit. According to table 3, more unemployed leave poverty thanks to income redistribution than individual out of labor. The transfer income reduces the advantage that this social group had on the social group of unemployed. This subpopulation is difficult to analyze because it is not clearly described in the GSOEP and is self-assessed. It is plausible to imagine that individuals have self-assessed themselves as out of the labor force while in reality they belong to another category (homemaker, unemployed or disabled). Moreover, it can also describes individuals that were unemployed but are no longer considered as unemployed by the German labor office. Individuals involve in the underground Economy. In that case, no income will be declared to the authority neither to the GSOEP.

The last category is the homemaker population. This population is statistically more likely by 16% to 22% to be poorer than unemployed before income redistribution. Before the reunification, they are facing the same problem as the out of labor population since they are more likely to be poor after transfer income than before. The year after reunification, the poverty likelihood of homemakers decreases by 4 percentage point and 7 percent point if the post-government is used instead. The income redistribution reduces the gap between homemaker and unemployed by 1 percentage point in 1991, 6 percentage point in 1995 and 9

¹³ Individual out of labor force are neither student, unemployed, looking for a job without being registered or homemaker



percentage point in 2000. However, the homemakers are still the most at risk of poverty. Homemaker is the only social group that is still more likely to be poor than unemployed after income transfer. The percentage of homemakers considered as poor according the pre-government income distribution but not the post-government one is increasing from 6% to 20% while this rate is between 9% and 13% for unemployed. It is the social group with the highest rate of change in poverty status according to the income distribution chosen¹⁴. However, they are also the biggest group in terms of observations.

Immigrant is a dummy variable equal to 1 if the individual is not German born and 0 otherwise. Being foreign born increases the probability of being poor by 1% to 2% compared to German born when the pre-government income is considered. Immigrant is the only factor for which the post-government income poverty is higher than the pre-government poverty. The post-government poverty was 0,5 percent point higher in 1991 and 1 percent point higher in 1995. The reunification increases the proportion of immigrant in the poor population. It is mainly due to the legislation surrounding welfare benefit since becoming a claimant of transfer income needed a minimum of time of residence in Germany that can vary according the type of social benefit.

Table 2 provides specifics results for the marital status. Only never married and separated individuals are study because the small number of widows would have produce non-exploitable results. Never married individuals are statistically more likely to be poorer than married individuals by 3% to 6% when the post-government income is used as a benchmark. Separated or divorced individuals are less likely to be poor than married individuals. However, the coefficients are not statistically significant since the coefficient are almost never greater than 1%.

The table 4 shows the weight of the household composition on poverty. A couple without kids is 1,5% to 2% statistically more likely to be poor than a one-person household when the poverty is defined according to the disposable income. It is not possible to draw conclusion on the effect of living in a household with kid(s) since none of the coefficient is statistically significant. In 1989, household composed by lone parent are 3,5% less likely to be poor than one-person household before income redistribution. This result is surprising because it is contrary to most of the empirical findings (see Jäntti and Danzinger, 1994). However, the only

¹⁴ If pensioners are excluded. It is relevant to consider differently pensioner than other social groups since the major part of their income is transfer income



statistically significant result is in 2000 and exhibits a contrary result. It is not possible to conclude on a specific trend due to particular labor market disposition or efficient anti-poverty policies.

Other household is a particular variable that gather households sharing an accommodation without being relatives. It increased the post-government income poverty by more than 3% for other household compared to one person household. The variable other household only contains few observations which one explanation of the high standard errors can be. Moreover, the positive sign of the coefficient can be explained by a biased variable. Indeed, individuals living in shared accommodation are more likely to be located on the left side of the income distribution than individuals living alone.

Table 4: linear probability regression of poverty before and after income redistribution in Germany between 1989 and 2000 using the household composition

	(1) 1989		(2) 1991		(3) 1993		(4) 2000	
	Pre-gouv	Post-gouv	Pre-gouv	Post-gouv	Pre-gouv	Post-gouv	Pre-gouv	Post-gouv
Age	-0.00151 (0.00078)	0.00225*** (0.00065)	-0.00206** (0.00080)	0.00475*** (0.00068)	-0.000765 (0.00094)	0.00911*** (0.00092)	-0.000422 (0.00051)	0.00604*** (0.00050)
Age ²	0.0000383*** (0.0000087)	-0.0000137* (0.0000065)	0.0000444*** (0.0000089)	-0.0000305*** (0.0000066)	0.0000433*** (0.000010)	-0.0000709*** (0.0000096)	0.0000264*** (0.0000055)	-0.0000459*** (0.0000050)
Female	0.0116** (0.0041)	-0.00463 (0.0032)	0.0123** (0.0039)	0.00198 (0.0033)	0.0110** (0.0042)	-0.00229 (0.0039)	0.00409 (0.0026)	0.00140 (0.0023)
Medium	0.00274 (0.0055)	-0.00739 (0.0052)	-0.00335 (0.0055)	-0.0166** (0.0055)	-0.0104 (0.0062)	-0.0243*** (0.0066)	-0.0153*** (0.0040)	-0.0201*** (0.0047)
High	-0.0101 (0.0070)	-0.0213** (0.0065)	-0.0135 (0.0070)	-0.0342*** (0.0070)	-0.0155* (0.0072)	-0.0258*** (0.0075)	-0.0252*** (0.0049)	-0.0306*** (0.0054)
Employed	-0.672*** (0.030)	-0.616*** (0.031)	-0.674*** (0.031)	-0.582*** (0.032)	-0.650*** (0.023)	-0.569*** (0.025)	-0.634*** (0.021)	-0.562*** (0.022)
Retired	0.193*** (0.032)	-0.637*** (0.032)	0.190*** (0.033)	-0.634*** (0.033)	0.176*** (0.026)	-0.604*** (0.026)	0.254*** (0.022)	-0.603*** (0.022)
Out of labor force	-0.284*** (0.049)	-0.276*** (0.048)	-0.280*** (0.059)	-0.192** (0.060)	-0.314*** (0.051)	-0.228*** (0.051)	-0.295*** (0.047)	-0.236*** (0.047)
Homemaker	0.197*** (0.031)	0.212*** (0.033)	0.168*** (0.032)	0.147*** (0.035)	0.171*** (0.026)	0.104*** (0.028)	0.221*** (0.022)	0.122*** (0.024)
Immigrant	0.0106* (0.0052)	0.0128* (0.0051)	0.00865 (0.0055)	0.0188*** (0.0056)	0.0165** (0.0057)	0.0233*** (0.0062)	0.0110** (0.0041)	0.0137** (0.0047)
Couple without kid	-0.00134 (0.0064)	0.0171** (0.0053)	0.00749 (0.0065)	0.0168*** (0.0049)	0.00475 (0.0066)	0.0159** (0.0061)	0.00530 (0.0042)	0.0209*** (0.0039)
Couple with kid	-0.00214 (0.0064)	0.0107 (0.0057)	-0.000203 (0.0065)	-0.00773 (0.0053)	0.000117 (0.0067)	-0.00483 (0.0064)	-0.00345 (0.0041)	0.000573 (0.0041)
Lone parent	-0.0348* (0.014)	0.0189 (0.010)	-0.0133 (0.013)	-0.00732 (0.011)	-0.0119 (0.013)	0.00377 (0.012)	0.0157* (0.0076)	-0.00576 (0.0089)
Other household	0.0175 (0.015)	0.0339* (0.016)	-0.0112 (0.031)	-0.00903 (0.029)	-0.0184 (0.027)	-0.0229 (0.026)	0.00178 (0.013)	0.0151 (0.012)
_cons	0.664*** (0.036)	0.546*** (0.036)	0.678*** (0.036)	0.459*** (0.037)	0.609*** (0.033)	0.344*** (0.033)	0.617*** (0.024)	0.411*** (0.025)
N	8212	8212	8118	8118	8211	8211	14835	14835
R-square	0.837	0.748	0.836	0.670	0.812	0.590	0.866	0.630
Transfer Income	NO	YES	NO	YES	NO	YES	NO	YES

Standard errors in parentheses
* p<0.05, ** p<0.01, *** p<0.001

Source: LIS 2019 own calculation



Results given in Table 2 and table 4 are close since the variable household composition and marital status are correlated to some extent. Furthermore, it is plausible to assume that most of the never married individual in the nineties were living alone. The never married are more likely to be poor than married individual whereas the household without kids are more likely to be poor than one-person household. The household composition is less significant than the marital status even though it explains well the poverty structure. The reunification did not have impact on the household composed by a couple without kid. Furthermore, it is the only statistically significant variable of the household composition.

The income transfer reduced the poverty by 53% in 1989, 59% in 1991 and 1995 and 69% in 2000. The efficiency of the income transfer in reducing poverty is increasing after the reunification (table 3). Even if the reunification increases poverty, the income transfer works as a counter-cycle policy and lower the negative impact that reunification has on poverty in the post-reunification Germany. To determine the veracity of the second hypothesis (the reunification made the transfer income less efficient and increased the likelihood to be poor of the most at risk of poverty subpopulation), three different categories of subpopulations are identified. The subpopulations who see their likelihood to be poor increasing right after the reunification but after five to ten years going back to the previous level, the subpopulations who see their likelihood to be poor increasing durably and the subpopulations that have no change in their likelihood to be poor after the reunification. Female and homemaker belong to the first category since the impact of reunification on their poverty's likelihood goes back to its pre-reunification level. Employed, immigrant, individual out of the labor force, pensioner and never married suffer from a durable increase of their likelihood to be poor because of the reunification. Aging increases more and more the probability to be poor after the reunification as well. Finally, retired and member of household only composed of a couple without kid have not been impacted by the reunification and have the same likelihood to be poor as before. The boom (permanent or transitory) never had a negative effect of a subpopulation's likelihood to be poor. The reunification did not change the likelihood poverty of individual at best and increased it at worst. The second hypothesis is verified for unemployed, female and low skilled individuals. However, it is not possible to conclude for the individual belonging to lone parents household since the results are not statistically significant. The increasing weight of age suggested that young are not seeing their probability of being poor increasing. Nonetheless, other categories of subpopulation suffered from an increasing probability of being poor while they were not at a



high risk of poverty meaning that larger part of the population than the one expected was impacted by the negative impact of the reunification.

8 Conclusion

The reunification had a negative impact on poverty in West Germany since it increased the poverty rate. It follows the findings of the previous literature about poverty in West Germany after reunification. This essay aimed to do a positive analysis of the structure of poverty over time. The structure of poverty did change a little right after the reunification in 1991. Indeed, female, elder, employed, homemakers, individuals out of labor force, immigrants and never married individual had a higher likelihood to be poor. The likelihood of being poor decreased for pensioners, secondary and tertiary educated individual. However, the most important factor in the poverty likelihood is employment status. The results seem to suggest that some categories, especially the homemakers are in a long spell of poverty which would need further researches on the duration of poverty experiences after reunification in West Germany. The income transfer has a positive impact and is becoming more efficient after the reunification, suggesting that even if reunification increased poverty, the anti-poverty policies had a good counter-cycle effect. Furthermore, poverty is a multidimensional problem which means that it can be analyzed in several fields and according to different approaches and definitions. Here, the definition used is common and only translates poverty according to income distribution.

Nevertheless, the shock of the reunification has been absorbed quickly by German society since the structure of poverty in 1995 and even more in 2000 was very similar to the structure of poverty before reunification.

The method of the difference-in-differences (DID) can lead to artificially low standard errors (Bertrand et al., 2003). If one could have included control variables such as age, occupation and education level in the DID, the results could have been more precise. However, it was not possible due to the limitation of the sample. Indeed, in order to protect the individuals that responded to the survey, access to the data is only possible via LIS server which is LISSY. Even if LISSY allows to use STATA, not all the commands are doable on this server.

This essay aimed to study the impact of transfer income on poverty even though transfer income is a particular type of redistribution but not the only one. Other policies such as tax refund could also have an impact. Frick et al. (2000) findings suggested that the tax refund is not the most efficient policy in Germany since Germany is a conservative country that uses



more the transfer income. However, this study was a comparison between the American model and the German one. In this regression, it has been assumed that the business cycle was the reunification and so that all the differences that occurred in terms of change of the structure of poverty could be linked to the reunification. Hence, the business cycle could have also depended on the monetary European policies of the European Monetary System. Furthermore, a crisis hit a part of Europe in 1992 because of the European Monetary System. Even if Germany was not hit by this crisis, since its trading partners were suffering from it, it could have impacted Germany and especially West Germany.



9 References

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Appendix A1: Statistic descriptive

a) Statistic descriptive: Germany

Variables	1987			1989			1991			1995			2000			2005			
	Obs	Mean	St. Dev	Obs	Mean	St. Dev	Obs	Mean	St. Dev	Obs	Mean	St.Dev	Obs	Mean	St.Dev	Obs	Mean	St.Dev	
Age	9922	41,05	17,08	9496	41,37	17,12	9514	41,78	16,91	9517	42,05	16,9	16915	45,06	17,45	17566	46,93	17,88	
	9922	12129,57	12540,34	9496	13444,73	15643,99	9514	13064,1	13109	9548	16480,18	17500,25	16969	18789,51	20552,47	17677	21880,16	30191,11	
<i>Age</i>	Obs	Freq	St. Dev	Obs	Freq	St. Dev	Obs	Freq	St. Dev	Obs	Freq	St.Dev	Obs	Freq	St.Dev	Obs	Freq	St.Dev	
	young	2122	21,39	0,410	1909	20,10	0,401	1740	18,29	0,380	1454	15,23	0,399	2226	13,12	0,338	2329	13,18	0,338
	adult	6763	68,16	0,466	6533	68,80	0,463	6659	69,99	0,453	6900	72,27	0,448	12013	70,79	0,455	11791	66,70	0,471
	old	1037	10,45	0,306	1054	11,10	0,314	1115	11,72	0,316	1194	12,51	0,331	2730	16,09	0,367	3557	20,12	0,401
	total	9922	100,00		9496	100,00		9514	100,00		9548	100,00		16969	100,00		17677	100,00	
<i>Gender</i>	male	4 928	49,67	0,500	4705	49,55	0,500	4697	49,37	0,500	4665	48,86	0,500	8195	48,29	0,500	8556	48,40	0,500
	female	4994	50,33	0,500	4791	50,45	0,500	4817	50,63	0,500	4883	51,14	0,500	8774	51,71	0,500	9121	51,60	0,500
	total	9 922	100,00		9496	100,00		9514	100,00		9548	100,00		16969	100,00		17677	100,00	
<i>Education</i>	low	3 382	35,76	0,500	3172	35,39	0,478	3030	34,22	0,448	2611	29,53	0,456	3336	21,64	0,412	2702	17,33	0,378
	medium	4 792	50,67	0,479	4547	50,73	0,500	4528	51,14	0,499	4720	53,38	0,499	8840	57,34	0,495	8782	56,31	0,496
	high	1 284	13,58	0,500	1245	13,89	0,346	1296	14,64	0,394	1512	17,10	0,377	3241	21,02	0,407	4111	26,36	0,441
	total	9 458	100,00		8964	100,00		8854	100,00		8843	100,00		15417	100,00		15595	100,00	
<i>Labour status</i>	employed	5392	55,77	0,343	5193	56,57	0,496	5257	57,95	0,490	5160	56,57	0,496	9547	59,09	0,492	9436	57,74	0,494
	unemployed	295	3,05	0,172	236	2,57	0,158	224	2,47	0,184	399	4,37	0,205	528	3,27	0,178	701	4,29	0,203
	not in labour	140	1,45	0,119	172	1,87	0,136	100	1,10	0,100	104	1,14	0,011	126	0,78	0,088	91	0,56	0,074
	retired	1385	14,32	0,350	1415	15,42	0,361	1447	15,95	0,372	1498	16,42	0,164	3254	20,14	0,401	3749	22,94	0,420
	in education	1054	10,90	0,109	897	9,77	0,300	857	9,45	0,285	810	8,88	0,089	919	5,69	0,232	920	5,63	0,231
	homemaker	1403	14,51	0,328	1266	13,79	0,466	1187	13,08	0,430	1151	12,62	0,291	1782	11,03	0,444	1445	8,84	0,407
	total	9669	100,00		9179	100,00		9072	100,00		9122	100,00		16156	100,00		16342	100,00	
<i>Marital status</i>	married	6208	64,42	0,479	5831	63,81	0,481	5778	63,98	0,48	5721	62,93	0,483	10156	63,11	0,483	10071	61,14	0,487
	never married	2333	24,21	0,428	2214	24,23	0,428	2135	23,64	0,425	2164	23,80	0,426	3645	22,65	0,419	3847	23,36	0,423
	separated	498	5,16	0,221	513	5,61	0,230	560	6,20	0,241	661	7,27	0,26	1249	7,77	0,268	1479	8,98	0,286
	widowed	598	6,21	0,241	580	6,35	0,244	558	6,18	0,241	545	5,99	0,237	1042	6,48	0,261	1074	6,52	0,247
	total	9637	100,00		9138	100,00		9031	100,00		9091	100,00		16092	100,00		16471	100	
	Household composition	Obs	Freq	St. Dev	Obs	Freq	St. Dev	Obs	Freq	St. Dev	Obs	Freq	St.Dev	Obs	Freq	St.Dev	Obs	Freq	St.Dev
one person	1003	10,11	0,302	972	10,24	0,303	983	10,34	0,304	1079	11,30	0,317	2188	12,90	0,335	2412	13,66	0,343	
couple without kids	2332	23,51	0,424	2363	24,88	0,432	2453	25,79	0,438	2590	27,13	0,445	5339	31,48	0,464	6232	35,29	0,478	
couple with kids	5918	59,66	0,491	5554	58,49	0,493	5490	57,72	0,494	5296	55,47	0,497	8391	49,48	0,5	7879	44,61	0,497	
lone parent	535	5,39	0,226	525	5,53	0,229	508	5,34	0,225	513	5,37	0,225	916	5,40	0,226	1024	5,80	0,234	
otherhousehold	131	1,32	0,114	82	0,86	0,093	77	0,81	0,089	70	0,73	0,0863	125	0,74	0,086	114	0,65	0,080	
Total	9919	100,00		9496,000	100,00		9511	100,000		9548	100,00		16959	100,00		17661	100		
<i>Immigrant</i>	2757	27,79	0,448	2672	28,14	0,450	2672	28,08	0,449	2798	29,30	0,455	3186	18,78	0,391	2803	15,86	0,365	

source: LIS, 2019



b) statistics descriptive: Sweden

Variables	1987			1995			2000			2005			
	Obs	Mean	St.Dev	Obs	Mean	St.Dev	Obs	Mean	St.Dev	Obs	Mean	St.Dev	
Age	16492	43,33	15,77	26518	48,71	19 059	26656	48.81	200 122	29985	48.39	19.83	
Current income	16492	78852,4	66317	26518	134433	121764	26656	171279	166614	29985	209497,5	231842	
<i>Age</i>	Obs	Freq	St.Dev	Obs	Freq	St.Dev	Obs	Freq	St.Dev	Obs	Freq	St.Dev	
young	2248	13,57	0,342	2716	10,24	0,303	3775	14,12	0,348	4375	14,56	0,353	
adult	12664	76,45	0,342	17486	65,94	0,474	16540	61,85	0,486	18855	62,75	0,484	
old	1652	9,97	0,300	6316	23,82	0,426	6425	24,03	0,428	6818	22,69	0,419	
total	16564	100,00		26518	100,00		26740	100,00		30048	100,00		
<i>Gender</i>	male	8 425	51,09	0,500	12896	48,63	0,500	13111	49,03	0,500	14838	49,38	0,500
female	8067	48,91	0,500	13622	51,37	0,500	13629	50,97	0,500	15210	50,62	0,500	
total	16 492	100,00		26518	100,00		26740	100,00		30048	100,00		
<i>Education</i>	low	-	-	-	14324	62,67	0,484	12611	55,88	0,497	12835	49,61	0,500
medium	-	-	-	3205	14,02	0,347	5295	23,46	0,424	6601	25,52	0,436	
high	-	-	-	5329	23,31	0,423	4664	20,66	0,405	6435	24,87	0,432	
total	-	-	-	22858	100,00		22570	100,00		25871	100,00		
<i>Labour status</i>	employed	12824	77,76	0,416	16133	60,84	0,488	15843	59,25	0,491	11607	56,01	0,496
unemployed	-	-	-	-	-	-	-	-	-	-	613	2,96	0,171
not in labour	3668	22,24	0,416	2680	10,11	0,301	2393	8,95	0,285	1275	6,15	0,241	
retired	-	-	-	5961	22,48	0,417	6197	23,18	0,422	4378	21,13	0,410	
in education	-	-	-	1744	6,58	0,248	2307	8,63	0,281	2620	12,64	0,410	
homemaker	-	-	-	-	-	-	-	-	-	-	-	-	
disabled	-	-	-	-	-	-	-	-	-	229	1,11	0,334	
total	16492	100,00		26518	100,00		26740	100,00		20722	100,00		
missing*	4711			7261			6399			16196			
<i>Marital status</i>	married	-	-	-	-	-	14025	54,17	0,498	14882	51,25	0,5	
never married	-	-	-	-	-	-	8065	31,15	0,463	9921	34,17	0,474	
separated	-	-	-	-	-	-	2079	8,03	0,272	2634	9,07	0,287	
widowed	-	-	-	-	-	-	1720	6,64	0,249	1601	5,51	0,228	
total	-	-	-	-	-	-	25889	100		29038	100		
<i>Household composition</i>	one person	3026	18,27	0,386	6237	23,52	0,424	4699	17,95	0,384	17,95	17,95	0,384
couple without kids	6378	38,51	0,487	10954	41,31	0,492	8930	34,12	0,474	34,11	34,11	0,474	
couple with kids	6812	41,13	0,492	8654	32,63	0,468	11287	43,12	0,495	49,98	41,98	0,494	
lone parent	348	2,1	0,143	673	2,54	0,157	1260	4,81	0,214	5,96	5,96	0,237	
Total	16564	100		26518	100		26176	100		29478	100		
Immigrant	-	-	-	1251	4,72	0,212	3116	11,69	0,321	4191	13,98	0,347	

- is used when the data is not available

* the number of missing observations in the sample

source: LIS, 2019



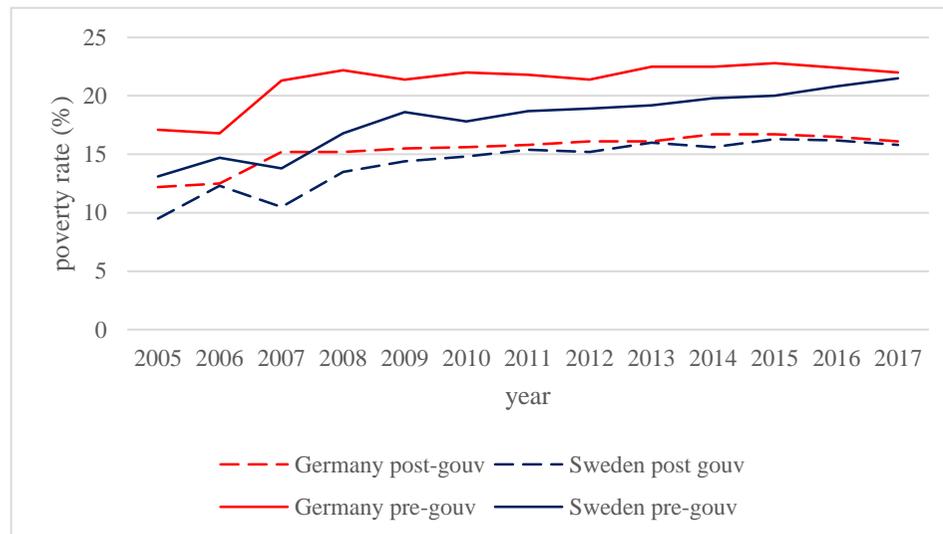
Appendix A2: macroeconomics figures about Germany and Sweden between 1987 and 2005

	Germany				Sweden			
	1987	1995	2000	2005	1987	1995	2000	2005
GINI Index	0,252	0,258	0,259	0,29	0,212	0,221	0,252	0,237
Annual Mean Equivalized Income*	13 033	16 912	19 156	20 801	79 696	135 553	167366	203 460
Annual Median Equivalized Income*	11 901	15 151	17 248	18 282	77 499	128 529	153 208	189 475
GDP per capita (USD)	16 614,41	31 729,70	23 718,75	34 696,62	21 485,29	29 914,33	29 283,01	43 085,35
growth rate (%GDP)	1,5	1,8	3,2	0,9	3,3	4	4,7	2,8
unemployment rate (%)	8,95	9,29	8,04	11,73	2,19	8,8	4,68	7,64
consumer price index	0,2	1,7	1,4	1,9	4,2	2,5	1,3	0,8
currency	EUR	EUR	EUR	EUR	SEK	SEK	SEK	SEK

*expressed with the national currency

source: World Bank, IMF, LIS poverty key figures

Appendix A3: Poverty rates before and after redistribution in Germany and Sweden between 2005 and 2017



Source: LIS 2019 own calculation

Appendix A4: Different values of the interaction variable

		I _i	Time	
			Before Unification T=0	After Unification T=1
Group	Sweden G=0		0.0 = 0	0.1 = 0
	Germany G=1		1.0 = 0	1.1 = 1

Source: inspired by free resources of the World Bank

Appendix A5: reference category of explanatory variables

Variable	Gender	Education	Employment status	Marital status	Household composition
Reference	Male	Low	Unemployed	Marries	One person



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