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**From Division to Integration:  
Economic Legacy of Socialist System on East German  
Entrepreneurship and Labor Mobility**

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The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics, or Erasmus University Rotterdam.

## Abstract

East Germany is a quasi-experimental case to analyze the socialist system and its economic consequences on entrepreneurship and labor mobility in the 1990s. The effect of German Reunification on self-employment numbers will be assessed using the Difference-in-Difference (DiD) approach. As for the migration from East to West Germany, the effects of the fall of the Berlin Wall are analyzed using the Interrupted Time Series Analysis (ITSA) technique. The findings in this research show that the German Reunification had a significant and positive effect on the self-employment numbers in East Germany. The fall of the Berlin Wall was characterized by the initial spike but an overall negative and significant effect on immigration numbers from East to West Germany. These findings highlight the long-term consequences of socialist policies on entrepreneurship and labor mobility and shed light on the post-socialist economic transitions.

## Table of Contents

<b>1</b>	<b><i>Introduction</i></b>	<b>4</b>
<b>1.1</b>	<b><i>Relevance and the Research Question</i></b>	<b>4</b>
<b>1.2</b>	<b><i>Addition to the Existing Literature</i></b>	<b>5</b>
<b>1.3</b>	<b><i>The Structure of the Paper</i></b>	<b>7</b>
<b>2</b>	<b><i>Historical Context</i></b>	<b>7</b>
<b>3</b>	<b><i>Literature Review</i></b>	<b>9</b>
<b>3.1</b>	<b><i>The Impact of Socialism on Entrepreneurship</i></b>	<b>9</b>
<b>3.2</b>	<b><i>The Impact of Socialism on Labor Mobility</i></b>	<b>10</b>
<b>4</b>	<b><i>Data</i></b>	<b>12</b>
<b>4.1</b>	<b><i>Data for Hypothesis 1 (Self-employment Numbers)</i></b>	<b>12</b>
<b>4.2</b>	<b><i>Data for Hypothesis 2 (Immigration Numbers)</i></b>	<b>13</b>
<b>4.3</b>	<b><i>Descriptive Statistics and Trends for Immigration Numbers</i></b>	<b>14</b>
<b>5</b>	<b><i>Methodology</i></b>	<b>15</b>
<b>5.1</b>	<b><i>Difference-in-Difference (DiD) Technique for Hypothesis 1</i></b>	<b>15</b>
<b>5.1.1</b>	<b><i>Justification of DiD Suitability</i></b>	<b>15</b>
<b>5.1.2</b>	<b><i>Application of DiD for the Self-employment Data</i></b>	<b>15</b>
<b>5.1.3</b>	<b><i>Mathematical Model Specification of DiD</i></b>	<b>16</b>
<b>5.2</b>	<b><i>Interrupted Time Series Analysis (ITSA) Technique for Hypothesis 2</i></b>	<b>17</b>
<b>5.2.1</b>	<b><i>Justification of ITSA Suitability</i></b>	<b>17</b>
<b>5.2.2</b>	<b><i>Mathematical Model Specification of ITSA</i></b>	<b>18</b>
<b>5.2.3</b>	<b><i>Requirments and Functionality of ITSA Model</i></b>	<b>18</b>
<b>5.3</b>	<b><i>Robustness Checks</i></b>	<b>19</b>
<b>6</b>	<b><i>Results</i></b>	<b>19</b>
<b>7</b>	<b><i>Discussion</i></b>	<b>25</b>
<b>8</b>	<b><i>Conclusion</i></b>	<b>26</b>
	<b><i>References</i></b>	<b>28</b>
	<b><i>Appendix</i></b>	<b>30</b>

# 1 Introduction

## 1.1 Relevance and the Research Question

When the Berlin Wall fell, the future arrived so suddenly that for many it was difficult to understand. Yet it was on these shifting sands that a new Germany was to be built. The demolition of the concrete barrier in 1989 toppled an entire socio-economic system crowned with official reunification a year later. The fall of the Berlin Wall is considered one of the significant hallmarks of modern history, a moment when history took a sharp turn (Sarotte, 2014). This event is not just a symbolization of a political and territorial merger but left a mark on social and economic integration. The dissolution of communism, a state-controlled collective ownership regime, in the late 1990s, allowed the emergence of transition economies - nations shifting from centrally planned to market-based systems (Sarotte, 2014). Germany, having experienced a 41-year Soviet-style regime in the East and a capitalist market economy in the West, demonstrates a profound example of such contrasting economic systems. Therefore, the setting of Germany provides a unique instance to investigate the apparent economic implications after the abrupt shift. The severity of restrictions imposed by the Soviet Union concerning any form of private enterprise hindered the entrepreneurship environment in East Germany. Thus, it raises questions about how much socialism has affected the further development of entrepreneurship in East Germany after reunification. Moreover, the paper specifically zooms on the impact of “breaking free” on migration from East to West Germany. Given the profound division of East and West Germany, it is intriguing to explore how labor mobility, particularly migration, was affected after the restrictions were alleviated. This naturally piques curiosity about the significance of socialism’s scars on entrepreneurship and migration patterns to uncover:

*"How did the dissolution of East Germany's socialist system and the subsequent economic integration with West Germany influence the development of entrepreneurship and migration during the transition period of the 1990s?"*

The lessons learned from Germany’s reunification are particularly pertinent to the policymakers. The question posed is not only historically significant but entails designing policies that foster entrepreneurship and narrow the economic gap between the two regions. Analyzing the shift in entrepreneurship and developments in labor mobility in Germany gives insights that can guide strategic decisions in other transition economies. The likely continuation of sizable immigration in the coming years raises questions such as what policies should be adopted to facilitate the absorption of immigrants into the labor market (Mayer, 1990).

The case of East Germany is highly relevant, especially in the East European theatre. The transformation shares substantial similarities with other former communist countries, and the insights presented in this paper may—to a certain degree—be generalized (Aslund, 1985). In particular, the restrictive policy toward entrepreneurship is comparable to other to other Eastern European countries (Pickel, 1992). Moreover, in many of these countries, the exposure to the communist regime lasted about four decades, similar to East Germany's experience (Fritsch et al., 2023). In contrast to other transition countries, the case of East Germany has some attractive features that create quasi-natural laboratory conditions for studying that relationship (Fritsch et al., 2014). All of these instances highlight the ongoing relevance of the topic and facilitate shaping specific policies to address the economic repercussions of the event. As an example, significant policy efforts were dedicated to closing not only the economic but also the societal gap between East and West Germany. The reunification left a long-lasting, deep-seated mark on the German populace's identity and cohesion, which can still be seen today (Pew Research Center, 2019).

Other prominent examples of countries that underwent the same regime as Germany are Poland, Hungary, and the Czech Republic. The restrictive policies on entrepreneurship by their socialist leaders are comparable to the East German case. Those countries' governments remained highly authoritarian and repressive, showing no signs of opening up or reforming in the way East Germany experienced before reunification (Foreign Policy Research Institute, 2017). Therefore, the paper aims to show that even though the actual event took place a couple of decades ago, the relevance and importance of its implications are here to stay.

## **1.2 Addition to the Existing Literature**

This paper adds to the existing literature on the reasons and causes behind the economic gap between the two regions, expanding on insights briefly addressed in previous studies (e.g., Akerlof et al., 1991; Burda & Hunt, 2001). Furthermore, the research analyzes the economic consequences of historical shocks and resilience to such shocks (Fritsch & Wyrwich, 2019). Additionally, the paper deploys a Difference-in-Difference (DiD) approach, making the estimates more reliable since this technique can account for time-invariant unobserved factors that vary between East and West Germany (see methodology section). This paper is an addition to the existing literature with its inclusion of fixed effects. The method helps to further add robustness to the model by explicitly specifying the factors that DiD controls for implicitly. Fixed effects were not included in earlier research, such as that conducted by Hunt (2006) and Fuchs-Schündeln & Schündeln (2005), which may have limited the accuracy of their findings. Thus, the study analyzes the (exogenous) institutional change, that is the reunification of Germany, and its effect on entrepreneurship.

The outcome variable – entrepreneurship will be conceptualized as a number of self-employed people in the years 1986-2009, retrieved from the Federal German Statistical Office and Statistical Yearbooks. As for assessing the impact of the socialist system on the self-employed people, German Reunification in 1991 will be taken as a cut-off point and an intervention year to analyze the before-after scenario. The study revealed that the German Reunification had a positive and significant effect on the number of self-employed people in East Germany.

Moreover, the paper's distinctiveness stems from the fact that it is inclusive of the years 1986-1989. The paper of Fritsch & Wyrwich (2019) overlooked those years due to the data access challenges in the prior research years. The authors approximated the pre-period by including the 1925 census in their analysis, allowing them to determine if there were any pre-separation trends in the development of self-employment in both parts of Germany (Fritsch & Wyrwich, 2019). This research employs Fritsch's methodology of the Difference-in-Difference technique with the addition of fixed effects, which were not utilized due to cross-sectional data in many articles (eg., Bauernschuster et al., 2012). The results show that the reunification in 1991 had a positive and significant effect on the self-employment numbers in East Germany.

As for exploring labor mobility, the paper zooms into the migration flows from the East to the West of Germany. Numerous articles address the apparent shift in migration patterns such as Rosenbaum-Feldbrügge et al. (2022), but focus on a qualitative review of the migration patterns. Moreover, this research is an addition in offering numerical effect and quantitative impact of these shifts in mobility. The special feature to test this effect in this paper is employing Interrupted Time Series Analysis (ITSA), which is less commonly used in prior studies, typically focusing on basic regression analyses. ITSA offers strong causal inferences by examining the effect of the intervention on a series of observations spanning from 1980 to 2009. Therefore, the second outcome variable – labor mobility will be conceptualized as the migration from East to West Germany. As for the impact of socialism, the Fall of the Berlin Wall in 1989 will be taken as an intervention year. Even though the reunification took place a year later, the immediate consequences on migration patterns specifically of the Berlin Wall demolition can readily be seen already in 1989. The sudden and unexpected demolition in 1989 led to the adoption of the West German system of formal institutions virtually overnight (Sinn & Sinn, 1992). The data is retrieved from German History in Documents and Images archives and the Federal Statistical Office of Germany. The study found that despite the immediate positive effect of the fall of the Berlin Wall on the number of migrants from East to West Germany, the overall effect on labor mobility was negative and significant.

### **1.3 The Structure of the Paper**

The structure of the paper is organized as follows. First, I will provide some historical context around the transition timeframe to establish a strong historical background. Moreover, new terms and concepts will be defined that are going to be used throughout the paper. After setting the stage, the literature and contributions concerning 1990s Germany will be reviewed which will be the building block in formulating further hypotheses. This section aims to highlight the existing knowledge gaps and two main hypotheses that will guide the remainder of the study. Additionally, the different sources of the dataset will be described where the number of self-employed individuals and migration trends were retrieved from. Following the methodology, I will highlight any data transformations or manipulations for the appropriate analysis. Furthermore, two main econometric techniques DiD and ITSA will be clarified as the most suitable methods for answering the research question. The next section will show the results and prepare the reader for the discussion of the possible mechanisms behind the socialism legacy on entrepreneurship and migration. Additionally, the paper employs robustness checks for reliable and replicable results. The final part of the paper will provide a summary of the key findings, and the main limitations of my study and suggest potential directions for future research.

## **2 Historical Context**

After WWII Germany was left scarred with its government in disarray. The Allied powers, consisting of France, the United Kingdom, the United States, and the Soviet Union, had to ensure that Germany did not become a threat to global peace again and pay the costs it incurred to the world during the war. Therefore, the Allies divided post-war Germany into four occupation zones, each administered by one of the four powers. The capital city itself – Berlin was further divided correspondingly, symbolizing the ideological divide between East and West. Over time, the UK, the US, and France formed the Federal Republic of Germany (FRG). In 1949, the Soviets took control of the fourth occupation zone, forming the German Democratic Republic (GDR), as seen in Figure 2.1.

Germany was now divided between the capitalist West and the communist East. For the Soviet leader at that time – Nikita Khrushchev the current state of East Germans was not enough since the population was seeking opportunities in the West, therefore he ordered the construction of a wall to hinder outmigration from East Berlin in 1961. Many people woke up to find themselves trapped on one side, often separated from their friends and family in the West. The wall started as barbed wire and fencing. But over the years, it became a series of walls, reinforced fences, gun positions, and watchtowers, which were heavily guarded and patrolled to make sure that people did not cross from one side to the other (Berlin Wall Anniversary: What Was the Berlin Wall?, 2023).



Figure 2.1. Germany before reunification in 1990.

Note: This map illustrates the political division of Germany into the Federal Republic of Germany and the German Democratic Republic, including the status of Berlin further divided between East and West. Adapted from Deutsche Welle.

The economic systems of the two Germanies diverged significantly - the West with its market economy spurred self-employment and small business growth. In contrast, the East with its state-controlled system was limiting private enterprise (Wyrwich, 2014). The socialist GDR regime perceived entrepreneurship as a bourgeois anachronism that strongly favored collectivist values (Pickel, 1992). As the Soviet Union's power waned in the 1980s, and its influence in Eastern Europe diminished, communism in the Eastern block and Soviet satellite states began to collapse at the end of the decade. On November 9, 1989, when an East German politician mistakenly claimed that restrictions on travel visas would be lifted with immediate effect, thousands of people in Berlin gathered at the checkpoints along the Berlin Wall demanding to be allowed through. As tensions rose, the commanding officers eventually gave in to public demands and opened the barriers, allowing the people to move freely again between both German states (Statista, 2024). Accordingly, people dissatisfied with the political situation in the GDR took advantage of the unexpected window of opportunity and moved to the West, mainly for political reasons (Meck et al., 1992). As a result, sizable migration flows from the GDR to the FRG occurred between November 1989 and March 1990 (Grundmann, 1998). 40 years later, in late 1989, the Berlin Wall fell and the unification of the “2 Germanies” took place. In particular, this reunification comprised membership in the European Union and the introduction of the West German market economic system (Fritsch et al., 2014).



### 3 Literature Review

#### 3.1 The Impact of Socialism on Entrepreneurship

Extensive research has been conducted about the scars that communism has left on transition economies. Seminal studies by Kornai (1992) and Aslund (1995) provide fundamental insights into the economic transformations of post-communist countries. Communism is regarded as one of the most entrepreneurship-inhibiting economic systems in human history (Earle & Sakova, 2000). In Soviet states, any form of private venture was strictly prohibited and controlled, which hindered the entrepreneurial culture from the start. This private-sector entrepreneurship, an activity that had been illegal for decades, not only became legal but also became essential for the creation of wealth and economic progress in these countries (Ovaska, 2005). This view is in line with Fritsch et al. (2012) who see the transition to a market economy as a way to increase the number of entrepreneurial opportunities tremendously, and entrepreneurs becoming crucial agents of change throughout this process. Furthermore, based on Minniti (1999) it is argued that it is an entrepreneur, who is the catalyst for economic growth because that individual creates a networking externality that promotes the creation of new ideas and new market formations. In exploring this post-Soviet economic growth in a historical context, numerous articles zoom into the case of Germany because it allows a natural, quasi-experimental framework - providing a clear before-and-after scenario to analyze (Fritsch et al., 2014). These are attractive features where the research in German entrepreneurship could add a distinctive flavor to the current mainstream debate. Comparisons of developments in East Germany and West Germany provide a suitable benchmark for identifying special features of entrepreneurship that may be regarded as an outcome of a socialist legacy or a “treatment effect” of exposure to a socialist system (Fritsch et al., 2014). The second advantage is that East and West Germany shared a common history and institutions before separation, and now share the same post-reunification institutional framework, making the West an excellent counterfactual for the East (Fritsch et al., 2023). An extensive analysis of entrepreneurial Germany in the post-Soviet era is provided in a paper by (Fritsch & Wyrwich, 2014). The authors mostly assess the long-term impact of the East German socialist regime on entrepreneurship activity in Germany. The empirical findings suggest that this entrepreneurial bloodletting significantly affected the start-up activity and self-employment rates today (Fritsch & Wyrwich, 2014).

Entrepreneurship in most articles and also included in this research is conceptualized as self-employment, which is the most suitable measure of the activity especially in the Soviet framework. Based on Shane and Venkataraman (2000) entrepreneurship is not defined as the general discovery of unnoticed opportunities, however is exclusively applied to individuals who open businesses, that is, they become self-employed. In pursuit of exploring the socialist legacy effects on post-reunification

Germany, Fritsch investigates the self-employment numbers between 1925 and 1939 (before World War II), at the end of the GDR period in 1989, and after German reunification between 1991 and 2014. The authors omit the years right after the Fall of the Berlin Wall (1989) and before reunification (1991), which will be exclusively included in this paper. This will allow me to estimate the direct impact of the fall of the socialist system on self-employment before and after the cut-off point of reunification. Therefore, estimating the 40 years of Soviet-style communism and the subsequent shock transition to a market economic system the according hypothesis is formulated:

*H1: The German Reunification had a positive effect on the number of self-employed people in East Germany in the 1990s.*

This pre and post-period is often analyzed with the Difference-in-Difference (DiD) technique, which in the paper of Fritsch et al. (2023) showed a negative coefficient for self-employment in East Germany in the first years after German Reunification. The analysis in the paper indicated that following the reunification, the socialist regime harmed the level of self-employment numbers in the transition period. In this research, however, I would expect that the post-reunification period saw an increase in the self-employment numbers in East Germany relative to what would be expected based solely on the baseline difference between East and West Germany (Bauernschuster et al., 2010). Such a result would be moreover opposing that of Fuchs-Schündeln (2007) who showed a lasting negative effect of the communist regime in the GDR on start-up intentions. In contrast, the finding in the first hypothesis is expected to show that the transition to a market economy effectively promoted self-employment numbers in East Germany post-reunification.

### **3.2 The Impact of Socialism on Labor Mobility**

The exposure to socialistic indoctrination, crowned by the construction of the Berlin Wall, not only changed the nature of entrepreneurship in the GDR but significantly affected labor mobility. Going back to the main reason for constructing the Berlin Wall – steady migration losses to the Federal Republic of Germany – makes an interesting topic to explore the results after erecting it. The distinct combination of conditions that defined reunified Germany in terms of stark East-West migration has resulted in a sizable literature on the subject, albeit one that is rather fragmented due to its multidisciplinary nature (Rosenbaum-Feldbrügge et al., 2022). Numerous articles focus on the individual and contextual factors of this shock-treatment-like transformation process on labor mobility. The most influential author in this regard, Hunt (2006) investigates the migration trends and concludes that in the course of the transformation process, outmigration from the East to the West was striking.

Contrary to Burda & Hunt (2001), who focus on different driving forces of migration by age, Fuchs-Schündeln (2009) instead analyses gender differences in the propensities to migrate. The results of the aforementioned two papers are still in line with each other and address the consequences of the transformation process. This massive outmigration was contributed mostly by young and qualified workers. They further conclude that this is why, more than 20 years after this transformation began, nearly all East German regions lag considerably behind their West German counterparts (Hunt, 2006). This lagging is further confirmed by Falck et al. (2013) concluding that the enactment of communist policies in the GDR, induced many entrepreneurs and firms to migrate to West Germany, leading to a massive loss of entrepreneurial capacity and talent. Further analyses of the communist regime in the German framework and its effects on younger individuals are provided by (Schultz, 2009). He explores that after the Wall was torn down, in November and December of 1989 alone, 200,000 people left the GDR. Additionally, investigating the group of people aged 18–24 years, between 1989 and 1997, eastern Germany lost 17% of the population in this age group which is considered the most mobile population at that time (Schultz, 2009).

However, the question holds as to whether the Wall truly suppressed the efforts to escape the GDR's regime. Perhaps, the Wall inadvertently intensified the desire of Germans to strive for life on the other side. According to Mayer (1990), it was the political collapse of the German Democratic Republic (GDR) in 1989 that paved the way for the significant wave of immigration into the Federal Republic of Germany (FRG). Asserting this view, Kemper (2004), emphasizes the special focus on the extraordinary volume of mass migrations from eastern Germany in connection with the political turn. After the fall of the Berlin Wall, this significant “break-free” situation allows me to explore the effects of the indirect abolition of the socialist system on migration flows between the two regions.

Many studies are based on the well-known hypotheses of neo-classical theory predicting that migration is primarily driven by wage gaps and differences in unemployment (Kemper, 2004). However, before underlying these causes and conditioning on control variables such as unemployment rates, migrants' gender, age, and/or labor position, none of the articles explicitly address the actual magnitude and effect of the erection of the Berlin Wall on migration from East to West Germany. Literature, such as the paper of Rosenbaum-Feldbrügge et al. (2022), provides a quantitative assessment of the immigration numbers throughout the years but does not draw causal inferences from it. To address this gap and isolate the specific impacts of historical shifts, the following hypothesis is proposed:

*H2: The fall of the Berlin Wall had a positive effect on the number of immigrants from East to West Germany in the 1990s.*

The hypothesis seeks to untangle the direct influence of the major political and economic events of communism on the migration patterns in Germany. It is worthwhile to note that the literature heavily relies on basic regression models and some studies elevate the analyses with fixed effects such as those discussed in Hunt (2006). It is generally considered uncommon to deploy different econometric techniques such as interrupted Time Series Analysis (ITSA). This technique was not commonly used during earlier periods with the reason being that introducing them as a common practice was done at a later point in time. In this study, to specifically provide the answer to the second hypothesis, the ITSA technique will be offered. It is particularly advantageous since the method allows us to measure the effect of the fall of the Berlin Wall on immigration from GDR to FRG. This approach will enable a clearer understanding of the historical shock and the magnitude of changes in immigration flow, providing insights into how such historical events influence migration trends. With the use of Interrupted Time Series Analysis (ITSA), this article not only contributes to a better understanding of the historical significance of the event but also enhances the methodological diversity in economic studies of migration.

To summarize, the first hypothesis analyzes entrepreneurship – measured as the number of self-employed people after the German Reunification. Moreover, the second hypothesis focuses on labor mobility - the migration from East to West Germany after the fall of the Berlin Wall. To quantitatively assess the hypotheses, Difference-in-Difference (DiD) and Interrupted Time Series Analysis (ITSA) will be employed to test hypotheses 1 and 2 respectively. Qualitative analysis will follow after exploring the results, with the limitations and directions for future research.

## **4 Data**

### **4.1 Data for Hypothesis 1 (Self-employment Numbers)**

The empirical strategy of the data and measurement for the first hypothesis is similar to that of Fritsch & Wyrwich (2019). Various German statistical databases were explored for the self-employment numbers to be collected and merged between the two regions from 1986 - 2009. The data was primarily sourced from the Federal German Statistical Office (Arbeitskreis Erwerbstatigenrechnung), which provides employment numbers, including self-employment for the entirety of Germany from 1986 – 2009. The mission of the Federal Statistical Office (Destatis) is to provide and disseminate statistical information, which according to the European Commission is objective, independent, and of high quality. According to this research, self-employed individuals are operationalized as those who manage a business or workplace as tenants, owners, co-owners, independent contractors, craftspeople, or business proprietors. Self-employed persons can only form agreements inside their work area and

exclude those who are in an employment relationship (self-employed branch managers, for example). Self-employed individuals include home-based foremen and tradespeople who, with the assistance of outside helpers, produce and process items at their workplace on behalf of tradesmen (Statistisches Bundesamt, 2024).

#### **4.1.1 Estimating the Self-employment Numbers for the Federal Republic of Germany (FRG)**

Since the historical division, West Germany accounted for yearly demographics, labor market conditions, education, health, and more in its Statistical Yearbook. In sum, the Yearbook of the Federal Republic of Germany provides a comprehensive overview of the diverse statistical measures of the German population of that time. This research utilizes the Statistical Yearbook of the FRG (Statistisches Jahrbuch für die Bundesrepublik Deutschland) from each year following 1986 until 2009. To keep the consistent numbers throughout the research, the self-employment numbers based on the Yearbook are similarly operationalized as those who run a commercial or agricultural business, either as owners or tenants, this encompasses self-employment artisans, professionals, domestic traders, and intermediate farmers (people operating between subsistence farming and commercial farming) (Statistische Ämter des Bundes und der Länder, 2019).

#### **4.1.2 Estimating the Self-employment Numbers for the German Democratic Republic (GDR)**

Moving forward, the greatest issue was to approximate the East Germany (GDR) data since the exact numbers before 1991 were not readily available. To address this significant challenge, two aforementioned key sources – the Statistical Yearbook and the Federal Statistical Office were used. Initially, I obtained self-employment data (Selbständig) for West Germany from the Statistical Yearbook. Consequently, to estimate the self-employment figures for East Germany, I used a manual procedure that involved subtracting the West German numbers from the totals for all of Germany retrieved from the Federal Statistical Office. This technique, which was not common in the existing literature, enabled me to finally estimate self-employment numbers in East Germany from 1986 to 2009. However, this manual measurement could pose some limitations as there may be some differences in data reporting standards and possible discrepancies in the totals.

#### **4.2 Data for Hypothesis 2 (Immigration Numbers)**

To evaluate the second hypothesis regarding the impact of the Fall of the Berlin Wall on immigration numbers, data from the two different sources will be employed. The migration data for the immigrants from East to West Germany before 1990 is retrieved from the German History in Documents and Images

(GHDI). This online archive provides a comprehensive collection of primary-source materials documenting various aspects of German history from the Early Modern period to the present. For the post-1990 period, the numbers are derived from my primary source - Statistisches Bundesamt (Federal Statistical Office of Germany).

It is important to note that data from both sources exclude the numbers concerning Berlin. As mentioned, Germany's present capital was also divided between East and West Berlin, which introduces some data problems. As it is not possible to differentiate between East and West Berlin in the administrative data from the year 2000 onwards, researchers studying migration between East and West Germany typically exclude migration flows to and from Berlin (Rosenbaum-Feldbrügge et al., 2022).

### 4.3 Descriptive Statistics and Trends for Immigration Numbers

Table 4.1 Descriptive statistics

Variable	Obs.	Mean	Std.Dev.	Min.	Max
Self-employment	48	1,899.79	1,404.44	34	3,628
Immigration	30	121,194.6	7,9042.41	11,343	343,854

Note: The data on self-employment years spans 48 years, while the data on immigration years spans 30 years.

The numbers are in thousands.

Table 4.1 provides the descriptive statistics for the primary variables used to test the two hypotheses. Hypothesis 1 concerns the number of self-employed individuals and includes observations from 48 data points covering the years 1986 to 2009. The variable *self-employment* includes numbers for both East and West Germany, with its corresponding years. Hypothesis 2 focuses on immigration numbers, the variable *immigration* provides the number of immigrants from East to West Germany. Due to the availability of data, it includes observations from six additional years prior to 1986.

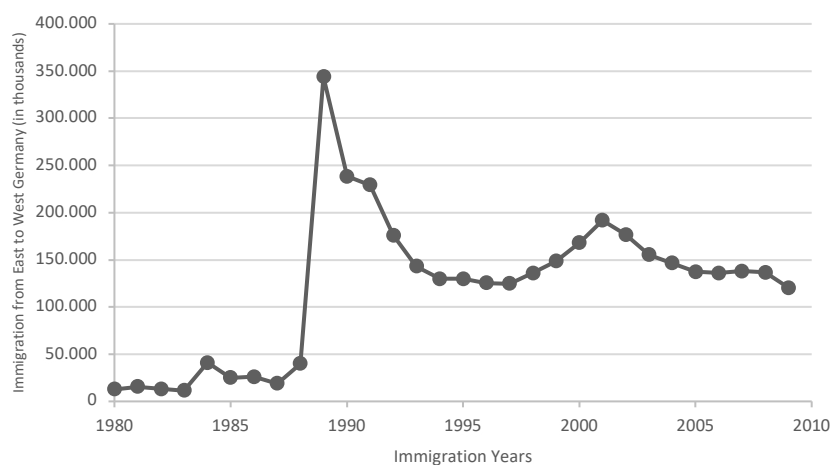


Figure 4.1 Scatterplot of the number of immigrants from East to West Germany in thousands, 1980-2009.

Moreover, Figure 4.1 depicts a scatterplot that maps the immigration from East to West Germany from 1980-2009. While the years before 1989 show a stable trend, the significance of the fall of the Berlin Wall can visually be seen with the apparent jump around the year 1989. The pronounced spike is followed by a gradual decline in numbers, which will be quantitatively analyzed by the employed methodology explained in the following section.

## 5 Methodology

### 5.1 Difference-in-Difference (DiD) Technique for Hypothesis 1

#### 5.1.1 Justification of DiD Suitability

To quantitatively analyze the effect of German reunification on self-employment numbers in East Germany (H1) Difference-in-Difference (DiD) technique will be employed. The justification of this econometric technique for my data is multifaced. Firstly, DiD is widely utilized by economists and business economists to analyze an intervention and its effects on the outcome. Difference-in-differences has become one of the most popular research designs used to evaluate the causal effects of policy interventions (Callaway, 2021). The reason behind the widespread use of the technique can be attributed to the fact that DiD assumes that selection bias stays constant over time. This means that it acknowledges that treatment, which is East Germany and control – West Germany, are inherently different. For instance, prior to reunification, West Germany was characterized as a market-based economy, whereas East Germany operated under a planned system. These and other fundamental differences that can even be unobserved are effectively addressed by the Difference-in-Difference (DiD). By assuming this selection bias to be consistent, DiD effectively estimates and isolates the true effect of intervention – that is reunification. By comparing the changes in the outcome (self-employment) – this econometric technique attributes any differential changes to the impact of reunification. In simple terms, DiD removes the pre-existing differences between East and West Germany (selection bias) by examining the initial differences between the groups before the intervention (reunification) took place.

#### 5.1.2 Application of DiD for the Self-employment Data

The data for the first hypothesis consists of self-employment numbers for East and West Germany, which is a list of East-West numbers throughout the years. To segregate the treatment and control groups, East and West Germany respectively, variable *treatment* is constructed. It is a binary variable that takes a value of 1 in case the region is East Germany and 0 otherwise. Moreover, to isolate the cut-off point – the reunification in 1991 – variable *After* is constructed. This represents an additional dummy variable that is 1 after reunification in 1991 and 0 otherwise. Lastly, to highlight the direct effect of the reunification on self-employment in East Germany specifically, an interaction term between variable *treatment* and *after*

is generated. This interaction term essentially gives the Difference-in-Difference estimator, resulting in the Average Treatment Effect on the Treated (ATET). By estimating this coefficient DiD will isolate the additional impact of reunification on self-employment numbers in East Germany.

### 5.1.3 Mathematical Model Specification of DiD

Building on this framework the constructed model takes the following form:

$$SER_{Et} = \alpha_E + \rho \text{treatment\_group}_E + \gamma \text{after} + \beta (\text{treatment\_group}_E * \text{after}) + \varepsilon_{Et},$$

Where  $SER_{Et}$  represents the number of self-employment individuals in East Germany (E) in a time period ( $t$ ).  $\text{treatment\_group}_E$  is a dummy variable for the treatment group, which equals 1 in the case of East Germany and 0 otherwise. The binary  $\text{after}$  takes the value of 1 after reunification in 1991. The most crucial part of the equation is the interaction term between the two binary variables  $\text{treatment\_group}_E * \text{after}$ , which captures that additional effect the reunification imposed on self-employment in East Germany. This effect is captured by the coefficient  $\beta$ , estimating the Average Treatment Effect (ATE). In this DiD framework, isolating the impact of reunification on self-employment in East Germany may be seen as the intervention's causal influence on the treatment group. Finally,  $\varepsilon_{Et}$  is the error term for East Germany E at time  $t$ , which captures the unexplained variation.

### 5.1.4 Incorporating the Fixed Effects in the Difference-in-Difference Model

As mentioned, one of the greatest advantages of DiD is accounting for all time-invariant characteristics between East and West Germany. This, however, is conditional to the fact that the “external shock” should equally affect the treatment and control group. Since we cannot be convinced that certain common external shocks may have affected the treatment and control group differently over time, this research uses fixed effects. This econometric technique can account for unobserved time-invariant confounders that affect self-employment numbers differently between East and West Germany. For instance, based on Runst (2013), the fact that the Federal Republic of Germany and the German Democratic Republic were at different stages in their economic development, differently affected their luxury goods consumption, which was relatively inappropriate for the relatively backward economic situation in the East. Therefore, adding the fixed effect  $\alpha_E$  for East Germany ( $E$ ) in the model is essential for capturing all unobserved, invariant characteristics of East and West Germany that could influence the number of self-employed people. Thus, any trait that does not vary over time within East or West but varies across years is accounted for, which enhances the validity and robustness of the results.



### 5.1.5 Assumption for DiD Model

When following the Difference-in-Difference (DiD) approach, it is essential to test that the parallel trend assumption (PTA) holds. Meaning that the outcome (self-employment numbers) of treated (East Germany) and non-treated (West Germany) would have changed in the same way in the absence of treatment (reunification). If the PTA does not hold, other time-varying characteristics likely differ across East and West Germany. Therefore, to test the assumption, leads will be incorporated into this model, in which case the second equation will take the following form:

$$SER_{Et} = \alpha_E + \rho \text{treatment\_group}_E + \gamma \text{after} + \beta(\text{treatment\_group}_E * \text{after}) + T * \text{year1990} + T * \text{year1989} + \varepsilon_{Et}$$

The generated year dummy leads  $T * \text{year1990}$  and  $T * \text{year1989}$  are testing any anticipatory effects one and two years before the intervention (reunification) took place, in 1990 and 1989, respectively. Introducing the leads will help determine whether the trends in the control and treatment groups were already diverging before the treatment was introduced, which would violate the parallel trends assumption. If the coefficients are significant it would challenge the PTA, since the intervention may be confounded by any unobserved anticipatory factors.

Furthermore, the Stable Unit Treatment Value Assumption (SUTVA) is likely to hold in this case, meaning that the treatment (reunification) and the switch to the market economy are confined to East Germany. Therefore, outcomes in self-employment numbers are considered independently, with no direct spillover effects.

## 5.2 Interrupted Time Series Analysis (ITSA) Technique for Hypothesis 2

### 5.2.1 Justification of ITSA Suitability

To assess the effect of the fall of the Berlin Wall on the immigration numbers in East Germany (H2), the Interrupted Time Series Analysis (ITSA) technique will be used. ITSA is a toolbox for researchers whose data consists of a long sequence of equally spaced observations – measured before and after an intervention. Accounting for the impact of the intervention amounts to comparing the means of the pre- and post-intervention time series segments (McDowall et al., 2019). ITSA estimates the effect of an intervention when the outcome variable is ordered as a time series and a number of observations are available in both pre-intervention and post-intervention periods. The study design is generally referred to as an Interrupted Time Series Analysis (ITSA) because the intervention is expected to interrupt the level or trend after its introduction (Shadish et al., 2002). In the case of the second hypothesis, the data

of immigration numbers from East to West Germany for 30 years provides the solid ground to quantitatively estimate the effect of the fall of the Berlin Wall in 1989. Interrupted Time Series Analysis is suitable for this analysis because it directly addresses the fall of the Berlin Wall and isolates its effect by comparing the number of migrants before and after the event. By using this method, the research will show the shifts in the immigration pattern that are specifically due to the event of 1989. Moreover, ITSA determines if there was an immediate jump or drop in immigration numbers following the intervention (level change), as well as whether the rate of immigration growth or decline changed over time post-intervention (trend change).

### 5.2.2 Mathematical Model Specification of ITSA

Since the data consists of the immigration numbers only from East to West Germany (one group under study) and its corresponding years, single-group ITSA will be used, which takes the following form of regression:

$$\mathbf{Immigration}_t = \beta_0 + \beta_1 \mathbf{Time} + \beta_2 \mathbf{intervention} + \beta_3 (\mathbf{intervention} * \mathbf{T})$$

Where  $\mathbf{Immigration}_t$  is the aggregated outcome variable, the number of immigrants from East to West Germany measured at  $t$  - each equally spaced time point (yearly).  $\mathbf{Time}$  is the time since the start of the study.  $\mathbf{intervention}$  is a dummy (indicator) variable representing the fall of the Berlin Wall (preintervention periods 0, otherwise 1), and  $\mathbf{intervention} * \mathbf{Time}$  is an interaction term between  $\mathbf{intervention}$  and a sequentially numbered variable  $\mathbf{Time}$  starting in the period immediately following the intervention.  $\beta_0$  represents the intercept or starting level of the outcome variable.  $\beta_1$  is the slope or trajectory of the immigrants until the introduction of the intervention.  $\beta_2$  represents the change in the level of the immigration numbers that occurred in the period immediately following the fall of the Berlin Wall, which essentially gives the immediate treatment effect.  $\beta_3$  represents the difference between pre-intervention and post-intervention slopes of the immigration numbers and indicates treatment effect over time (Linden & Adams, 2011).

### 5.2.3 Requirments and Functionality of ITSA Model

To assess the changes in migration numbers, ITSA will use the Generalized Linear Model (GLM). This model is widely used for data that might not follow a normal distribution. Normality assumption, which is often violated in the time series data is frequently tackled by the GLM. For example in this research, the dependent variable – the number of migrants – might not meet the normality assumption. Therefore, to accurately account for the possible challenges, ITSA will use GLM as a core method for the analysis.

One of the most critical things to be considered while working with time series data is heteroskedasticity and autocorrelation. The former refers to the anomaly in the error terms that are experiencing non-

constant variance. The latter is the correlation of the error terms with one another. To resolve these issues, Newey-West standard errors will be applied. The Newey-West approach is especially useful in time series analysis because it considers that data closer together in time might have more comparable error characteristics than those farther apart (Smith, 1994). To test the autocorrelation, the Cumby-Huizinga test for autocorrelation (also referred to as the Breusch-Godfrey test) will be used. The results for the autocorrelation can be found in Appendix A.

### 5.3 Robustness Checks

The results might be sensitive to the exact timing of the interventions – the German reunification in 1991 and the Fall of The Berlin Wall in 1989. The same robustness check will be employed for both hypotheses to test the credibility of the results. The actual intervention year will be changed with a random year in the future and the results will be accordingly re-analyzed. By adjusting the intervention year, the research shows how valid the causal inference can be that will be drawn from the analysis. To test those mentioned above, I will be taking the year 1997 as a cutting-point year and re-doing the analysis as outlined above. The ideal robustness check will show that no effects are found from the placebo.

## 6 Results

### 6.1 The Effect of Reunification on Self-Employment Numbers

Table 6.1.1 The impact of German Reunification on self-employment numbers in East and West Germany using the Difference-in-Difference (DiD) method.

	<i>Dependent variable:</i> <i>Self-employment numbers</i>	
	(I)	(II)
<i>Treatment group</i>	-	-
<i>After</i>	303.51*** (85.37)	303.51*** (87.34)
<i>Treatment group* After</i>	305.2*** (120.74)	315.47** (138.87)
<i>T * year1990</i>		37.67 (200.66)
<i>T * year1989</i>		13.67 (200.66)
<i>Constant</i>	1,538.70*** (53.71)	1,533.57*** (63.45)
<i>Observations</i>	48	48
<i>R<sup>2</sup></i>	0.16	0.17

Note: The table shows the results of a Difference-in-Difference (DiD) regression, including fixed effects. It analyzes the impact of German Reunification on self-employment numbers in East and West Germany. Model (I) is the regular DiD regression with the interaction term showing the DiD coefficient. Model (II) is the extension of Model (I) with the inclusion of the lead terms (*T \* year1990* and *T \* year1989*) to assess the Parallel Trend Assumption (PTA). Standard errors are in parentheses. The indicating significance is as follows \*  $p < 0.1$ , \*\*  $p < 0.05$ , and \*\*\*  $p < 0.01$ . The R-squared value represents the proportion of variance in self-employment numbers explained by the models.

Hypothesis 1 states that German Reunification had a positive effect on self-employment numbers in East Germany in the 1990s. The regression result in Table 6.1.1, Model I shows that the DiD coefficient (the interaction term) is 305.2 and statistically significant at the 1% level ( $p < 0.01$ ). This result means that keeping other things equal, reunification had a positive and significant effect on self-employment numbers in East Germany compared to West Germany. Specifically, the coefficient of 305.2 indicates that on average, reunification led to an increase of approximately 305.2 thousand self-employed individuals in East Germany relative to West Germany. Thus, confirming hypothesis 1.

This finding is opposing that of Fritsch et al. (2023) who found that following the reunification, the socialist regime harmed the level of self-employment numbers in the transition period. Notably, the effect is further enhanced when adding the lead terms in Model II to assess the Parallel Trend Assumption. The leads show that East and West Germany would have followed similar trends in self-employment numbers if the reunification had not occurred. If the lead coefficients were significant, it would suggest that the groups were already diverging before the treatment, thus violating the PTA and questioning the validity of the DiD results. Model II in Table 6.1.1 shows that both  $T * year1990$  and  $T * year1989$  (1 and 2 years before the reunification) are 37.67 and 13.67 respectively. The coefficients are not statistically significant, indicating that the self-employment numbers in the period immediately and 2 years before the treatment (reunification) did not differ significantly between the treatment (East Germany) and control (West Germany) groups. Thus, any difference in the number of self-employed people in East and West Germany before the reunification can be attributed to a random variation rather than a systematic trend, which is confirmed by the lack of significance of the lead terms in Model II. These results confirm the fact that East and West Germany were experiencing similar, parallel pre-treatment trends in self-employment numbers before the reunification took place. Therefore, the positive increase in the number for East Germany after reunification can be attributed to the reunification rather than pre-existing trends. Thus, enhancing the result and isolating the true effect of reunification on self-employment numbers, further supporting the validity of the DiD approach.

It is worth noting that the coefficient of the treatment group in both models is omitted. This means that the models are incapable of estimating what is the effect of being in a treatment or a control group on self-employment numbers. The reason behind the exclusion of the coefficient is the inclusion of fixed effects. Since it only accounts for time-invariant unobservables, being in a treatment or in a control group that changes over time is not estimated. Despite not estimating the baseline effect of East or West Germany on self-employment numbers, the main focus of interest is the effect of East Germany after the reunification, representing the Average Treatment Effect (ATE), as already discussed above.

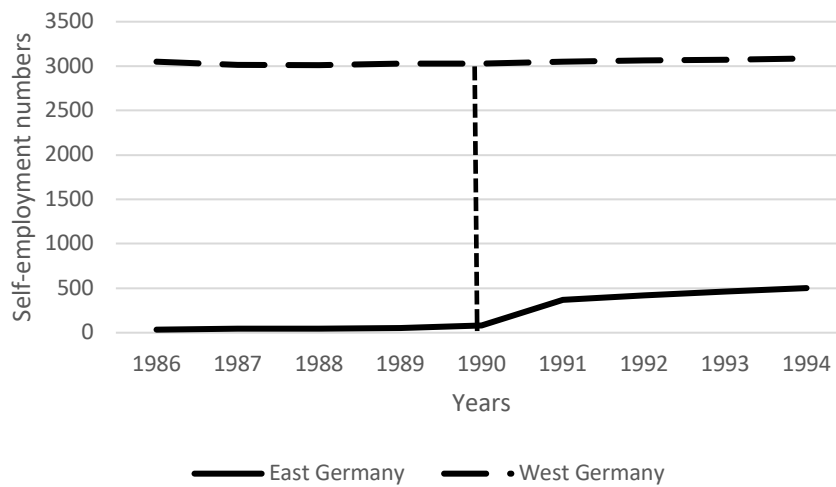


Figure 6.1.2 Graphical representation of the Parallel Trends in East and West Germany 1986-1994.

Note: I specifically narrowed the year gap 4 years before and after the intervention so it is visually more focused on the before-after scenario and apparent that the trends are parallel before the jump after the year 1990. All numbers are in thousands.

Figure 6.1.2 shows the Parallel Trends graphically in East and West Germany, illustrating the trends in the number of self-employed people in both regions. To better illustrate the jump around the intervention in 1990, the graph is restricted to 4 years before and after the reunification. From the figure, it can be seen that West Germany experienced steady self-employment numbers throughout the years. In contrast, East Germany shows extremely low numbers, which indicates the strict restrictions that were imposed during the socialist regime. After 1990 there is a surge in self-employment numbers for East Germany while the West continued the stability. Pre-reunification period shows that both regions experienced similar trends in the outcome. This visual evidence further supports the Parallel Trend Assumption, enhancing the validity of Difference-in-Difference analysis.

Hypothesis 2 states that the fall of the Berlin Wall had a positive effect on immigration numbers in East Germany in the 1990s. Table 6.2 shows the results of the Interrupted Time Series Analysis. By analyzing the coefficient of *Intervention* it can be seen that keeping other things equal, the fall of the Berlin Wall had an immediate positive and significant effect on the number of immigrants, significant at a 1% level ( $p < 0.01$ ). This intervention in 1989 had a significant positive impact on immigration numbers, increasing by approximately 175,530 immigrants. However, before concluding the hypothesis, the coefficients of *Intervention\*Time* and *Treated* should be interpreted. The former shows the trend in immigration numbers after the intervention, which is seen to be decreasing with about 7,430 immigrants post-1989. The latter anticipated the trend change over time which is the sum of *Intervention\*Time* and

*Intervention* coefficients. It shows a significant decline of about 4,791 immigrants annually after the intervention in 1989. The coefficient of *Intervention\*Time* and *Treated* are both negative and significant at 1% ( $p < 0.01$ ) and 5% ( $p < 0.05$ ) levels, respectively. Even though the fall of the Berlin Wall had an immediate positive effect, overall it negatively affected the immigration numbers (the coefficient of *Treated*), which rejects the second proposed hypothesis.

## 6.2 The Effect of the Fall of the Berlin Wall on Immigration Numbers

Table 6.2.1 The impact of the Fall of the Berlin Wall on immigration numbers in East and West Germany using the Interrupted Time Series Analysis (ITSA) method.

	<i>Dependent Variable:</i>
	<i>Immigration numbers</i>
<i>Time</i>	2,639.33*** (655.08)
<i>Intervention</i>	175,529.90*** (33,606.76)
<i>Intervention*Time</i>	-7,430.24*** (2636.87)
<i>Treated</i>	-4,790.90** (2,375.58)
<i>Constant</i>	12,065*** (2839.08)
<i>Observations</i>	30
<i>AIC</i>	24.07

Note: The table presents the results of the Interrupted Time Series Analysis (ITSA) for immigration from East to West Germany. The variable *Treated* represents the sum of the variable *Time* and *Intervention\*Time*. It measures the post-intervention trend change, suggested by the ITSA technique. The Akaike Information Criterion (AIC) is a measure of the model's goodness-of-fit. Heteroskedasticity- and autocorrelation-consistent (HAC) standard errors are in parentheses. The indicating significance is as follows \*  $p < 0.1$ , \*\*  $p < 0.05$ , and \*\*\*  $p < 0.01$ .

Figure 6.2.1 is a representation of the ITSA of immigration to West Germany, displaying both actual and predicted immigration numbers from 1980 to 2010. The dashed vertical line marks the intervention (the Fall of the Berlin Wall), which separates pre and post-periods. Each dot represents the actual recorded number of immigrants to West Germany for each year, whereas the dashed horizontal lines show the predicted values based on the Generalized Linear Model (GLM) used in the analysis.

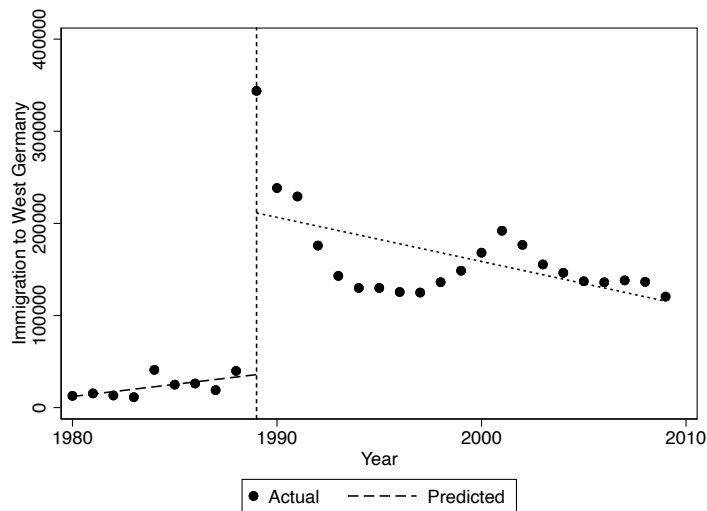


Figure 6.2.1 Graphical representation of the Interrupted Time Series Analysis on Immigration to West Germany from 1980 -2010.

Note: This graph illustrates the interrupted time series analysis of immigration to West Germany from 1980 to 2010. The analysis employs a Generalized Linear Model (GLM) with a Gaussian distribution and an identity link function, which predicts the annual immigration numbers based on observed trends. The vertical dashed line in 1989 is an intervention (the Fall of the Berlin Wall). Post-1989 predictions consider adjustments for autocorrelation with Newey-West standard errors corrected up to one lag, enhancing the robustness of the model against potential serial correlation and heteroskedasticity in the data.

Before the intervention, the number of immigrants showed a stable increase annually, which also closely follows the model's proposed predictions. This suggests that the model accounts for the observed data for this period well. Both the amount and the trajectory of immigration show apparent change following the intervention. The spike in immigration following 1989 is another indication of the intervention's rapid impact. This immediately began to decline, indicating that immigration patterns were significantly impacted by the fall of the Berlin Wall in 1989.

### 6.3 Robustness Checks

To test the robustness of the results the actual intervention year is artificially moved forward as a cut-off point in 1997 and the results are then reassessed. Table 6.3.1 shows the analysis of the robustness check for the self-employment numbers (H1). The difference-in-difference estimator (the interaction term) in Model 1 is neither comparable to the first result nor significant. The robustness check showed no effect of the reunification on the self-employment numbers in East Germany. Furthermore, adding the lead Coefficients of  $T * year1996$  and  $T * year1995$  show a significant positive effect on self-employment numbers, violating the parallel trend assumption, and making the results of this artificially constructed DiD unreliable. This robustness check shows that changing the intervention year results in

non-significant results and defies the parallel trend assumption, supporting the validity of the initial findings.

Table 6.3.1 The robustness check for the impact of German reunification on self-employment numbers in East and West Germany using the Difference-in-Difference (DiD) method.

	<i>Dependent variable:</i>	
	<i>Self-employment numbers</i>	
	(I)	(II)
<i>Treatment group</i>	-	-
<i>After</i>	389.02*** (60.00)	389.02*** (54.89)
<i>Treatment group* After</i>	69.92 (84.86)	131.38 (79.93)
<i>T * year1996</i>		376.55** (141.24)
<i>T * year1995</i>		299.55** (141.24)
<i>Constant</i>	1,670.13*** (31.23)	1,639.40*** (30.11)
Observations	48	48
R <sup>2</sup>	0.004	0.003

Note: The table presents the robustness check of a Difference-in-Difference (DiD) regression, incorporating fixed effects. It examines the impact of German reunification on self-employment numbers in East and West Germany. Model (I) is the regular DiD regression with the interaction term showing the DiD coefficient. Model (II) is the extension of Model (I) with the inclusion of the lead terms (*T \* year1996* and *T \* year1995*) to assess the Parallel Trend Assumption (PTA). Standard errors are in parentheses. The indicating significance is as follows \*  $p < 0.1$ , \*\*  $p < 0.05$ , and \*\*\*  $p < 0.01$ . The R-squared value represents the proportion of variance in self-employment numbers explained by the models.

Similarly, Table 6.3.2 shows the robustness check regarding the immigration numbers (H2). Altering the intervention year in 1997 not only changed the significance of most of the variables but the sign of the coefficient too. In the context of H2, focusing specifically on the trend change the variable *Treated* shows a negative and insignificant coefficient. This means that this particular year did not have any effect on the immigration from East to West Germany.

Moreover, for both robustness checks the goodness of fit, in the first case  $R^2$  and in the second case AIC are far different from the original result. Table 6.3.1 shows  $R^2$  of approximately 0.4% and 0.3% in both models respectively. This means that the proposed model can almost not explain the variation in the self-employment numbers. In Table 6.3. the Akaike Information Criterion (AIC) increased, worsening the model fitness for immigration numbers as well. This highlights the robustness of the results and increases confidence in the causal inferences drawn from the original study.



Table 6.3.2 The robustness check for the impact of the Fall of the Berlin Wall on immigration numbers in East and West Germany using the Interrupted Time Series Analysis (ITSA) method.

	<i>Dependent Variable:</i>
	<i>Immigration numbers</i>
<i>Time</i>	12,165.39*** (3,081.00)
<i>Intervention</i>	-53,203.71 (47,130.43)
<i>Intervention* Time</i>	-13,829.67*** (3,829.02)
<i>Treated</i>	-1,664.28 (1,843.77)
<i>Constant</i>	3,808.61 (21,943.84)
<i>Observations</i>	30
<i>AIC</i>	25.08

Note: The table presents the robustness check of the Interrupted Time Series Analysis (ITSA) for immigration from East to West Germany. The variable *Treated* represents the sum of the variable *Time* and *Intervention\*Time*. It measures the post-intervention trend change, suggested by the ITSA technique. The Akaike Information Criterion (AIC) is a measure of the model's goodness-of-fit. Heteroskedasticity- and autocorrelation-consistent (HAC) standard errors are in parentheses. The indicating significance is as follows \*  $p < 0.1$ , \*\*  $p < 0.05$ , and \*\*\*  $p < 0.01$ .

## 7 Discussion

### 7.1 Mechanisms Behind the Effect of Socialist Regime on Entrepreneurship in East Germany

As drawn from the analysis, the socialist regime, as conceptualized by the German Reunification for Hypothesis 1, had a positive and significant effect on entrepreneurship (self-employment numbers) in East Germany. This sudden surge in the number of self-employed people post-reunification can be explained by the several factors that I propose below. Firstly, the upsurge in start-up activity was the skyrocketing unemployment in the first years of transition that may have induced the “out of need” business formation (necessity entrepreneurship). There was an economic vacuum left by the transition from planned to the central economy, incentivizing individuals to turn to self-employment as a necessary option to fill the lessened job market gaps (Estrin et al., 2018). Secondly, it is notable that a high share of the newly emerged businesses in East Germany were in industries that are characterized by low entry barriers in terms of financial resources, making it easier for the emergence of start-ups (Fritsch et al., 2012). Thirdly, some authors investigate and show that communism affected the daily lives of

individuals and how it flourished during the Soviet period which provided a foundation for more substantial and productive entrepreneurship post-socialism (Rehn & Taalas, 2004).

### **7.2 Mechanisms Behind the Effect of Communism on Labor Mobility in East Germany**

For the second hypothesis, communism, as conceptualized as the Fall of the Berlin Wall, had an overall negative effect on immigration from East to West Germany. Despite the spike in 1989, there was a gradual decline which is due to numerous reasons. Firstly, after the fall of the wall, there was an initial optimism, the speedy wage convergence in the early 1990s, which translated into rising living standards for many in the East and fewer job opportunities in the West after 1992. This can explain the relatively low outmigration numbers during the early to mid-1990s (Heiland, 2004). Secondly, the likely dominant motive and high number of East-West migrants in 1989 was because of the fear of missing this unexpected window of opportunity to leave the GDR. However, the first free national elections that were held in 1990, strengthened the influence of the reformist parties and negotiations towards closer cooperation with West German officials began. This outcome faded the motive of migration and coincided with a decline in the number of migrants thereafter (Heiland, 2004).

## **8 Conclusion**

The analysis in this research showed quantitatively and qualitatively how the socialist regime affected entrepreneurship and labor mobility in East Germany. Firstly, German Reunification and its effect on self-employment numbers were examined with the Difference-in-Difference (DiD) technique. The study demonstrated that the reunification had a positive and significant effect on the number of self-employed people in East Germany. Secondly, the Fall of the Berlin Wall and its effect on the immigration from East to West Germany was assessed using the Interrupted Time Series Analysis (ITSA) method. The findings displayed that the Fall of the Wall had an overall negative trend change in immigration numbers. The analysis was strengthened by using robustness checks and providing qualitative analysis behind the findings for both hypotheses. Therefore, the answer to the proposed research question is provided as follows, the dissolution of East Germany's socialist system and the subsequent economic integration with West Germany positively influenced the development of entrepreneurship and negatively affected migration during the transition period of the 1990s.

There are certain limitations demonstrated in this research that should be taken into account while generalizing the findings as well as advice for future research. Firstly, the research can not estimate the

overall baseline effect of East and West Germany on self-employment numbers due to the inclusion of fixed effects. Since this absorption is irrelevant to this research, I recommend using random effects for future research if the treatment or control group estimation is important. Secondly, the limitation emerges in the nature of the data sources. Since in the 1980s reporting the exact number of self-employed people was difficult, the results may underestimate the exact effect of communism on both entrepreneurship and labor mobility. Lastly, it is interesting to examine how both entrepreneurship and labor mobility come about when applied together. Future research can see how these two concepts relate to one another which is particularly useful in policy evaluation and studies. Nevertheless, the findings in this research are relevant not only to Germany but for transition or emerging economies as well as to mature market economies requiring large structural changes after unforeseen economic shocks.

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## Appendix

Appendix A. Autocorrelation Test Results for Interrupted Time Series Analysis (ITSA) of Migration after the Fall of the Berlin Wall.

H0: $\rho=0$ (serially uncorrelated) HA: s.c. present at range specified				H0: $\rho$ =specified lag-1 HA: s.c. present at lag specified			
Lags	$\chi^2$	Degrees of freedom	p-value	Lag	$\chi^2$	Degrees of freedom	p-value
1-1	9.50	1	0.002	1	9.50	1	0.002
1-2	9.50	2	0.009	2	1.90	1	0.168
1-3	10.58	3	0.014	3	0.01	1	0.919
1-4	11.12	4	0.025	4	0.54	1	0.464
1-5	11.12	5	0.049	5	0.80	1	0.371
1-6	12.01	6	0.062	6	1.70	1	0.192
1-7	12.47	7	0.086	7	1.69	1	0.193
1-8	12.81	8	0.119	8	1.57	1	0.209
1-9	12.92	9	0.166	9	0.85	1	0.357
1-10	13.15	10	0.216	10	0.17	1	0.682
1-11	13.40	11	0.268	11	0.00	1*	0.942
1-12	13.86	12	0.309	12	0.16	1*	0.686

The Appendix A shows the results of the autocorrelation using the Cumby-Huizinga test. The left hand-side tests whether the series is serially uncorrelated with the given range of lags. As shown, the ranges up to 1-5 show the significant serial autocorrelation at a 5% level ( $P < 0.05$ ). This suggests that past values within these lag ranges are influencing current values. However, the more lags the model includes the less significant it gets, implying that the evidence for serial correlation weakens. The right hand-side tests for serial correlation at specific lags. Here, the significant p-value at lag 1 (0.002) confirms strong serial correlation at this specific lag, whereas higher p-values at subsequent lags (e.g., 0.168 at lag 2, 0.919 at lag 3) indicate no significant serial correlation at those individual points. These findings suggest that while there is a notable autocorrelation at the first lag, subsequent lags do not show significant autocorrelation. Even though the autocorrelation is present at certain lags, the results of the ITSA showed the significant coefficient for the fall of the Berlin Wall on the immigration numbers from East to West Germany, giving confidence that the observed changes in migration are not due to random variation.