

# Essays in Political Economy and Finance

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TESI DOCTORAL UPF / ANY 2017

DIRECTOR DE LA TESI

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To Gabriele and Rolf



## Acknowledgements

First of all, I want to thank my advisor Hans-Joachim Voth for his continuous encouragement and support. His guidance has been invaluable for the completion of this thesis. It has been very rewarding to learn from him how to identify and approach important economic questions.

I am grateful to Giacomo Ponzetto, Christian Fons-Rosen, Ander Pérez-Orive, and Andrea Polo who were always available to meet and discuss my work. This thesis benefited tremendously from their detailed comments and recommendations. I highly appreciate their support and advice for the job market.

I owe many thanks to the faculty at UPF and CREI for providing an outstanding environment for learning and research. The comments and feedback in seminars and meetings enormously helped in advancing my research projects. I especially want to thank Patricia Funk, Jaume Ventura, Fernando Broner, Antonio Ciccone, Christian Michel, and Albrecht Glitz for their help.

I am grateful for the financial support of the Department of Economics, Universitat Pompeu Fabra. I would like to thank Marta Araque, Laura Augustí, and Mariona Novoa for their excellent work. Their administrative support is invaluable for students.

Many thanks go to my PhD colleagues who shared my experience in Barcelona over the last years. A particular thank-you goes to Fernando, Gene, Kiz, Miguel, Marc, and Pau.

Finally, I want to thank my family for their continuous support during these last years.



## **Abstract**

This thesis explores the interactions between the political and corporate environment. In the first chapter, I examine the high concentration of headquarters in capital cities and the incentives for firms to locate in close proximity to politicians. I study the relocation of the German Federal Government. I show that locating the headquarters in the capital city has a substantial positive effect on firm values, in particular for firms that operate in regulated industries. The second chapter analyzes the implications of franchise extensions and resulting variations in median voter preferences for the corporate environment. I find that the introduction of female suffrage in Switzerland has considerable consequences for firms in specific industries. In the third chapter, I investigate the effects of misjudgments on housing prices. I show that overly optimistic expectations regarding the German unification caused substantial price exaggerations in the Berlin housing market.

## **Resumen**

Esta tesis explora las interacciones entre el entorno político y corporativo. En el primer capítulo, examino la alta concentración de sedes principales en las capitales y los incentivos para empresas de ubicarse cerca de los políticos. Estudié la relocalización del gobierno federal alemán. Demuestro que la localización de la sede principal en la capital tiene un efecto significativo sobre los valores de las empresas, en particular para las empresas que operan en industrias reguladas. El segundo capítulo analiza las implicaciones de la extensión del derecho de voto y las variaciones resultantes en las preferencias del votante mediano para el entorno corporativo. Averigüé que la introducción del sufragio femenino en Suiza tiene consecuencias considerables para las empresas en ciertos sectores. En el tercer capítulo, investigo los efectos de estimaciones falsas sobre los precios de la vivienda. Muestro que las expectativas excesivamente optimistas con respecto a la unificación alemana causaron exageraciones substanciales de los precios en el mercado de la vivienda de Berlín.





## Preface

This doctoral thesis brings together the results from three research projects in the fields of Political Economy and Finance. A common characteristic of the three chapters is the analysis of particular events that caused changes in the political environment. These events in combination with the investigation of reactions in financial markets serve to study the interaction between the political field and economic agents.

In the first chapter, I analyze why disproportionately many companies locate their headquarters in the capital city. Geographic proximity to a country's leading politicians may be beneficial for a number of reasons, including greater opportunities to influence policy makers. Since neither firms nor capital cities move randomly, the effects of firms' co-locating with the government are normally hard to identify. I solve this problem by examining a unique event - the decision to relocate the German Federal Government from Bonn to Berlin in 1991. Following reunification, there was a free vote in the German parliament on the future location of the government. Berlin won by a narrow margin, an event that could not be anticipated even days before. I examine the firm value effects of being co-located with the government by analyzing security prices in capital markets. Using a Fama-French Multi-Factor framework, I find that firms with operational headquarters in Berlin experienced substantial increases in their values, following the relocation decision. The increase in firm valuation was considerably higher for firms in lobby-intensive and highly regulated industries.

The second chapter studies the implications of franchise extensions for corporations. A country's electorate constantly changes due to naturalization of immigrants or amendments in suffrage legislation. Shifts in the electorate typically alter the preferences of the median voter, which induces support-maximizing politicians to adjust their legislative behavior. These policy responses may have far-reaching consequences for the prospects of industries and firms. Corporate decision-makers should incorporate potential variations in the political environment in their strategies. This chapter shows that changes in the electorate can indeed have considerable impacts on individual firms. I analyze the implementation of female suffrage in Switzerland, introduced by a referendum in 1971. Gender differences in preferences and socio-economic characteristics shifted the Swiss median voter preferences in the new electorate. I derive predictions regarding which business areas should benefit and which should suffer from according policy adjustments. I find that firms operating in areas that should benefit from female suffrage strongly outperform in capital markets following the referendum. Firms that should be adversely affected, experience a substantial underperformance.

In the third chapter, I show how overly optimistic expectations can create price exaggerations in the housing market. Since the recent housing bubble there is an intense debate in many countries about whether real estate price movements are in line with changes in their fundamentals or driven by speculative investment. Analyzing asset bubbles that occurred in the past can assist in understanding and identifying current and future mispricings. In this chapter, I provide a well-identified example of price exaggerations and their reversal that were caused by investor misjudgments and overly optimistic expectations. I analyze the real estate market in West Berlin at the time of the German unification. There exists evidence of a bubble episode, following the fall of the Berlin Wall. As of the beginning of the 1990s, real estate related prices in West Berlin markedly outperformed benchmarks without considerable changes in the fundamentals.

Most prices fully reversed to the benchmarks a few years later. This pattern can be observed in several markets, be it prices of real estate firms in capital markets, price-rent multiples, housing prices, and building land values. Exuberant beliefs about Berlin's future provoked a boom in prices that came to a sudden halt merely a few years later and was followed by substantial price deterioration.

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# Chapter 1

## Capital Gain: The Returns to Locating in the Capital City

### 1.1 Introduction

Company headquarters<sup>1</sup> are overwhelmingly concentrated in capital cities, more so than the rest of economic activity. Figure 1.1 illustrates the concentration of publicly listed firms in capital cities across the EU-28 and EFTA area.<sup>2</sup> More than 40 percent of firm headquarters are located in a European capital city, while only about 16 percent of the European economically active population resides in the capitals.<sup>3</sup> The status of being a capital city remains a significant factor for headquarters agglomeration when controlling for population size.<sup>4</sup>

Do firms locate in the capital city because they want to be close to the government?<sup>5</sup> Ades and Glaeser (1995) argue that spatial proximity to politicians increases political influence and, consequently, motivates agents to be active in capital cities. This is in line with a rich literature on political connections that demonstrates that being politically connected can be highly valuable for firms (e.g. Roberts 1990, Fisman 2001, Faccio 2006, Ferguson and Voth 2008, Acemoglu et al. 2013). Most capital cities, however, are also very large. The high concentration of headquarters in capital cities might simply be explained by firms' preferences to agglomerate in large metropolitan areas. An extensive literature examines the concentration of economic activity and identifies its determinants (e.g. Marshall 1920, Kim 1995, Ellison and Glaeser 1997,

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<sup>1</sup> Throughout this work, I define headquarters as the main administrative center of an enterprise or a place from which something (such as a business or a military action) is controlled or directed. Cf. Merriam-Webster Dictionary.

<sup>2</sup> The data on firm location are from the Bureau van Dijk Amadeus Database. The population data are from Eurostat's Regional Database and reflect the economically active population in the respective metropolitan region as defined by Eurostat. The data are for the year 2013. Population data for Switzerland are from the Swiss Statistical Office (<http://www.bfs.admin.ch>) and are for year 2012. The data sources differ to some extent in their classification of metropolitan areas, which may lead to some firms being included in a specific area for which the population is excluded or vice versa. The potential deviations, however, should not be too severe and should not bias the result to a large extent. The sample includes all EU-28 and EFTA countries except Croatia, Cyprus, Iceland, Luxembourg, Malta, and Moldavia. For these countries, Eurostat does not provide sufficient population data at the metropolitan area level.

<sup>3</sup> The countries within the EU-28 & EFTA area differ markedly in the number of publicly listed firms and in population size. I, therefore, also evaluate, for each country separately, the share of publicly listed firms and the share of population in the respective capital city and take means across countries. On average, 50 percent of the firms within each country are located in a capital city, while only 24.8 percent of the economically active population resides in the capital metropolitan area.

<sup>4</sup> For more than 100 European metropolitan areas, I regress the number of headquarters per metropolitan area on its economically active population, the square of economically active population, and a dummy variable for capital cities. The dummy is statistically and economically significant for each specification. Cf. appendix A for results and details.

<sup>5</sup> The majority of capital cities also hold the seat of the federal government. Throughout this paper, I use the terms capital city and seat of the federal government interchangeably. I comment on the relevant cases in which capital city and seat of the federal government do not coincide.

Rosenthal and Strange 2001, 2003, 2004).<sup>6</sup> Since in most countries the capital city is the largest city, the effects of firms' co-locating with the government are normally hard to identify. The well-established agglomeration economies are likely to confound firm value effects created by this source.

In this paper, I identify and quantify the firm value effects of co-locating with the government. I study a unique event, the decision to relocate the German Federal Government from Bonn to Berlin on June 20, 1991, and analyze the stock market reactions of German firms with headquarters in Berlin, at the time the decision was taken. Importantly, even days before the crucial vote, its outcome was highly uncertain. For these firms, I find mean cumulative abnormal returns (CARs) of about 3 percent within the two trading days following the decision, using a Fama-French Multi-Factor framework. One week after the event the CARs were still well above 2 percent and amounted to 3.35 percent after two weeks.<sup>7</sup> There was no immediate reversal of these abnormal returns, and the result does not seem to be driven by industry composition. Figure 1.2 shows the cumulated abnormal returns of the Berlin sample and the 0.95 percent confidence interval of the coefficient estimates for the days before and after the event. These results suggest that the presence of the government should be considered an important factor for location decisions; it also seems to create important economic advantages for firms thus favored. Firms that were politically connected or operated in lobby-intensive industries experienced considerably higher increases in their valuation than the sample mean.

On November 9, 1989, the Berlin Wall was opened, the first step on the road to German unification. Unification itself took place on October 3, 1990, when the German Democratic Republic acceded to the Federal Republic of Germany. Most of the legal details of the unification were settled by the Unification Treaty (Einigungsvertrag). One of the major stumbling blocks during the unification negotiations was the location of Germany's future government. While the representatives of the former East Germany demanded to relocate the government from Bonn to Berlin, the majority of prime ministers of the West German Länder wanted to maintain its seat in Bonn. The issue was so controversial that it remained unresolved in the Unification Treaty, and the decision was postponed.

The decision regarding the government location was taken by vote in the German Federal Parliament (Deutscher Bundestag) on June 20, 1991.<sup>8</sup> This course of events provides a setting that allows me to isolate the firm value effects of the relocation decision from the impact of other events. The relocation decision<sup>9</sup> is irreversible and

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<sup>6</sup> Combes, Duranton, Gobillon, Puga, and Roux (2012) show that spatial productivity differences cannot be explained by firm selection, using French establishment level data. This suggests that agglomeration economies are the primary source of productivity advantages in large cities.

<sup>7</sup> The exact returns are 2.95 percent after two trading days, 2.15 percent after five trading days, and 3.35 percent after ten trading days. This would amount to an annualized return of 3,700 percent, 190 percent, and 128 percent, respectively.

<sup>8</sup> The government did not move to Berlin before 1999. However, if agents are rational, then any effects on firm valuation should already have been revealed on the financial markets once the relocation decision was taken.

<sup>9</sup> The decision established the relocation of the German Parliament on the federal level (Deutscher Bundestag), the German Chancellor, and the federal ministers to Berlin. The terms government or government and parliament in the text always refer to the Deutscher Bundestag, the Chancellor, and the federal ministers. The German Bundesrat was not affected by this decision. It voted independently two weeks later to stay in Bonn.



caused exogenous variation in geographical distance of firm headquarters to the federal government. The vote was very close (338 to 320 votes in favor of Berlin), and it was preceded by an almost 13 hour long debate of the parliament, with a multitude of speeches by proponents of either of the two cities. Importantly, parties allowed their MPs a free vote, making it near-impossible to predict the outcome. These characteristics of the decision render it unlikely that its result could have been foreseen by market participants. This provides an attractive setting to estimate the effect on firm values using an event study framework.

This article contributes to two important strands in the literature. The scholarship on spatial agglomeration analyzes several characteristics and determinants of geographic concentration of industries (e.g. Kim 1995, Ellison and Glaeser 1997, Rosenthal and Strange 2001, 2003, 2004). Marshall (1920) famously identified natural advantage as well as input sharing, labor market pooling, and knowledge spillovers as key determinants of industry concentration. Other studies add home market effects, consumption, and rent-seeking to the list of sources of agglomeration economies.<sup>10</sup> Several studies focus on the particular case of headquarters location and find a high degree of U.S. headquarters concentration in metropolitan areas for large firms (Ross 1987, Holloway and Wheeler 1991, Klier and Testa 2002, Diacon and Klier 2003, Klier 2006).<sup>11</sup> Metropolitan areas that dispose of good airport facilities, low corporate taxes and wages, that offer high levels of business services, and are characterized by the agglomeration of headquarters in the same sector of activity seem to be particularly appealing (Lovely, Rosenthal, and Sharma 2005, Davis and Henderson 2008, Henderson and Ono 2008, Bel and Fageda 2008, Strauss-Kahn and Vives 2009). Duranton and Puga (2005) provide a framework that motivates the increasing spatial separation of headquarters from their production facilities. They show that the high degree of concentration of headquarters and business services in large cities can be explained by cities shifting from sectoral to functional specialization. In addition, it appears as if financial incentives provided by local politicians constitute an additional factor that attracts headquarters. Garcia-Milà and McGuire (2002) report that the city of Chicago and the state of Illinois offered more than \$50 million in tax abatement and other incentives to allure Boeing's headquarters in 2001.<sup>12</sup> This suggests that interactions with politicians, potentially beyond the pure negotiation and provision of tax incentives, matter for firm location decisions.

In this respect, my study relates to other influential scholarship, the literature on political connections. Roberts (1990), Jayachandran (2006), Goldman, Rocholl, and So (2008), Acemoglu, Johnson, Kermali, Kwak, and Mitton (2013), and Albuquerque, Lei, Rocholl, and Zhang (2015) provide evidence that U.S. financial markets price politically connected firms differently from unconnected ones. These findings are confirmed by Fisman (2001) for Indonesian firms with political connections to former president Suharto, Johnson and Mitton (2003) for Malaysia, and Ferguson and Voth (2008) for German firms that had established close ties to the Nazi Regime. Cross-section results

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<sup>10</sup> Cf. Rosenthal and Strange (2004) for a review of the empirical evidence on the nature and determinants of agglomeration economies and Duranton and Puga (2004) for a survey of the theoretical literature.

<sup>11</sup> Cf. Evans (1973) for an analysis of large British industrial companies and the high concentration of their headquarters in London.

<sup>12</sup> Likewise, in 2013 the Hertz corporation announced that it will relocate its worldwide headquarters to Estero, Florida from Park Ridge, New Jersey. Hertz receives around \$19 million in economic stimulus from the county and the state (Dick Hogan, *The (Fort Myers, Fla.) News-Press*, May 7, 2013).

point in the same direction. Firms experience positive stock market returns when one of their officers or large shareholders enters politics (Faccio 2006), while firms with headquarters in a politician's home town suffer from a significant drop in stock prices when the respective politician unexpectedly dies (Faccio and Parsley 2009).<sup>13</sup> These findings, combined with the rent-seeking motive (Ales and Glaeser 1995), suggest that the presence of leading politicians affects firm location decisions.

Other related scholarship focuses on the same historical setting and/ or city, analyzes the characteristics of capital cities, or uses similar identification approaches. Redding and Sturm (2008) use the division and reunification of Germany to assess the role of market access for economic development. Ahlfeldt, Redding, Sturm, and Wolf (2014) disentangle agglomeration and dispersion forces from fundamentals as factors that determine location choices. They analyze the division and reunification of Berlin, which provided an exogenous source of variation in the concentration of economic activity. The work by Brühlhart, Carrère, and Trionfetti (2012) uses the fall of the Iron Curtain in 1990 as a natural experiment to evaluate the effects of trade liberalization in Austrian municipalities.<sup>14</sup> Campante and Do (2014) find that U.S. isolated state capitals show greater levels of corruption than their counterparts that are located closer to the main centers of population. Campante, Do, and Guimaraes (2014) analyze links between capital cities, conflict, and governance quality. Greenstone and Moretti (2004) and Greenstone, Hornbeck, and Moretti (2010) estimate the impact of locating a large manufacturing plant in a U.S. county. They compare total factor productivity and property value effects in that county to counties that are otherwise similar, but do not attract the industrial plant.<sup>15</sup>

This paper contributes to the existing literature by showing that co-locating with the government is beneficial for firms. It combines results and approaches from the urban economics, political connections, and finance literature. I tackle the difficult empirical task of disentangling government co-location effects from other agglomeration economies, by analyzing a unique event.

The rest of the paper is structured as follows. Section 2 briefly summarizes the historical background. Section 3 describes the data and defines the sample identification. The main results are stated in Section 4, while section 5 provides several robustness checks. Section 6 discusses political connections as a driver of the results, before section 7 concludes.

## 1.2 Historical background

This section describes the events that led to the unification of Germany and the subsequent decision to relocate the government to Berlin. It places particular emphasis

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<sup>13</sup> In addition, politically connected firms seem to increase their performance and their financial leverage (Boubakri, Cosset, and Saffar 2012), have lower cost of equity capital (Boubakri, Guedhami, Mishra, and Saffar 2012), and are significantly more likely to be bailed out by the government (Faccio, Masulis, and McConnell 2006).

<sup>14</sup> Cf. Fuchs-Schündeln and Schündeln (2005), Alesina and Fuchs-Schündeln (2007), Fuchs-Schündeln (2008), Bursztyn and Cantoni (2012), and Burchardi and Hassan (2013) for further studies that exploit the German reunification as a natural experiment.

<sup>15</sup> Chan, Gau, and Wang (1995) and Ghosh, Rodriguez, and Sirmans (1995) relate to my paper in that they find that stock markets respond to headquarters (re)location announcements.

on the chronology of incidents that resulted in the isolation of the government location decision from other events. Table 1.1 provides a chronology of the main events.

On November 9, 1989, the Berlin Wall, that divided the eastern and the western part of Berlin for almost three decades, was opened. Less than one year later, on October 3, 1990, the territory of the German Democratic Republic (“East Germany”) acceded to the scope of application of the constitutional law of the Federal Republic of Germany (“West Germany”). The accession was established by the Unification Treaty (Einigungsvertrag) that was signed on August 31, 1990, and came into effect on September 29, 1990. One of the most disputed issues during the elaboration of the Unification Treaty was whether the capital city of the unified Germany should be Bonn or Berlin.<sup>16</sup> The subject was so controversial that the decision whether the federal government should move to Berlin or stay in Bonn was postponed until after the unification and was not settled before June 20, 1991.

Bonn was the seat of the government of the German Federal Republic during the division of Germany. Berlin served as Germany's capital before the division, and its eastern part was the capital of the German Democratic Republic thereafter. Before the negotiations for the Unification Treaty began, a public debate regarding the future capital of the unified Germany was already under way. So far, the main actors of this debate had been regional politicians from the Bonn and Berlin area, respectively. On June 29, 1990, however, the first high-ranking politician took a stand on the issue. The Federal President of West Germany, Richard von Weizsäcker, on the occasion of being nominated honorary citizen of Berlin, announced his preference for Berlin as the capital city and seat of the government.<sup>17</sup> Von Weizsäcker's announcement was highly criticized, especially by the Bonn proponents, since many expected neutrality from the President.<sup>18</sup> The reactions to his announcement document the increasing importance that many politicians ascribed to the issue. The majority of the West German federal states (Bundesländer) was opposed to Berlin as the location. The respective prime ministers of the states feared a loss of influence for themselves and believed that German federalism could lose some of its power in a metropolis like Berlin.<sup>19</sup>

The first round of negotiations for the Unification Treaty took place on July 6, 1990. The prime minister of the German Democratic Republic, Lothar de Maizière, demanded that Berlin be the future capital of the unified Germany. He preferred to establish this claim in the Unification Treaty and not to postpone the decision until a joint government was elected for the unified Germany. Wolfgang Schäuble, chief negotiator on behalf of the Federal Republic of Germany, countered that such a disputed issue should not be included in the treaty. He was convinced that including the demands of Lothar de Maizière in the Unification Treaty would have made it impossible to sign and ratify the treaty in the parliament of the Federal Republic of Germany. The opposition of the West German ministers to Berlin as seat of the government was too strong.

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<sup>16</sup> The location of the capital was by far not the sole argument during the negotiations of the Unification Treaty. In fact, e.g., a dissent across parties and regions on the legislation on abortion caused, in the last minute, the postponement of the initialing of the treaty. Cf. Schäuble (1990), p. 230.

<sup>17</sup> He did so again in November 1990 and on February 24, 1991, in a letter to the chairmen of the political parties and parliamentary groups, when it seemed as if the decision in favor of Bonn as seat of the government was almost certain. Cf. Tschirch (1998), p. 43.

<sup>18</sup> Cf. Tschirch (1998), p. 41-43.

<sup>19</sup> Cf. Schäuble (1991), p. 131, 132 and Dreher (1999), p. 198.

The second round of negotiations took place from August 1 to 3, 1990. It resulted in a first draft of the Unification Treaty that was completed on August 6, 1990.<sup>20</sup> During these three days the press was reporting a clear tendency for Berlin as the capital and seat of the government, according to the East German draft of the Unification Treaty. However, on August 3, press agencies announced that the West German states had made a decision in favor of Berlin as capital, but that the treaty would not include any statement regarding the location of the government.<sup>21</sup> This was in clear contrast to the East German proposition.<sup>22</sup> The first draft of the Unification Treaty showed that the balance of power leaned towards the West German politicians. Its second article stated that the capital of Germany was Berlin and that the issue of where the government seat should be located would be decided after the completion of the German unification.<sup>23</sup> This potential separation of capital city and government seat had not been considered an option at the outset of the negotiations.

The formulation in the Unification Treaty at least partly fulfilled the demands of the East German side, but at the same time postponed the decision on the government location. While it assured the approval of the Unification Treaty by the prime ministers of the West German states,<sup>24</sup> it eroded the position of Berlin as the capital city. The concurrence of capital city and seat of the government had so far been taken for granted.<sup>25</sup> The negotiations ended at 02.08am on August 31, 1990, when the treaty was initialed by Günther Krause and Wolfgang Schäuble.<sup>26</sup> The wording in its second article was virtually unchanged from its earlier version in the first draft. On December 2, 1990, elections took place to the first German Parliament in the unified Germany. Prior to the elections, the contest between the proponents of Bonn as seat of the government and those in favor of Berlin had already intensified, and the issue of the government location may be considered the most important dispute in German domestic politics during the first half of the year 1991.<sup>27</sup>

In March 1991, the Bonn advocates presented a proposal of their demands. It consisted of the following three statements: 1. The German capital is Berlin. 2. Seat of the government and parliament is Bonn. 3. This law comes into effect on the day of its promulgation. They sent the proposal to every member of the federal parliament on March 21, 1991, and announced that they had collected signatures in favor of it from 255 members of parliament.<sup>28</sup> This constituted about three quarters of the votes necessary for a majority. The Berlin proponents followed with their proposal a few days later, on March 25, 1991. A large part of their proposition dealt with the way in which Bonn should be compensated, in case of the relocation of the government. Since they

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<sup>20</sup> Cf. Schäuble (1991), p. 170, 306.

<sup>21</sup> Cf. Tschirch (1998), p. 29.

<sup>22</sup> Cf. Schäuble (1991), p. 170.

<sup>23</sup> The original wording in the draft: **Artikel 2 Hauptstadt** "Hauptstadt Deutschlands ist Berlin. Die Frage des Regierungssitzes wird nach der Herstellung der Einheit Deutschlands entschieden." Cf., e.g. Handelsblatt, August 6, 1990, p. 6.

<sup>24</sup> Cf. Schäuble (1991), p. 131-133.

<sup>25</sup> For Lothar de Maizière and many others from the eastern part of Germany it had been a matter of course that the government would be located in Berlin. Cf. Kansy (2003), p. 16.

<sup>26</sup> Cf. Schäuble (1991), p. 309.

<sup>27</sup> Cf. Möller (2002), p. 10.

<sup>28</sup> The recently elected German Parliament had 662 members.

could not hope to match the number of signatures collected by their opponents, they chose not to collect any.<sup>29</sup>

On April 23, 1991, a meeting of the top-ranking German politicians took place in the office of the President of the German Bundestag (Bundestagspräsidentin), Rita Süßmuth. The main item on the agenda was to decide on the appropriate decision-making procedure regarding the government location.<sup>30</sup> They decided that the federal parliament should debate and take a vote by roll call on the future location of government and parliament on June 20, 1991. This decision removed the uncertainty regarding the date and the procedure by which the decision should be taken.<sup>31</sup> On the same day, Helmut Kohl announced his preference for Berlin.<sup>32</sup>

Several experiences of members of parliament illustrate the importance of the decision to the involved persons. During the days before the decision, participants of the session of the parliamentary group of the Christian Democratic Union and Christian Social Union (CDU/CSU) were complaining about harassment, pressure, and moral constraint regarding the upcoming vote. Moreover, East German delegates were threatened to be showed up, in case they would opt in favor of Bonn. Some of their West German counterparts, who were in favor of Berlin, received anonymous calls and hate mail. The Parliamentary Secretary, Ingrid Roitzsch, classified the incidents as psychological coercion.<sup>33</sup>

One day before the debate, the general opinion among the MPs was that Bonn would win the vote.<sup>34</sup> In addition, the two newspapers *Bonner General-Anzeiger* and *Kölner Expresß*, on June 14, 1991, reported estimates that 310 of the 662 representatives in the German Parliament were in favor of Bonn, as opposed to only 250 in favor of Berlin. The *Bild am Sonntag*, even more strikingly, published the results of a poll on June 16, 1991, that stated that, two weeks before the vote, 343 members of parliament favored Bonn, while only 267 supported Berlin.<sup>35</sup> However, in the late evening of June 20, 1991, after a debate that lasted for almost 13 hours, the parliament decided, with 338 to 320 votes, that the German Government and Federal Parliament would be relocated from Bonn to Berlin.

### 1.3 Data

This study uses several data sources: the *Handbuch der deutschen Aktiengesellschaften* (edition for the years 1939, 1949-1951, and 1991-1992), a compendium that contains information on all incorporated German firms, Datastream, contemporary quotation lists and newspapers, Bureau van Dijk's Amadeus Database, and Eurostat.

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<sup>29</sup> Cf. Dreher (1999), p. 224, 225.

<sup>30</sup> Apart from Rita Süßmuth herself, the invitees were the Federal President (Bundespräsident), Richard von Weizsäcker, the Federal Chancellor (Bundeskanzler), Helmut Kohl, the President of the German Bundesrat (Bundesratspräsident), Henning Vorscherau, the President of the Federal Constitutional Court (Präsident des Bundesverfassungsgerichts), Roman Herzog, as well as the chairmen of the parliamentary groups (Fraktionsvorsitzende), Alfred Dregger, Hans-Jochen Vogel, and Hermann Otto Solms. Cf. Dreher (1999), p.227-229.

<sup>31</sup> So far, several members of the Social Democratic Party (SPD) were proposing a plebiscite on the issue.

<sup>32</sup> Cf. Dreher (1999), p. 227-229.

<sup>33</sup> Cf. *Ibid.*, p. 240, 241.

<sup>34</sup> Cf. Kansy (2003), p. 32.

<sup>35</sup> Cf. Dreher (1999), p. 238, 239.

To identify the location of firms, I use the *Handbuch der deutschen Aktiengesellschaften*. This yearly published compendium includes information on every incorporated German firm in the respective year. For those firms for which the *Handbuch der deutschen Aktiengesellschaften* does not provide sufficient location information, I consult the firm web page and retrieve the respective information from there. The compendium also serves to identify the entire German market of publicly traded firms.

In Germany, in general, the location of a firm's corporate seat and its headquarters coincide. However, the *Handbuch der deutschen Aktiengesellschaften* provides information on the location of the corporate seat and headquarters, and for some firms the locations of these two institutions differ. Several publicly traded firms had more than one corporate seat (at most two) and/ or more than one headquarters (at most two) in 1991. This was, in particular, the case for firms with corporate seat in Berlin. Following the division of Germany, Berlin was located in the Soviet occupation zone, but its western part still belonged to West Germany. Several firms with corporate seats and/ or headquarters in West Berlin relocated these institutions to a West German city or established a new headquarters, while maintaining a corporate seat and/ or a headquarters in Berlin. With the information from the *Handbuch der deutschen Aktiengesellschaften*, firm links to Berlin (and correspondingly to other German cities) can be divided into three groups: 1) firms that had their corporate seat and headquarters exclusively in Berlin;<sup>36</sup> 2) firms that had a corporate seat and a headquarters in Berlin, but another corporate seat and/ or headquarters in another German city; and 3) firms that had a corporate seat in Berlin, but their headquarters (and possibly another corporate seat) in a different German city. The definition of the baseline sample for the analysis can be understood in terms of these groups. In order to benefit from the geographic proximity to the government, it is the location of the headquarters that matters. The headquarters is the place where firms' key decision-makers are located. If a firm's headquarters and corporate seat do not coincide, I assume that this firm's decision-makers are located in the city where the headquarters is. The baseline sample of the analysis, therefore, comprises all firms that had a least one headquarters in Berlin in 1991 and were publicly traded in the Federal Republic of Germany.<sup>37</sup> This definitions applies to groups 1 and 2. It yields a sample of 22 firms. The sample composition for other cities and dates is defined in an analogous manner. Section 5 on robustness discusses results for differing sample definitions.

Daily stock price data are from Datastream.<sup>38</sup> I drop firms that did not experience any price change in the 20 days prior to and the 10 days following the event. This ensures that only securities enter the analysis that were actively traded and not already delisted in 1991.<sup>39</sup> Some firms had more than one quoted stock (usually

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<sup>36</sup> In case the *Handbuch der deutschen Aktiengesellschaften* only mentions one address for a firm, I assume that corporate seat and headquarters were located at that one address.

<sup>37</sup> Firms from the former German Democratic Republic were not publicly traded before 1992.

<sup>38</sup> Cf. Datastream: "Datatype (P) represents the official closing price. This is the default datatype for all equities. Prices are generally based on ?last trade? or an official price fixing. For stocks which are listed on more than one exchange within a country, default prices are taken from the primary exchange of that country (note that this is not necessarily the ?home? exchange of the stock). Germany (floor trading) default closing prices are taken from the Frankfurt exchange."

<sup>39</sup> Datastream continues reporting securities with the last price quoted, even after their delisting. Datastream does not provide trade volumes for every firm in the sample. Therefore, the trade volumes cannot be used as criterion to figure out which firms are no longer listed on the stock exchange. For some

preferred shares in addition to ordinary shares). These securities enter the event study framework separately. Combining these criteria with the location criteria stated above, the baseline sample (“Berlin sample”) of the analysis consists of 27 securities.

Data on market value<sup>40</sup> as well as the information on industry and sector classifications<sup>41</sup> are from Datastream. In addition, Datastream provides performance indices for the German financial market as well as for specific industries, supersectors, sectors, and subsectors.<sup>42</sup> I use these indices in different model specifications. Table 1.2 displays descriptive statistics on market value and industry composition.<sup>43</sup> The baseline sample of Berlin-headquartered firms has a lower mean market value than the entire German market of publicly traded firms. However, the opposite holds for the median market value. In general, the differences between the baseline sample and the German market, in terms of market value and industry composition, are rather moderate.

For an event study analysis for the year 1949,<sup>44</sup> I use official quotation lists from the stock exchanges in Frankfurt, Hamburg, and Dusseldorf for October and November, 1949, as well as stock quotes from the *Süddeutsche Zeitung*. For the identification of firm headquarters and corporate seat locations, I use the *Handbuch der deutschen Aktiengesellschaften* (edition for the years 1949 to 1951).

The data for the concentration of headquarters and population across Europe are from Bureau van Dijk's Amadeus Database and Eurostat's Regional Statistics Database.

## 1.4 Results

This section discusses the effects of the government location decision on firm values. A Fama-French Three-Factor Model estimates high positive abnormal returns for the Berlin-headquartered firms in the days following the decision. In addition, I state results for different cities and events to assess the relevance of the baseline results.

### 1.4.1 Model

I apply a multi-factor event study framework<sup>45</sup> in the spirit of Fama and French (1993) to estimate the effects of the relocation decision on the value of firms with headquarters

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securities, Datastream does not show price changes for several months or years. Including those could yield nonzero abnormal returns, although the price of the stock did not change, neither in the months before the event nor after.

<sup>40</sup> Market value is defined as the product of stock price and the number of securities in issue.

<sup>41</sup> Datastream provides classification according to the Industry Classification Benchmark (ICB) created by FTSE and Dow Jones.

<sup>42</sup> Datastream uses a representative sample of stocks covering a minimum of 75 - 80% of total market capitalization to calculate market indices. The largest value stocks for each market are included in the market index. Stocks with more than one equity issue are valued on each issue. Within each market, Datastream allocates securities to industrial sectors using the Industry Classification Benchmark (ICB) jointly created by FTSE and Dow Jones and calculates sector indices.

<sup>43</sup> For one of the firms in the Berlin sample as well as for 49 firms in the entire German market Datastream does not provide information on the market value. For this reason, the number of observations for the the comparison of market value differ from those of the comparison of industry composition.

<sup>44</sup> Cf. section 4.7.

<sup>45</sup> Cf. Fama, Fisher, Jensen, and Roll (1969), which is the reference that introduced the event study methodology.

in Berlin.<sup>46</sup> Fama and French (1992, 1993) identify three common risk factors that appear to explain average stock returns in the United States: 1) the variation explained by the return on the market portfolio (market beta); 2) size, as measured by market value; and 3) the book-to-market equity ratio (BE/ME). These factors form a Three-Factor Model of the following form:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_i SMB_t + \delta_i HML_t + \varepsilon_{it} \quad (1.1)$$

$$E[\varepsilon_{it}] = 0 \quad Var[\varepsilon_{it}] = \sigma_{\varepsilon_i}^2$$

where  $R_{it}$  is the return of stock  $i$  on day  $t$ .  $R_{mt}$  is the return of the market index<sup>47</sup> on day  $t$ .  $SMB_t$  - “small minus big” - is the difference between returns of portfolios that contain small size securities and portfolios that contain big size securities on day  $t$ .  $HML_t$  - “high minus low” - is the difference between returns of portfolios that contain securities with a high book-to-market equity ratio and portfolios with low book-to-market securities on day  $t$ .  $\varepsilon_{it}$  are the zero mean residuals of stock  $i$  on day  $t$  that are not explained by the three risk factors of the model.<sup>48</sup>

The model is fitted for each stock of the baseline sample within an estimation window of -240 to -20 trading days prior to the event. The fitted values of these regressions yield a predicted value of individual stock returns. I use these predicted values to calculate the abnormal returns as difference between actual and predicted returns within the event window:

$$AR_{it} = R_{it}^* - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}^* + \hat{\gamma}_i SMB_t^* + \hat{\delta}_i HML_t^*) \quad (1.2)$$

where  $AR_{it}$  is the abnormal stock return for stock  $i$  on day  $t$ .  $\hat{\alpha}_i$ ,  $\hat{\beta}_i$ ,  $\hat{\gamma}_i$ , and  $\hat{\delta}_i$  are the fitted coefficients from the estimation window.  $R_{it}^*$ ,  $R_{mt}^*$ ,  $SMB_t^*$ , and  $HML_t^*$  are the respective returns on day  $t$  within the event window. The abnormal returns for individual securities are first aggregated across the trading days of the respective event window and then aggregated across securities. This yields mean cumulative abnormal returns (mean CARs) for the entire sample:

$$CAR_i = \sum_{t=D_1}^{D_e} AR_{it} \quad (1.3)$$

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<sup>46</sup> Cf. Campbell, Lo, and MacKinlay (1997) for an excellent technical introduction to the event study analysis and Binder (1998) for a discussion of the methodology.

<sup>47</sup> I use the German market index provided by Datastream.

<sup>48</sup> Cf. Fama and French (1993) and the appendix for how these portfolios are constructed and for the results of fitting equation (1.1) by ordinary least squares to the portfolio of Berlin securities.



$$mean\ CARs_{(D_1, D_e)} = \frac{1}{n} \sum_{i=1}^n CAR_{i,(D_1, D_e)} \quad (1.4)$$

where  $D_1$  and  $D_e$  denominate the first and the last day of the event window, respectively. If the event of the government location decision affects the Berlin sample and the entire market in the same manner, then individual and cumulated abnormal returns should be equal to zero. If the mean cumulative abnormal returns for the Berlin sample are different from zero, this difference is assumed to be induced by the government location decision.

### 1.4.2 Estimation results

The event day ( $t = 0$ ) is June 20, 1991, the day the location decision was taken. The respective event windows begin one day after the event day ( $t = 1$ ). The relocation decision was taken on June 20, 1991 at 21.47pm, which made it impossible to trade on the information on the event day. I analyze the cumulative abnormal returns (CARs) for three different event windows: two (+1, +2), five (+1, +5), and ten (+1, +10) trading days following the decision. The two-day event window is the event window of main concern. Effects on stock prices that can be attributed to the relocation decision should be realized within two trading days. The longer the event window, the more likely it is that the effect of the relocation decision is confounded with other, stock-specific, effects. I, however, consider results for longer event windows as well, in order to assure that there is no immediate reversal of results. The calculation of t-statistics uses the variance of cumulative abnormal returns across securities during the event window.

Table 1.3 provides the baseline results of the Three-Factor Model analysis. The sample of firms with at least one headquarters in Berlin displays almost 3 percent mean cumulative abnormal returns within the two trading days following the relocation decision. The results are statistically significant different from zero on the 99 percent level of confidence. 77.8 percent of the securities in the sample display positive CARs (Positive CAR (%)) for the two-day event window. The mean CARs are lower after five trading days, but even higher after ten trading days. Results for the five- and ten-day event window are statistically significant different from zero on the 95 percent level of confidence. The share of positive CARs are to some extent weaker for the five- and ten-day event window, but still confirm that the results are not driven by a few outliers in the sample.

Firms with headquarters in Berlin in 1991 experienced a striking increase in their values, which can be attributed to the fact that in the future they would be located next to the German government. The results are driven by a broad share of the sample and not merely by a few outliers. Moreover, there is no evidence for a reversal of this gain. This strongly suggests that the location of firm headquarters in the same city where the government resides positively contributes to firm values.

### 1.4.3 Event-induced effects on market values

On average, firms with headquarters in Berlin experienced high abnormal returns. In this subsection, I show how these abnormal returns translate into changes in market value. Naturally, the firms in the Berlin sample differ in size and in their individual abnormal return. The results on the mean CARs of the sample are calculated for equally-weighted securities. In order to calculate event-induced average changes in the market value of the sample, I multiply the market value of each firm on June 20, 1991, with its respective CAR. This product yields the event-induced change in market value for each individual stock. I then add this product to the individual market values of June 20, 1991, take sample means for each event window, and compare them to the sample mean on June 20, 1991. The resulting differences in mean market value on the event day and mean market value of the respective event window are, by assumption, induced by the relocation decision. Table 1.4 summarizes how the mean market value of the Berlin sample is affected by the relocation decision. The mean market value is almost 2.5 percent higher within just two trading days. This change amounts to more than 5 percent after ten days. The changes in mean market value are very similar in magnitude to the mean cumulative abnormal returns of the sample. This shows that it is not a few large or small firms that drive the results, but that the gains are rather balanced across the sample.

### 1.4.4 Effects on the Bonn-Cologne metropolitan area

A natural question to ask is whether firms with headquarters located near Bonn suffered from negative abnormal returns to a similar degree as Berlin-headquartered firms did benefit. I analyze the sample with firms that had at least one headquarters in the Bonn-Cologne metropolitan area at the time.<sup>49</sup> This yields a sample of 29 securities of publicly traded firms. The results of the Three-Factor analysis for this sample are shown in table 1.5. The mean CARs have the expected negative sign for all three event windows. However, the magnitude is much lower compared to the Berlin sample, and the results are statistically not significant. For the two-day window of main concern, the median shows a negative sign, and the share of securities with negative CARs is higher than the share of positive CARs. This could be interpreted as evidence of a negative impact of the relocation decision on Bonn-Cologne-headquartered firms. Still, the results are rather weak.

There are several explanations for why I do not find strong negative abnormal returns for the Bonn-Cologne region. The proposal in favor of Berlin as the seat of the government that won the vote in the German parliament offered several compensations to the Bonn region in case of a government relocation. These included financial transfers, some of the government departments staying in Bonn, and the location of international institutions in the region. This could have, at least partially, compensated for the “loss” of the government and have confounded the effects of the relocation decision for the Bonn-Cologne region. Another explanation comes from the fact that the firms from the Bonn-Cologne region had more than four decades to establish ties with

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<sup>49</sup> Cologne is the closest large city to Bonn with a distance of around 25 km as the crow flies.

high-ranking politicians. It is rather unlikely that these ties ceased to exist, once the respective politicians moved to Berlin.

#### **1.4.5 Effects on other large German cities**

Were there any effects on firms with headquarters in large cities other than Berlin and the Bonn-Cologne region? It is important to assure that there was no general tendency for firms with headquarters in large cities to react in a similar fashion to the relocation decision. In addition, it is interesting to check if the West German ministers' fear of loss of influence, due to a government relocation to Berlin, was confirmed by value effects on other West German firms. Table 1.6 provides mean CARs for firms with headquarters in Hamburg, Munich, and Frankfurt, the largest German cities besides Berlin and Cologne. For all event windows the magnitude of the mean CARs is considerably lower than for Berlin-headquartered firms. The high magnitude of abnormal returns seems to be specific to Berlin and not a large city phenomenon. While firms with headquarters in Hamburg and Frankfurt suffered from negative mean CARs within the two-day event window, Munich-headquartered firms experienced on average positive abnormal returns. The t-statistics for all three samples are significant on a 95 percent level of confidence. This is not necessarily surprising, as stock price comovements of firms with headquarters in the same city have been described in the literature, though on a more long-term horizon (Pirinsky and Wang 2006). Within the five- and ten-day event window, all three city samples show negative mean CARs. It is, however, hard to tell whether this can be read as confirmation of the before mentioned fear of West German politicians.

#### **1.4.6 Effects from the Unification Treaty**

The negotiations of the Unification Treaty that arranged the accession of East Germany to West Germany began on July 6, 1990. As pointed out in section 2, East German politicians wanted to establish Berlin as seat of the government in the Unification Treaty. This position was opposed by the West German ministers. They preferred to maintain the government in Bonn and would not have approved the Unification Treaty if it had adopted the East German position. As a consequence, the first draft of the treaty as well as its final version included article 2, which stated that the capital of Germany was Berlin and that the issue of where the government seat should be located would be decided after the completion of the German unification. This should have been a huge disappointment for those expecting the government to move to Berlin.

Prior to the negotiations, a conceptual distinction between capital and seat of government was not considered. The compromise in the treaty was driven by the opposition of West German politicians. This increased the likelihood that, if a decision regarding the government location was to be taken in the parliament of the unified Germany, the vote would not be in favor of Berlin. West German politicians formed the majority in the parliament. Therefore, the solution regarding the government location, proposed by the Unification Treaty, should have been detrimental to any expectations of Berlin becoming the seat of the government. This should have been reflected in the financial markets.

Figure 1.3 plots the cumulated abnormal returns of the Berlin sample for the period of the negotiations and completion of the Unification Treaty. The returns decreased to some extent once the negotiations began. However, there was an increase in the days prior to the announcement of the first draft. In the weeks following the announcement, returns decreased, and the decrease was strongly accelerated once the treaty was signed. This pattern confirms the intuition that Berlin-headquartered firms were sensitive to news regarding the government location and, in particular, suffered from relative value losses following the disclosure of the content of the Unification Treaty.

One caveat may weaken this result. On August 2, 1990, Iraq began their invasion of Kuwait. This marked the beginning of the Gulf War. While there is no particular reason to believe that Berlin-located firms should have been affected differently by the invasion than other German firms, this constitutes an event that may have superposed the effects from the negotiations of the Unification Treaty.

#### **1.4.7 The government location decision in 1949**

In this subsection, I provide further evidence that German firm values are sensitive to whether headquarters are located in the same city as the government. Following World War II, Germany was divided into four occupation zones. In 1949, West Germany had to decide on a seat for its government, since the hitherto German capital, Berlin, was located in the Soviet occupation zone. This event resembles the relocation decision in 1991. The decision on the government location was taken between the two cities of Bonn and Frankfurt. A close vote in the German parliament decided in favor of Bonn.

Berlin had been the capital city of the German Empire since its foundation in 1871. The surrender of Germany on May 8, 1945, marked the end of this era. Germany was divided into four occupation zones. Berlin was located in the Soviet occupation zone, the most eastern one. However, only the eastern part of Berlin was controlled by the Soviet Union. Its western part was split into three occupation zones, corresponding to the three occupations zones in Western Germany, which were occupied by the United States, Great Britain, and France. Soon after the war, the tension between the Soviet Union and the occupants of the western zones accelerated fiercely. The politics of the Soviet Union in their occupation zone, the Allied Control Council,<sup>50</sup> and on international conferences differed considerable from those of the other occupants. This complicated the task of finding a postwar order for the entire Germany. As a result, US politicians and economic specialists began to ask for a West German entity in 1947. At the London conference in February/March and April/July, 1948, the secretaries of state of Belgium, France, Great Britain, Luxembourg, the Netherlands, and the United States agreed on the “London recommendations”. These cleared the way for the elaboration of a constitution for a West German state. On April 16, 1948, the three western occupants agreed on the US Marshall plan, and they enacted a currency reform on June 20, 1948. Both reforms merely applied to the Western occupation zones. The Soviet Union reacted to this unilateral policy-making by the Western allies by withdrawing from the

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<sup>50</sup> The Allied Control Council (Alliiertes Kontrollrat) was installed by the occupying powers as the primary governmental power after the end of World War II.

Berlin city commander's office<sup>51</sup> on June 16, 1948, and by initiating the Berlin blockade on June 24, 1948.

On July 1, 1948, the prime ministers of the German Länder received the declarations of the London conference. These so-called “Frankfurt documents” empowered them to summon a constituent assembly in order to establish a federalist type of government. The Parliamentarian Council (Parlamentarischer Rat) was formed to carry out this task. The council met for the first time on September 1, 1948. On August 13, 1948, the prime ministers of the West German states voted for Bonn as the seat of the council. Whether Bonn should also stay the preliminary seat of the council and the future German parliament, remained an open question. The German cities of Frankfurt, Kassel and Stuttgart competed with Bonn for this position, although, the final vote was between Bonn and Frankfurt. On May 10, 1949, the Parliamentarian Council decided with 33 to 29 votes that Bonn, and not Frankfurt, should be the preliminary seat of the West German political institutions. However, the decision was preliminary and the issue remained highly controversial. The definitive decision was taken on November 3, 1949, by the German Federal Parliament (Deutscher Bundestag).<sup>52</sup> The parliament refused the proposal that the preliminary seat of the leading political entities should relocate to Frankfurt with 200 to 176 votes.<sup>53</sup>

The evaluation of firm value effects focuses on this final decision on November 3, 1949. The data analysis for this event is more complex and elaborate than for the relocation decision in 1991. Daily stock prices for 1949 are not available in digitized form. In order to perform an analysis of stock price effects, I use hand-collected stock price data from official quotation lists of the stock exchanges in Frankfurt, Dusseldorf, Hamburg, and from the *Süddeutsche Zeitung* for the stock exchange in Munich. Trade at the German stock exchanges was disrupted during the war. The stock exchanges in Frankfurt, Dusseldorf, Hamburg, and Munich opened between July 1945 and April 1946. The securities of many firms were only traded at the local stock exchange, and/ or the stock exchanges were specialized in specific industries. In addition, the stock exchange with the highest volume before the war, the Berlin Stock Exchange, did not open before July 19, 1950.<sup>54</sup> Therefore, it was necessary to collect data from all of these four stock exchanges, in order to obtain a comprehensive overview of the German stock market in 1949.

In general, the German stock market in November 1949 was very volatile. However, some stocks do not show any price changes for the entire period of observation, and others do not have prices quoted for some trading days. I exclude these stocks from my analysis.<sup>55</sup> I compile a database of 384 securities that were traded at these stock exchanges and use the data to calculate abnormal returns for firms headquartered in the Bonn-Cologne and Frankfurt area. Table 1.7 displays how the industry composition of the Bonn-Cologne and Frankfurt samples compare to the sample of the German market in 1949. The differences in representation in the different

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<sup>51</sup> The Berlin city allied commander's office (Berliner Alliierte Stadtkommandantur) was a committee of the occupying powers for the four sector city of Berlin. It was subordinated to the Allied Control Council.

<sup>52</sup> The German Federal Parliament had been elected on August 14, 1949.

<sup>53</sup> For this section, cf. Pommerin, Möller, and Feldkamp (2008).

<sup>54</sup> Cf. Rudolph (1992).

<sup>55</sup> I do not observe whether specific stocks are excluded from trading during the period. Given the volatile market, it seems likely that firms that do not show any price changes were not traded. Therefore, I exclude those stocks that do not show any price changes. I restrict the sample to those that showed at least one price change during the period of observation and have prices quoted for the trading days of interest.

industries are not too large. However, the Frankfurt sample does not include any firms from the transportation and insurance industry, and Bonn-Cologne-headquartered firms were not represented in the transportation industry. Therefore, I use industry indices instead of the market index for the calculation of abnormal returns. I compute the industry indices as equally-weighted performance indices for the stock prices in the sample of the German market. Again, I evaluate prices changes after two, five, and ten trading days. Since there is no digitized data available, I cannot construct an appropriate time series, which would be necessary for the estimation window of the Fama-French Model. I restrict the analysis to the Market-Adjusted-Return Model, using industry indices:

$$R_{it} = R_{indit} + \varepsilon_{it} \quad (1.5)$$

$$AR_{it} = R_{it}^* - R_{indit}^* \quad (1.6)$$

where  $R_{it}$  is the rate of return of stock  $i$  on day  $t$ .  $R_{indit}$  is the return of the industry index to which stock  $i$  belongs on day  $t$ . Abnormal returns for stock  $i$  are merely the difference between the actual return of stock  $i$  and the return of the index for the industry to which stock  $i$  belongs. I do merely have data points for trading days 1, 2, 4, 5, 9, and 10. Therefore, the t-statistics for the 5- and 10-day trading window are calculated with the variance from incomplete event windows. The results have to be regarded with caution. Trading in the years following the re-opening of the stock exchanges was rather irregular. While some prices show no changes for several trading days, price changes in general were highly volatile in the fall of 1949. Stehle, Wulff, and Richter (1999) report a return for German blue-chips of 152.18% for the year 1949 and that the major part of this return came about in the months September through December.<sup>56</sup> Another drawback comes from the fact that data is missing for several securities on particular days.

The results of the event study for 1949 for the Bonn-Cologne region are displayed in table 1.8. The sample shows strong positive abnormal returns in the two trading days following the government location decision. These are of very similar magnitude as those of the Berlin sample in 1991 for the relocation decision. While the results are not statistically significant, the median of the returns as well as the fact that two-thirds of the sample show positive abnormal returns confirm that a large share of firms experienced an increase in their valuation. The mean CARs are lower after five trading days, but even above 4% after ten days. However, the median decreases, as does the share of firms with positive abnormal returns. This may have been caused by the high volatility in the German market during this period. Other events may have confounded the effect of the location decision.

Table 1.9 provides the results of the analysis for firms headquartered in Frankfurt in 1949. The coefficient of mean CARs has the expected negative sign, two days after the decision. The magnitude, however, is rather low. This result is driven by two extreme outliers that show an abnormal return of about 10 and 15 percent,

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<sup>56</sup> The strong performance of the stock market in the fall of 1949 was most likely associated with the passing of two laws, the Deutsche Mark balance sheet law (DM-Bilanzgesetz) and the securities validation law (Wertpapierbereinigungsgesetz). These reduced existing uncertainties in the market.

respectively. The high magnitude of the median CAR as well as the fact that less than 30 percent of the sample show positive abnormal returns (Positive CAR (%)) confirm that the lower than expected magnitude of mean CARs is caused by outliers. The magnitude of mean CARs increases after five days and reaches 4.5 percent ten days after the event. These results suggest that the Frankfurt-headquartered firms did experience losses in their firm values, caused by the fact that the expectations of being located next to the government in the near future had been disappointed. However, given the high volatility at the German stock exchanges in the fall of 1949, it is not clear what share of this enormous loss in firm values after ten trading days can be attributed to the government location decision. Overall, the results in this section provide evidence that firm valuation is indeed sensitive to co-locating with the government.

## 1.5 Robustness

In this section, I show that the baseline results for the relocation decision in 1991 do not depend on the presented model and are not driven by industry composition effects. In addition, I provide and discuss results for different sample definitions.

### 1.5.1 Alternative models

The Fama-French Multi-Factor Model is not the only one used in practice. This subsection shows that the baseline results do not depend on the application of this specific model, but are robust to the adoption of other models. The most widely used ones are probably the Market Model and the Constant-Mean-Return Model. These can be considered special cases of the Multi-Factor Model.<sup>57</sup> This can be easily seen from the Market Model, that relates the return of stock  $i$  merely to the return of the market portfolio:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \xi_{it} \quad (1.7)$$

$$E[\xi_{it}] = 0 \quad \text{Var}[\xi_{it}] = \sigma_{\xi_i}^2$$

The variables are defined analogously to the ones of the Three-Factor Model, and the assumptions are as well correspondent. The Constant-Mean-Return Model relates the returns of an individual stock to the mean of its returns:

$$R_{it} = \mu_i + \eta_{it} \quad (1.8)$$

$$E[\eta_{it}] = 0 \quad \text{Var}[\eta_{it}] = \sigma_{\eta_i}^2$$

where  $\mu_i$  is the mean return for stock  $i$ . The models are estimated within the estimation window to obtain fitted values for the parameters of the Market Model and the mean

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<sup>57</sup> Cf. Campbell, Lo, and MacKinlay (1997) on the theoretical basics of these two models and Brown and Warner (1980, 1985) on how they compare in practice.

returns for the Constant-Mean-Return Model. These are then used to calculate abnormal returns within the event window:

$$AR_{it} = R_{it}^* - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}^*) \quad (1.9)$$

$$AR_{it} = R_{it}^* - \mu_i \quad (1.10)$$

Abnormal returns are cumulated in the same manner as in the multi-factor framework. Another, less commonly used model, is the Market-Adjusted-Return Model, presented in chapter 4.7 (daily returns are adjusted by industry indices in that particular case). It merely subtracts the return of the market index from the return of each stock within the event windows to obtain abnormal returns. I do this exercise as well for industry-adjusted returns, i.e., instead of the market index I subtract the return of the index of the industry to which stock  $i$  belongs. Table 1.10 compares the results of the application of the three models to the baseline results. They are very similar, which documents that the baseline results do not depend on the application of a specific model. Moreover, for the two-day event window of main interest, the mean CARs calculated with the Market Model and the Constant-Mean-Return Model are higher than those for the Three-Factor Model. My baseline results, therefore, constitute a lower bound.

## 1.5.2 Industry composition effects

A major concern regarding the baseline results may be that they are driven by industry composition effects of the Berlin sample. If individual industries perform significantly different from the market within the respective event windows, then an over- or underrepresentation of these industries in the Berlin sample may drive the results. Cumulative abnormal returns of individual securities that are calculated with respect to the market index may be over- or understated. Although the industry composition of the Berlin sample compares fairly well to the composition of the entire market, there still remain some differences.

I address these concerns by using industry or sector indices instead of the market index for the calculation of CARs. Datastream provides indices on the industry and sector level for the German market, as classified by the Industry Classification Benchmark (ICB). While for some securities only the respective industry index is available, for others there exist indices even at the subsector level. I modify the Three-Factor Model by substituting the respective industry index for each stock for the market index when calculating individual CARs. Industry indices are provided by Datastream for all securities. In a second check, I repeat this exercise, but substitute the most detailed index for each stock for the market index. For some securities this will be the industry index, for others the index on a more detailed level. Equation (1.11) and (1.12) state the respective modifications:

$$R_{it} = \alpha_i + \beta_i R_{indit} + \gamma_i SMB_t + \delta_i HML_t + \varepsilon_{it} \quad (1.11)$$

$$R_{it} = \alpha_i + \beta_i R_{secit} + \gamma_i SMB_t + \delta_i HML_t + \varepsilon_{it} \quad (1.12)$$



where  $R_{indit}$  is the return of the industry index to which stock  $i$  belongs on day  $t$ , and  $R_{secit}$  is the equivalent for the most specific sector index available to which stock  $i$  belongs. The assumptions and variable definitions are the same as for the baseline Three-Factor Model. I calculate individual abnormal returns following the same procedure as for the baseline calculations and then cumulate these abnormal returns as before. The mean CARs for the Berlin sample are displayed in table 1.11. The results differ only slightly from the benchmark results in table 1.3. Again, the benchmark results constitute a lower bound. In any case, the analysis shows that the results obtained with the market index as benchmark are not driven by a bias in industry composition of the sample.

### 1.5.3 Different definitions of the sample

In the analysis so far, the baseline sample comprises all publicly traded German firms that had at least one headquarters in Berlin in 1991. This applies to groups 1) to 2) as defined in section 3. I choose this definition for the baseline sample because of the intuition that firms, in order to benefit from geographic proximity to the government, should have their leading decision-makers, i.e., their headquarters, located close to the politicians. The mere location of a corporate seat does not convey information on whether there is any firm employee located there. However, as pointed out in section 3, for several firms the *Handbuch der deutschen Aktiengesellschaften* provides information on the location of the corporate seat and the headquarters. In this section, I make use of this information and provide results for differing definitions of the sample.

Panel A) of table 1.12 provides results for the sample of firms that had a corporate seat in Berlin in 1991, but their headquarters and/ or another corporate seat in a different German city. This applies to group 3) as defined in section 3. The sample includes all firms that can be linked to Berlin by their corporate seat, but do not enter the baseline sample because of the before mentioned intuition. From the information provided by the *Handbuch der deutschen Aktiengesellschaften* it is hard to tell how strongly linked these firms were to Berlin, i.e., how many and what type of employees were located in Berlin. The mean CARs within the two-day event window amount to about one percent, but are statistically not significant. The share of securities with positive CARs (Positive CAR (%)) is slightly above 50 percent. The results for the five- and ten-day window are similar. While there seems to be a positive effect on firms with corporate seat in Berlin in 1991, this effect is not very strong. The results confirm the intuition that what matters, in order to benefit from geographic proximity to the government, is the location of the headquarters.

Panel B) of table 1.12 displays the results for the sample of firms that had their corporate seats and headquarters exclusively in Berlin in 1991. This applies to group 1) as defined in section 3. Naturally, this sample is a subsample of the baseline sample. The sample displays even higher mean CARs for each of the three event windows than the baseline sample. Again, this result confirms the intuition that those firms that were most likely to have their decision-makers in Berlin in 1991, were those that benefited the most from the government relocation decision.

Finally, table 1.13 provides results for the entire sample of firms that can somehow be linked to Berlin, either by the location of a corporate seat or a headquarters in Berlin, or both. This applies to groups 1) to 3) as defined in section 3. Even for this

broad definition of the sample, the mean CARs within the two-day window are well above 2 percent and statistically significant different from 0 on the 99 percent level of confidence.

## 1.6 The effect of political connections

The Berlin sample comprises firms from seven different industries as defined by the Industry Classification Benchmark (ICB). Table 1.14 illustrates the industry performance within the respective event windows. There is a high variation across industries. In general, detailed inference is limited by the small sample size. Three of the seven industries are represented by only one or two securities. The fact that consumer goods (at least half of the firms in this industry were primarily active on the local market) show a very strong performance, may support the intuition that a potential increase in demand in Berlin was a driver of the results. However, this would suggest that consumer services should have fared equally well. The opposite is the case.

It is very plausible that the strong firm value effects, at least to some extent, were caused by the reduced distance to Germany's leading politicians and the improved potential to influence the policy-making process. If this was the case, then one would expect that firms that were already politically connected prior to the relocation decision, would have experienced stronger value effects than unconnected ones. Politicians that were on the board of directors of Berlin-headquartered firms should have been of high value to these firms. They supposedly gained influence within Berlin, following the government relocation. Moreover, firms of which the city of Berlin was the major shareholder should as well have benefited disproportionately. It is very likely that politicians take special care of firms that are owned by the capital city. I, therefore, define as firms with political ties those firms that had either a local politician or a politician from the federal parliament on the board of directors, or which major stake was owned by the city of Berlin, or for which a combination of these criteria applied.

Following a similar reasoning, firms should have benefited differently from improved access to politicians, depending on the sector in which they operated. Interactions with politicians are supposedly more important in lobby-intensive industries. The web page [opensecrets.org](http://opensecrets.org) provides information on the lobby-intensity of U.S. sectors, as measured by firm contributions to political parties or lobbying expenses. Among the sectors that are represented in my sample, the sectors of Finance/Insurance/Real Estate, Health & Pharmaceuticals, and Energy (Utilities in the Berlin sample) are the most lobby-intensive ones. I define firms in the Berlin sample that operated in one of these sectors as lobby-intensive.

To test whether politically connected firms or firms in lobby-intensive industries did indeed outperform other firms in the Berlin sample, I perform simple OLS regressions within the Berlin sample with the two-day cumulative abnormal returns as the dependent variable. Table 1.15 provides the results. *Political ties* is a dummy variable that takes on the value 1 if firms were politically connected as defined above (5 securities) and 0 otherwise. *Lobby-intensive* is another dummy variable that takes on the value 1 (13 securities) if the respective firm operated in a lobby-intensive sector as defined above and 0 otherwise. *Market value* is the absolute market value in Deutsche Mark. The hypothesis I test here is that the coefficients on *Political ties* and *Lobby-intensive* are statistically significant larger than 0. I, therefore, use the significance level

of one-sided t-tests to test the hypothesis. Regressions 1 and 2 show that the coefficient on the *Political ties* dummy is positive, very large, and statistically significant on the 90 percent level of confidence. Politically connected firms outperformed their unconnected peers by around 5 percentage points. The coefficients on the *Lobby-intensive* variable (regressions 3 and 4) show a similar pattern, though the magnitude is lower, and the coefficients are not significant. Since both of the variables have the expected sign and magnitude, in a second step, I interact them. *Pol.ties\*Lobby-int.* (4 securities) represents the interaction of the *Political ties* dummy and the *Lobby-intensive* dummy. This subsample essentially equals the *Political ties* sample, except that it excludes one firm that operated in the Industrials sector. Regressions 5 and 6 illustrate that this interaction term is very large in magnitude and statistically significant either on the 95 percent level of confidence. Firms that were politically connected and operated in lobby-intensive industries outperformed the rest of the Berlin-headquartered firms by about 7 percent within the two trading days following the relocation decision. Some caution is warranted regarding these results. All 4 firms that enter the *Pol.ties\*Lobby-int.* sample rather serve the local than the country-wide market. Therefore, the results could, at least partially, be driven by expectations of an increase in demand in the Berlin metropolitan area. Statistical inference is weak given the small sample size. However, the results suggest that firms that were more likely to benefit from the relocation decision for reasons of political connectedness, did indeed strongly outperform the rest of the sample.

## 1.7 Conclusion

Firm headquarters are highly concentrated in capital cities. Several sources of agglomeration economies can explain firms' locating in large metropolitan areas. However, whether or to what extent the presence of the national government in capital cities attracts firm headquarters remains unexplored. In this paper, I show that co-locating with the government benefits firms and provide an estimate of the effect on firm values. By analyzing a unique event, I am able to disentangle these effects from the confounding impacts of agglomeration economies. The decision to relocate the German Federal Government from Bonn to Berlin brought Berlin-headquartered firms in close proximity to the government. It was taken in summer 1991, after Germany was already unified and can be considered independent from other events in the aftermath of the opening of the Berlin Wall. Changes in the valuation of Berlin-headquartered firms, therefore, should have been triggered solely by the sudden co-location with the government.

For the sample of firms with at least one main headquarters in Berlin in 1991, I find mean cumulative abnormal returns of around 3 percent within the two trading days following the decision, using a Fama-French Multi-Factor Model. The effects are exclusive to Berlin-headquartered firms, and there is no immediate reversal of the results. The findings are robust to the application of different commonly-used event study models, and the results are not driven by industry composition effects.

Given the small sample size, I cannot exactly identify the channel via which Berlin-headquartered firms experienced an increase in their valuation. However, the strong performance of firms with existing political ties and operations in lobby-intensive sectors suggests that the improved potential for interaction with politicians

was a substantial contributor. This source is in line with the rent-seeking motive put forward by Ades & Glaeser (1995). A comparison with evidence from the political connections literature, as summarized in table 1.16, reveals that identified firm value effects are similar, though somewhat larger in the present paper. Faccio and Parsley (2009) find that firms that are headquartered in a politician's home town suffer from drops in their stock prices of up to 1.7 percent when the respective politician unexpectedly dies. Ferguson and Voth (2008) show that connected firms in Nazi Germany outperformed their unconnected peers on the financial markets by 5 to 7 percent following the coming to power of the Nazi regime in 1933. While the value effects are higher than in the present study, they are measured over a time period of two months. Fisman (2001) investigates the stock market performance of politically connected firms in Indonesia during the presidency of Suharto. For the period from 1995 to 1997, he shows that adverse rumors regarding president Suharto's state of health resulted in worse stock market performance of firms connected to the president compared to their less-connected peers. The two-day firm value effects in the present paper are somewhat higher than in other studies. This suggests that either the geographic proximity to politicians is valued more than existing ties, or that there are other factors that contribute to the increase in firm valuation.

The firms could have benefited from coagglomeration economies with the government. The number of politicians and government workers that moved to Berlin added up to several thousand, which is comparable to the size of a large firm. This could have created effects similar to those of the “million-dollar plants” analyzed by Greenstone, Hornbeck, and Moretti (2010). They find that in the years after locating a large manufacturing plant in a US county, the total factor productivity of the county's firms increased more compared to firms located in counties that did not attract the plant, but were otherwise similar. The results are stronger for firms that share the same labor or technology pool with the new plant. Ellison, Glaeser, and Kerr (2010) find that same labor market needs across firms constitutes a strong impact on coagglomeration. Headquarters typically employ highly skilled workers. It is possible that Berlin-headquartered firms benefited from the multitude of high-skilled government officials that moved to Berlin. Consequently, Berlin firms could have benefited from agglomeration economies that were strengthened by the presence of the government.

Naturally, most of the city characteristics that attract headquarters should as well be of high interest for the government. A well-functioning government needs a modern infrastructure, especially good airport facilities as well as a high level of business services. The mere promotion of these characteristics in Berlin should have been advantageous for firms. In addition, the proximity to politicians enables firms' decision-makers to shape the development of certain city characteristics in their favor. Porter (1990) emphasized the role of the government for the “diamond” that determines firms' advantages and points to the importance of influencing government policies.

Another way to interpret the strong increases in firm values comes from the former position of Berlin, as the German primate city before the end of World War II. Berlin was Germany's capital city, and more than 20 percent of incorporated firms were headquartered in the city. After the relocation decision in 1991 it became the political center again. It is likely that this improved its prospects to resume its special position within Germany. A major concern of the West German ministers prior to the relocation decision was that a megacity like Berlin would exert a stronger pull than the relatively small city of Bonn and that a move to Berlin would come along with a reinforcement of

centralization.<sup>58</sup> The vote in favor of Berlin could, therefore, be interpreted as a signal that the majority of politicians did no longer share these fears or else came to terms with them. In consequence, one would not have expected any political obstacles to the growth of the city, which should have served Berlin firms that benefit from agglomeration economies.

While it is difficult to exactly pin down which individual factor or which combination of factors caused the effects on Berlin firms, the results show that the presence of the federal government has a strong impact on firm values. It should, consequently, be considered a factor that drives agglomeration in capital cities. The evolution of the share of firm headquarters in Berlin confirms this finding. The share of headquarters in Berlin in 1991 was very low. Following World War II and the division of Germany, many West Berlin firms relocated their headquarters and corporate seats to other cities in West Germany. The results in this paper suggest that the share of firms in Berlin should increase following the relocation decision. Figure 1.4 shows that this was indeed the case. In 1991 only 3.6 percent of publicly listed German firms were headquartered in Berlin. This share increased to 9.3 percent in 2013, with no remarkable change of the share of German employment in Berlin.<sup>59</sup>

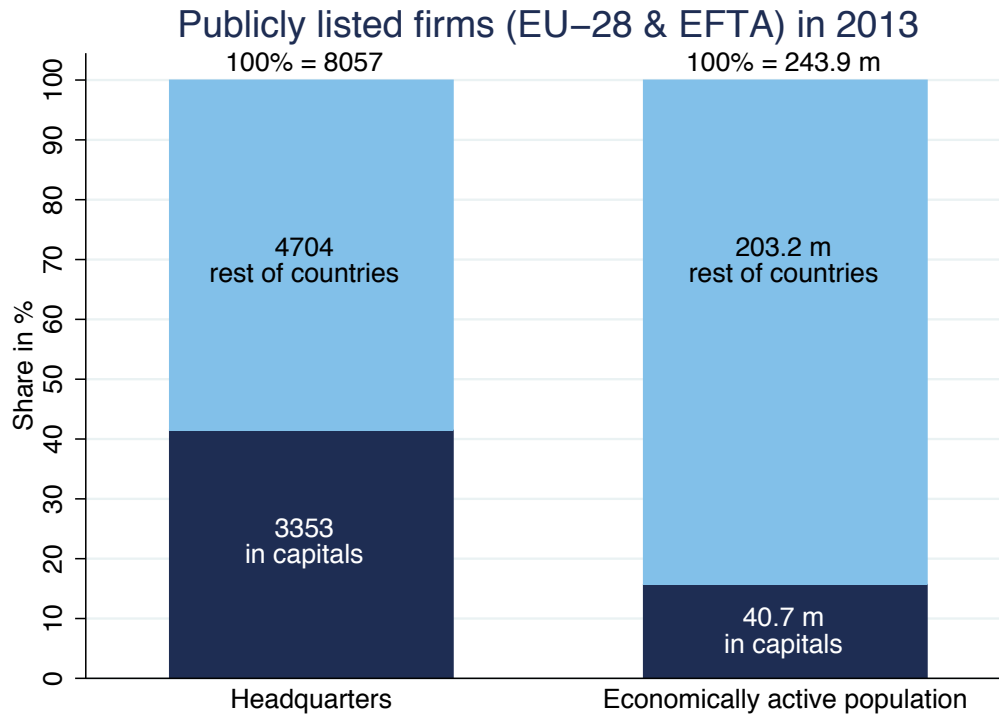
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<sup>58</sup> Cf. Schäuble (1991), p. 132.

<sup>59</sup> The sources for the data differ to some extent. The information on headquarters location for 1991 are from the Handbuch der deutschen Aktiengesellschaften (shares calculated by the author), and the data for 2013 are from Bureau van Dijk's Amadeus Database. The information on employment for both years are from the German Federal Statistical Office (available at <https://www.destatis.de>)

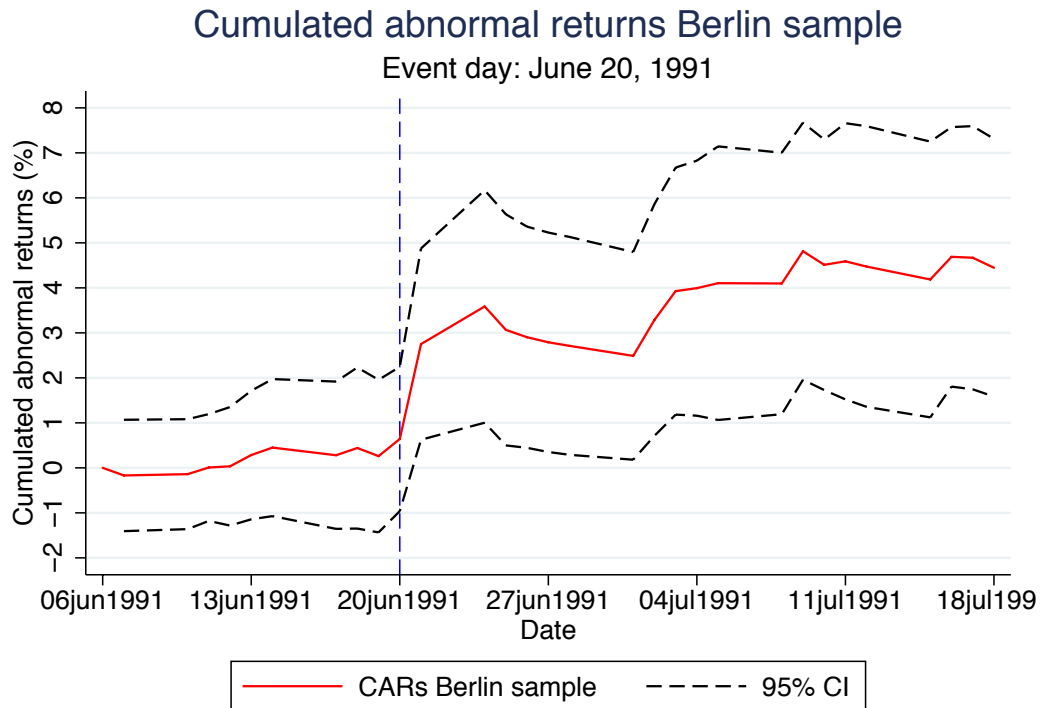
## 1.8 Figures and tables

Figure 1.1: Concentration of headquarters and population in Europe



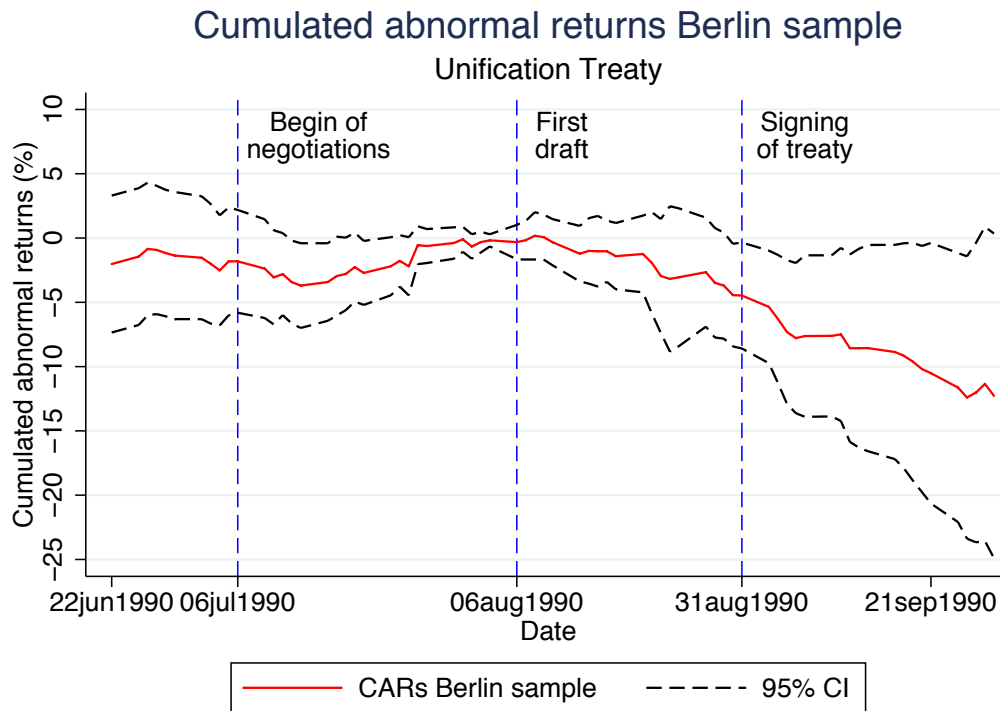
*Notes:* This figure displays the share of headquarters of publicly listed firms and the share of economically active population in European capital cities in 2013.

Figure 1.2: Cumulated abnormal returns for the relocation decision - Berlin sample



*Notes:* This graph plots the cumulated abnormal returns (solid line) and the 0.95% confidence interval (dotted lines) of the sample of firms that had their headquarters located in Berlin in 1991. The event day is June 20, 1991, the day the relocation decision was taken. The returns are plotted for the two weeks before and the four weeks following the event.

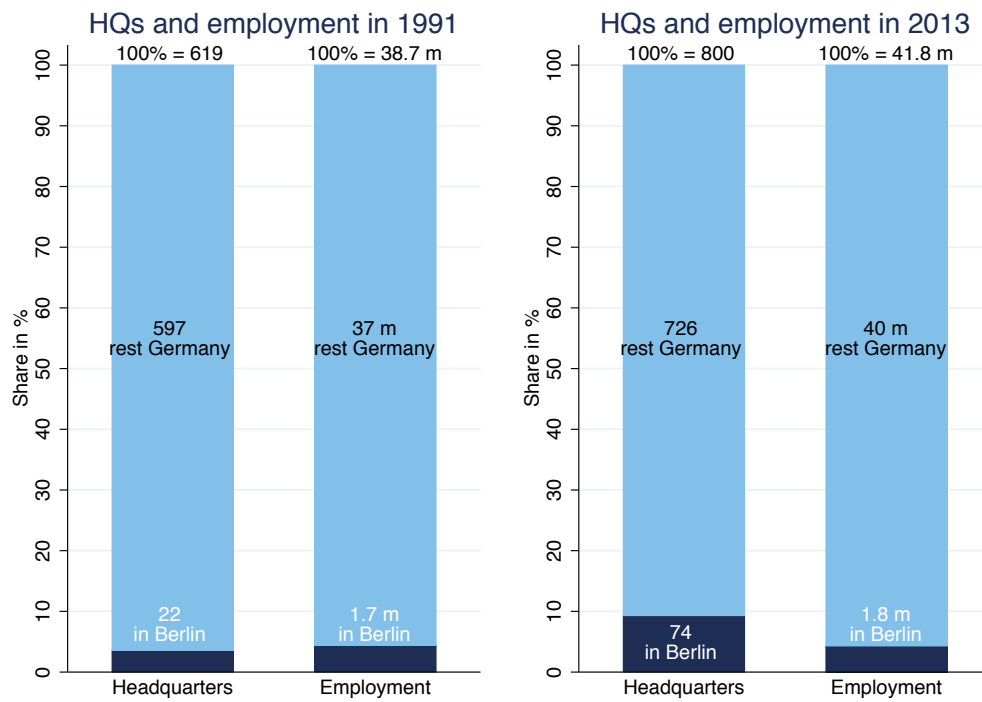
Figure 1.3 Cumulated abnormal returns for the Unification Treaty - Berlin sample



*Notes:* This graph plots the cumulated abnormal returns (solid line) and the 0.95% confidence interval (dotted lines) of the sample of firms with headquarters in Berlin in 1990. The returns are calculated with the Fama-French Three-Factor Model. The returns are plotted for the months of summer 1990 during which the negotiations of the Unification Treaty took place.



Figure 1.4: Share of headquarters of publicly listed firms in Berlin



Notes: This graph displays the share of publicly listed German firms that were headquartered in Berlin and the share of employment in Berlin for the years 1991 and 2013.

Table 1.1: Chronology of main events

1989	November 9	Opening of the Berlin Wall
1990	May 18	Treaty on the Currency, Economic and Social Union (Staatsvertrag zur Währungs-, Wirtschafts- und Sozialunion) is signed; Chancellor Kohl: "hour of birth of the free and united Germany"
	July 6	First round of negotiations of the Unification Treaty
	August 6	Completion of first draft of the Unification Treaty
	August 30-31	Final round of negotiations of the Unification Treaty
	August 31	Unification Treaty is signed
	October 3	Entry into force of the accession of the German Democratic Republic to the scope of application of the constitutional law of the Federal Republic of Germany
	December 2	First federal elections in the unified Germany
1991	April 23	Representatives of the German constitutional bodies decide that on June 20, 1991, the decision regarding the location of the government will be taken by vote in the parliament
	June 20	At 21.47pm the German parliament decides that Berlin will be the future seat of government and parliament

Table 1.2: Descriptive statistics

Panel A: Market value (MV)	Berlin firms	German market
Mean MV (million Deutsche Mark)	774.5	1019.9
Median MV (million Deutsche Mark)	230.7	172.27
Number of securities	26	779
Panel B: Industry composition		
Oil & Gas	0	1 (0.1%)
Basic materials	1 (3.7%)	71 (8.6%)
Industrials	5 (18.5%)	238 (28.9%)
Consumer goods	4 (14.8%)	185 (22.5%)
Health care	1 (3.7%)	16 (1.9%)
Consumer services	4 (14.8%)	58 (7.0%)
Telecommunications	0	8 (1.0%)
Utilities	2 (7.4%)	32 (3.9%)
Financials	10 (37.0%)	208 (25.2%)
Technology	0	11 (1.3%)
Number of securities	27 (100%)	828 (100%)

*Notes:* This table provides information on market values and industry composition for the sample of publicly traded firms with at least one main headquarters in Berlin in 1991 as well as for the entire German market. Panel A compares the mean and median market value (data on the market value is missing for some observations). Panel B shows the number and the respective share of securities that belong to a particular industry category. The classification of industries follows the Industry Classification Benchmark (ICB) created by FTSE and Dow Jones. The data are from Datastream. The information is for June 20, 1991.

Table 1.3: Mean CARs – Berlin sample

Panel A: Mean CARs			
Event window	(+1, +2)	(+1, +5)	(+1, +10)
Mean CARs	2.95%	2.15%	3.35%
t-statistic	2.83***	2.17**	2.43**
Median	2.14%	0.89%	2.52%
Positive CAR (%)	77.8%	63.0%	63.0%
Number of securities	27	27	27
Panel B: Unadjusted returns			
Event window	(+1, +2)	(+1, +5)	(+1, +10)
Berlin sample	3.22%	1.80%	1.64%
German market index	0.56%	-0.81%	-3.40%

*Notes:* Panel A of the table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had at least one headquarters in Berlin in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991. The results are calculated by applying the Three-Factor Model. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)). Panel B provides the equally-weighted, unadjusted performance of the Berlin sample as well as the market index during the event windows.

The benchmark index for the calculation of CARs is the German market index from Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.4: Event-induced market value effects

Trading days (year is 1991)	June 20	+2	+5	+10
Mean market value (million Deutsche Mark)	774.5	793.2	796.3	814.8
Change in % (with respect to June 20)		2.41%	2.82%	5.21%
Number of securities	26	26	26	26

*Notes:* This table provides the event-induced changes in mean market value of the sample of firms with at least one headquarters in Berlin in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days following the relocation decision). In order to calculate event-induced average changes in the market value of the sample, I multiply the market value of each firm on June 20, 1991 with its respective CAR. This product yields the event-induced change in market value for each individual stock. I then add this product to the individual market values of June 20, 1991, take sample means for each event window, and compare them to the sample mean on June 20, 1991.

Market value data for June 20, 1991, are from Datastream.

Table 1.5: Mean CARs – Bonn-Cologne sample

Event Window	(+1, +2)	(+1, +5)	(+1, +10)
Mean	-0.23%	-0.20%	-0.59%
t-statistic	0.66	0.38	0.81
Median	-0.26%	0.21%	0.44%
Positive CAR (%)	41.4%	55.2%	55.2%
Number of securities	29	29	29

*Notes:* This table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had at least one headquarters in either Bonn or Cologne in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991. The results are calculated by applying the Three-Factor Model. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)).

The benchmark index for the calculation of CARs is the German market index from Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.6: Mean CARs – other large German cities

Event window: (+1, +2)	Hamburg	Munich	Frankfurt
Mean	-0.88%	0.54%	-0.40%
t-statistic	2.55**	2.24**	2.67**
Median	-0.40%	0.12%	-0.30%
Event window: (+1, +5)	Hamburg	Munich	Frankfurt
Mean	-0.64%	-0.44%	-0.34%
t-statistic	1.44	1.31	0.97
Median	-0.47%	-0.22%	-0.23%
Event window: (+1, +10)	Hamburg	Munich	Frankfurt
Mean	-1.22%	-1.48%	-0.87%
t-statistic	1.49	2.88***	1.65
Median	-1.35%	-1.26%	-0.33%
Number of securities	33	41	41

*Notes:* This table provides mean and median cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had at least one headquarters in Hamburg, Munich, or Frankfurt in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991. The results are calculated by applying the Three-Factor Model.

The benchmark index for the calculation of CARs is the German market index from Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.7: Descriptive statistics (1949)

Industries	Bonn-Cologne	Frankfurt	German market
Manufacturing	18 (85.7%)	18 (90%)	327 (85.2%)
Banking	2 (9.5%)	2 (10%)	27 (7%)
Insurance	1 (4.8%)	0	14 (3.6%)
Transportation	0	0	16 (4.2%)
Number of securities	21 (100%)	20 (100%)	384 (100%)

*Notes:* This table provides information on the industry composition of the sample of publicly traded firms with at least one headquarters in the Bonn-Cologne region, in Frankfurt, and of the firms of the German market that enter the analysis in 1949.

The data on industry affiliation are from the official quotation lists of the stock exchanges in Frankfurt, Hamburg, and Dusseldorf, and the *Süddeutsche Zeitung*.



Table 1.8: Mean CARs (Market-Adjusted-Return) - Bonn-Cologne sample (1949)

Days	+2	+5	+10
Mean	3.09%	2.09%	4.01%
t-statistic	1.33	0.83	1.25
Median	1.24%	0.04%	-2.98%
Positive CAR (%)	66.7%	52.4%	42.9%
Number of securities	18	21	21

*Notes:* This table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had at least one headquarters in the Bonn-Cologne area in 1949. Results for abnormal returns are displayed for 2, 5, and 10 trading days after the decision to locate the West German government in Bonn. Event day is November 3, 1949. The results are calculated by applying the Market-Adjusted-Return Model, using the respective industry index for each individual stock. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)).

Industry indices are used for the calculation of abnormal returns. I obtain these by calculating equally-weighted performance indices for the stock prices in my sample of the German market. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.9: Mean CARs (Market-Adjusted-Return) - Frankfurt sample (1949)

Days	+2	+5	+10
Mean	-0.17%	-0.86%	-4.50%
t-statistic	0.12	0.67	2.35**
Median	-1.24%	0.07%	-3.76%
Positive CAR (%)	29.4%	52.6%	23.5%
Number of securities	17	19	17

*Notes:* This table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had at least one headquarters in Frankfurt in 1949. Results for abnormal returns are displayed for 2, 5, and 10 trading days after the decision to locate the West German government in Bonn. Event day is November 3, 1949. The results are calculated by applying the Market-Adjusted-Return Model, using the respective industry index for each individual stock. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)).

Industry indices are used for the calculation of abnormal returns. I obtain these by calculating equally-weighted performance indices for the stock prices in my sample of the German market. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.10: Mean CARs – alternative models

Event window: (+1, +2)	Three-Factor Model	Market Model	Constant-Mean- Return Model	Market-Adjusted- Return Model (Industry-Adjusted in parenthesis)
Mean	2.95%	3.10%	3.41%	2.65% (2.89%)
t-statistic	2.83***	3.01***	3.28***	2.56** (2.77**)
Median	2.14%	2.77%	2.99%	1.94% (1.94%)
Event window: (+1, +5)	Three-Factor Model	Market Model	Constant-Mean- Return Model	Market-Adjusted- Return Model (Industry-Adjusted in parenthesis)
Mean	2.15%	2.44%	2.26%	2.61% (3.00%)
t-statistic	2.17**	2.55**	2.38**	2.72** (3.16***)
Median	0.89%	1.30%	1.24%	0.81% (1.53%)
Event window: (+1, +10)	Three-Factor Model	Market Model	Constant-Mean- Return Model	Market-Adjusted- Return Model (Industry-Adjusted in parenthesis)
Mean	3.35%	3.68%	2.59%	5.04% (5.47%)
t-statistic	2.43**	2.72**	2.00*	3.79*** (4.28***)
Median	2.52%	2.76%	2.26%	4.41% (3.89%)
Number of securities	27	27	27	27

*Notes:* This table compares the results of the Three-Factor Model to the results obtained with the Market Model, the Constant-Mean-Return Model, and the Market-Adjusted-Return Model (Industry-Adjusted in parenthesis). Mean cumulative abnormal returns (CARs) for the sample of firms that had at least one headquarters in Berlin in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991.

The market index for the calculation of CARs is the German market index from Datastream. The industry indices for the calculation of the industry-adjusted returns are as well from Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.11: Mean CARs - industry/ most specific index instead of market index

Panel A: Industry index			
Event window	(+1, +2)	(+1, +5)	(+1, +10)
Mean (benchmark: industry)	3.11%	2.38%	3.53%
t-statistic	2.97***	2.40**	2.61**
Median	2.51%	0.93%	1.81%
Positive CAR (%)	81.5%	63.0%	63.0%
Number of securities	27	27	27
Panel B: Most specific index			
Event window	(+1, +2)	(+1, +5)	(+1, +10)
Mean (benchmark: most specific index available)	3.25%	2.58%	3.77%
t-statistic	3.08***	2.62**	2.78**
Median	2.64%	1.00%	1.90%
Positive CAR (%)	81.5%	70.4%	63.0%
Number of securities	27	27	27

*Notes:* This table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had at least one headquarters in Berlin in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991. The results are calculated by applying the Three-Factor Model, but instead of using the market index, the respective industry index (Panel A) or the respective most specific index available (Panel B) for each stock is adopted. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)).

The benchmark index for the calculation of CARs in panel A) is the respective industry index for each stock and for panel B) the respective most specific index available, as classified according to the Industry Classification Benchmark (ICB). The index data are from Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.12: Mean CARs - different definitions of Berlin sample

Panel A: Firms with corporate seat in Berlin, but headquarters in another German city			
Event window	(+1, +2)	(+1, +5)	(+1, +10)
Mean	0.99%	1.31%	0.88%
t-statistic	1.63	1.27	0.78
Median	0.03%	-0.31%	0.08%
Positive CAR (%)	52.6%	42.1%	52.6%
Number of securities	19	19	19
Panel B: Firms with corporate seat and headquarters exclusively in Berlin			
Event window	(+1, +2)	(+1, +5)	(+1, +10)
Mean	3.42%	2.40%	4.12%
t-statistic	2.60**	1.98*	2.75**
Median	2.35%	1.27%	1.66%
Positive CAR (%)	76.2%	61.9%	61.9%
Number of securities	21	21	21

*Notes:* This table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for different sample definitions. Panel A provides results for firms that had a corporate seat in Berlin in 1991, but their headquarters (and possibly a second corporate seat) in another German city in 1991. This applies to group 3) as defined in section 3. Panel B provides results for firms that had their corporate seat and operational headquarters exclusively in Berlin in 1991. This applies to group 1) as defined in section 3. It is a subsample of the baseline sample (“Berlin sample”- groups 1) and 2) as defined in section 3). Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991. The results are calculated by applying the Three-Factor Model. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)).

The benchmark index for calculation of CARs is the German market index as provided by Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.13: Mean CARs - all firms somehow linked to Berlin

Event window	(+1, +2)	(+1, +5)	(+1, +10)
Mean	2.14%	1.80%	2.33%
t-statistic	3.19***	2.52**	2.47**
Median	1.05%	0.14%	1.11%
Positive CAR (%)	67.4%	54.3%	58.7%
Number of securities	46	46	46

*Notes:* This table provides mean cumulative abnormal returns (CARs) and the respective t-statistics for the sample of firms that had either a corporate seat or a headquarters or both in Berlin in 1991. This applies to groups 1) to 3) as defined in section 3. The sample comprises all publicly traded firms that could be linked to Berlin by their corporate seats or headquarters in 1991. Results are displayed for three different event windows (2, 5, and 10 trading days) after the relocation decision. Event day is June 20, 1991. The results are calculated by applying the Three-Factor Model. The table also displays the sample median and the share of securities within the sample that show positive cumulative abnormal returns (Positive CARs (%)).

The benchmark index for calculation of CARs is the German market index as provided by Datastream. Log returns are used to calculate the CARs. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

Table 1.14: Mean CARs by industry

Industry	Number of securities	Event window		
		(+1, +2)	(+1, +5)	(+1, +10)
Consumer goods	4	7.00%	6.86%	12.50%
Utilities	2	5.43%	3.76%	6.39%
Financials	10	4.04%	2.88%	1.59%
Industrials	5	2.78%	1.62%	5.07%
Health care	1	-0.21%	1.76%	4.40%
Consumer services	4	-2.48%	-2.60%	-3.46%
Basic materials	1	-3.49%	-5.13%	-4.10%

*Notes:* This table provides mean cumulative abnormal returns by industry for three different event windows.

The industries are classified according to the Industry Classification Benchmark (ICB) and are from Datastream. Log returns are used to calculate the CARs.

Table 1.15: OLS regressions Berlin sample - dependent variable: two-day cumulative abnormal return (in %)

	Regression					
	1	2	3	4	5	6
Political ties	5.35*	4.99*				
	(0.059)	(0.073)				
Lobby-intensive			1.89	1.46		
			(0.21)	(0.26)		
Pol.ties*Lobby-int.					7.05**	6.77**
					(0.029)	(0.034)
Market value		-0.0003		-0.0005		-0.0004
		(0.48)		(0.44)		(0.9373)
Constant	1.95*	2.53*	2.03	2.85*	1.90*	2.52*
	(0.086)	(0.063)	(0.20)	(0.09)	(0.082)	(0.052)
$R^2$	0.154	0.153	0.032	0.030	0.224	0.231
N	27	26	27	26	27	26

*Notes:* This table provides results for OLS regressions of the two-day cumulative abnormal return (in %) on different variables.

For the indicator variables Political ties, Lobby-intensive, and Pol.ties\*Lobby-int. p-values for one-sided t-tests are presented in parenthesis. For Market value and the constant p-values for two-sided t-tests are presented in parenthesis. Standard errors are based on Huber-White heteroscedasticity-consistent estimates and clustered on the firm level. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.



Table 1.16: Comparison to results of other studies

Study	Identification	Period of observation	Firm value effects
Germany 1991: relocation of government to Berlin	HQs in Berlin vs rest of Germany	2 days	3%
Germany 1933: <sup>a</sup> coming to power of Nazi regime	Connected to Nazi regime vs unconnected	2 months	5% to 8%
Worldwide: <sup>b</sup> sudden death of politicians	HQs in politician's hometown vs market	3, 7, 11 days	-0.6% to -1.7%
Indonesia 1995 - 1997: <sup>c</sup> adverse rumors regarding Suharto's health	Most connected to Suharto	6 events, 1 to 6 days	-0.6%

*Notes:* This table provides a summary of study results that are related to the present analysis.

<sup>a</sup>Ferguson and Voth (2008); <sup>b</sup>Faccio and Parsley (2009); <sup>c</sup>Fisman (2001)

## 1.9 Appendix A: Headquarter share and share of economically active population

In this section, I analyze the share of publicly listed firm headquarters and the share of the economically active population across 106 European metropolitan areas for the year 2013.<sup>60</sup> The number of areas that enter the sample differ per country, with larger countries being overrepresented in the sample.<sup>61</sup> In order to test whether headquarters of publicly traded firms are disproportionately concentrated in capital cities, I run the following simple OLS regression:

$$HQ_{s_i} = \alpha_i + \beta_i pop_i + \gamma_i (pop_i)^2 + \delta_i D_{cap} + \varepsilon_i \quad (1.13)$$

where  $HQ_{s_i}$  is the number of headquarters located in metropolitan area  $i$ . Accordingly,  $pop_i$  is the economically active population that resides in metropolitan area  $i$ , while  $(pop_i)^2$  is the square of the economically active population in metropolitan area  $i$ .  $D_{cap}$  is a dummy variable that equals 1 if the respective metropolitan area is the capital city area and 0 otherwise. The values for  $pop_i$  and  $(pop_i)^2$  are centered around the mean of  $pop_i$ . Table 1.A1 shows the results. Regressions 1-3 include all 106 regions. The dummy for the capital metropolitan areas remains statistically and economically significant when controlling for population size. Regressions 4-6 exclude the London metropolitan area and the Ile de France (Paris and surrounding area) region. These are strong outliers in terms of population size and in numbers of headquarters. The coefficients and t-statistics of the capital city dummy do not change by much. However, the sign of the  $(pop_i)^2$  coefficient becomes negative and is no longer statistically significant. This suggests that the rather exponential than linear relationship between number of headquarters and population size, found in regressions 1-3 (positive and significant coefficient on  $(pop_i)^2$ ), is driven by the London and Ile the France region.

Figure 1.A1 illustrates the relationship between capital and non-capital regions. It shows that, in general, capital city areas a larger in terms of economically active population. However, it also demonstrates that the distribution of headquarters in capital

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<sup>60</sup> The data on firm location are from the Bureau van Dijk Amadeus Database. The population data are from Eurostat's Regional Database and reflect the economically active population in the respective metropolitan region as defined by Eurostat. The data are for the year 2013. Population data for Switzerland are from the Swiss Statistical Office (<http://www.bfs.admin.ch>) and are for year 2012. The data sources differ to some extent in their classification of metropolitan areas, which may lead to some firms being included in a specific area for which the population is excluded or vice versa. The potential deviations, however, should not be too severe and should not bias the result to a large extent. The sample includes all EU-28 and EFTA countries except Croatia, Cyprus, Iceland, Luxembourg, Malta, and Moldavia. For these countries, Eurostat does not provide sufficient population data at the metropolitan area level.

<sup>61</sup> For some countries, Eurostat provides population information for less than 3 metropolitan areas. For countries for which Eurostat provides information on less than 5 areas, I include all areas in the sample. For countries for which Eurostat provides information on more than 5 areas, I include all areas that have a population of more than 1 million, but at the most 7 areas per country.

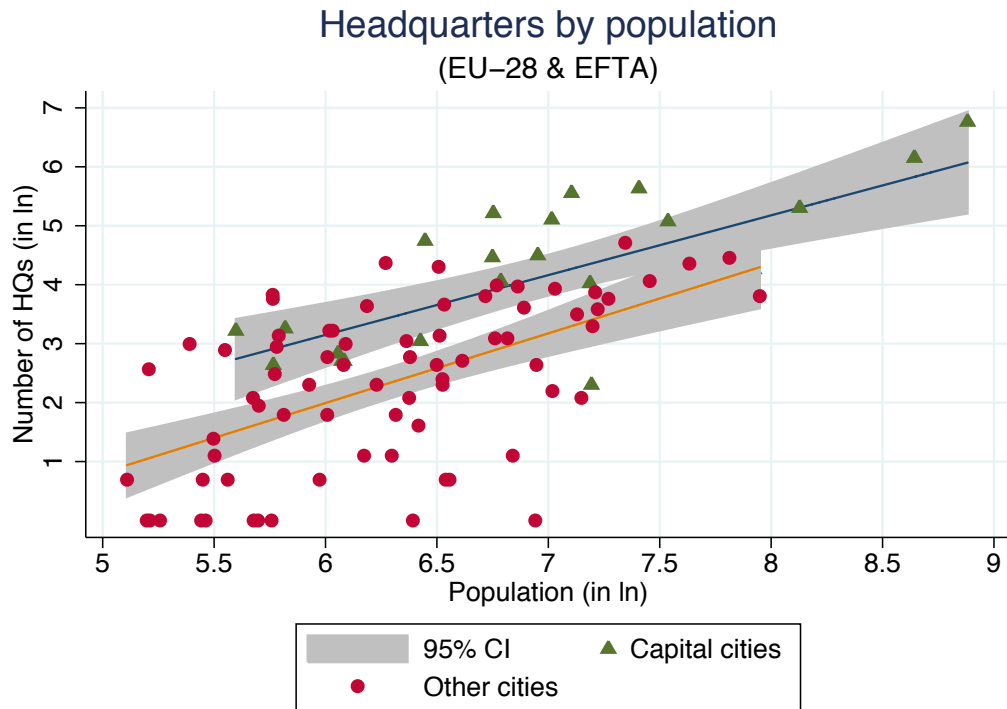
city areas lies above the distribution of headquarters in other areas for any given size of the economically active population.

Table 1.A1: OLS regressions for headquarters concentration - dependent variable: number of headquarters

	Regression					
	1	2	3	4	5	6
$D_{cap}$	108.57*** (3.01)	34.41** (2.36)	47.18*** (3.30)	63.65*** (4.10)	46.37*** (3.36)	45.88*** (3.37)
$pop_i$		0.083*** (4.22)	0.022** (2.48)		0.035*** (7.25)	0.039*** (4.14)
$(pop_i)^2$			0.00002*** (7.46)			-4.15e-06 (0.53)
Constant	20.39*** (4.84)	36.89*** (4.83)	19.57*** (3.74)	20.39*** (4.84)	27.43*** (7.42)	29.48*** (4.14)
London/ Ile de France	yes	yes	yes	no	no	no
$R^2$	0.204	0.728	0.849	0.277	0.433	0.436
N	106	106	106	104	104	104

Notes: This table provides results for OLS regressions of the number of headquarters in a metropolitan area on the economically active population in the respective area and an indicator variables on whether a specific area includes the capital city.  $D_{cap}$  is a dummy variable that equals 1 if the respective metropolitan area includes the capital city and 0 otherwise.  $pop_i$  is the economically active population that resides in metropolitan area  $i$ , while  $(pop_i)^2$  is the square of economically active population in metropolitan area  $i$ . The row London/ Ile de France depicts whether these two regions are included in the regression or not.

Figure 1.A1: Headquarters by population in Europe



Notes: The graph displays the correlation of headquarters and economically active population (both in natural logarithms) across European metropolitan areas that include the capital and other metropolitan areas.

## 1.10 Appendix B: Construction of Fama-French Three-Factor Model portfolios

Following Fama and French (1993), I split the sample into portfolios on the two dimensions size (as measured by market value) and book-to-market equity. In a first step, I rank the securities by size. I use the median market value to split the sample into two groups, one group of securities with market value above the median (big - B) and the other group with securities with market values below the median size (small - S). Then, the sample is split into three groups according to the securities' respective values for book-to-market-equity (BE/ME). The first group (low - L) is formed by the securities with the bottom 30% values for the BE/ME, the second group (medium - M) contains those with the 40% middle values, and the third group (high - H) consists of those securities with the top 30% values of BE/ME. From this partitioning into subsamples one can construct six portfolios (S/L, S/M, S/H, B/L, B/M, B/H). For each of the six portfolios, I calculate daily value-weighted returns. These six portfolios form the basis for the construction of the SMB (small minus big) and the HML (high minus low) portfolios that enter the three factor model. The SMB portfolio according to Fama and French (1993) proxies for the risk factor in returns that is related to size. Its returns are calculated by taking the daily difference between the simple average of the returns on the three portfolios that are considered small on the size dimension (S/L, S/M, and S/H) and the simple average of returns for the portfolios which contain the securities that have market values above the median (B/L, B/M, B/H). The return of the HML portfolio, which is supposed to mimic the risk factor in returns that can be related to book-to-market equity, is the daily difference between the simple average of the returns on the high book-to-market portfolios (S/H and B/H) and the simple average of returns for the low book-to-markets portfolios (S/L and B/L).

The data for the construction of the portfolios are from Datastream. I restrict the analysis to ordinary shares<sup>62</sup> and to those securities for which Datastream provides data on the market value and the market-to-book equity.<sup>63</sup> Given these restrictions, the portfolios are constructed from a sample of 319 securities. I use June 29, 1990, as the reference date for the market values and market-to-book values, respectively. As shown in Table 1.B1, about 70 percent of the variation of the portfolio of the Berlin sample can be explained by the three risk factors within the estimation window.

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<sup>62</sup> This follows the approach of Fama and French (1993).

<sup>63</sup> Datastream only provides data on market-to-book value. For the construction of the portfolios I use the inverse order of the ranking of the market-to-book value, i.e., the stock with the highest market-to-book value is considered the one with the lowest book-to-market value.

Table 1.B1: Fit of the Fama-French Three-Factor Model

	Coefficient
Constant	-0.0005623** (.0002842)
Market return	.7470555*** (.0481819)
SMB	.5079158*** (.0827066)
HML	-.2070603*** (.0731615)
R-squared	0.6970

*Notes:* This table provides the coefficients of regressing the equally-weighted portfolio of firms with at least one main headquarters in Berlin in 1991 on the three risk factors market return, SMB, and HML within the estimation window of -240 to -20 trading days prior to the event day. Event day is June 20, 1991.

The German market index is from Datastream. Heteroskedasticity-robust standard errors are in parenthesis. \*, \*\*, \*\*\* indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

## 1.11 Appendix C: List of securities of firms in Berlin in 1991

Table 1.C1: Securities of firms in Berlin in 1991

Firm name	Industry	Sector	Market value (m)	Group
Aqua Butzke Werk	Industrials	Industrial engineering	87	1
Axel Springer	Consumer services	Media	2244	1
Bastfaserkontor	Financials	Real Estate Investment & Services	18	1
Berliner Bank	Financials	Banks	1738.8	1
Berliner Elektro Holding AG	Financials	Financial services	249.4	1
Berliner Elektro Holding AG (pref. shares)	Financials	Financial services	120	1
Berliner Kindl Brauerei	Consumer goods	Beverages	224.9	1
H. Berthold	Industrials	Electronic and Electrical equipment	87.4	1
Bewag 'A'	Utilities	Electricity	1267.8	1
Deutscher Eisenhandel	Basic materials	Industrial metals & Mining	185.5	1
Fernheizwerk Neukölln	Utilities	Gas, Water & Multiutilities	36.3	1
Herlitz	Consumer goods	Household goods & Home construction	504	1
Herlitz (pref. shares)	Consumer goods	Household goods & Home construction	352.5	1
Ikon Präzisions-technik	Industrials	Industrial engineering	75.2	1
Kempinski	Consumer services	Travel & Leisure	236.5	1
Kötitzer Ledertuch- und Wachstum-Werke (pref. shares)	Financials	Financial services	970	1
Lewag Holding	Industrials	Industrial engineering	37	1
Schering	Health care	Pharmaceuticals & Biotechnology	5216.7	1
Tempelhofer Feld	Financials	General industrials	101.9	1
Zoologischer Garten Bl. (incl. aquarium)	Consumer services	Travel & Leisure	52.8	1
Zoologischer Garten Bl. (excl. aquarium)	Consumer services	Travel & Leisure	-	1

Table 1.C1 continued: Securities of firms in Berlin in 1991

Firm name	Industry	Sector	Market value (m)	Group
AEG	Industrials	Electronic & Electrical equipment	3594.4	2
Berliner Leben (reg. shares)	Financials	Life insurance	224.9	2
Brau und Brunnen	Consumer goods	Beverages	1467.7	2
Nordstern Versicherung	Financials	Non life insurance	595	2
Nordstern Versicherung (pref. shares)	Financials	Non life insurance	148.5	2
Nordstern Versicherung (reg. shares)	Financials	Non life insurance	360	2



Table 1.C1 continued: Securities of firms in Berlin in 1991

Firm name	Industry	Sector	Market value (m)	Group
Allianz	Financials	Non life insurance	42786	3
Allianz Lebensversicherung	Financials	Life insurance	11320	3
BHF Bank	Financials	Banks	2305.5	3
Deutscher Centralboden	Financials	Banks	1629.6	3
DVB Bank	Financials	Financial services	329.34	3
Hermes Kreditversicherung	Financials	Non life insurance	93.6	3
Hermes Kreditversicherung (50%)	Financials	Non life insurance	185.6	3
IKB Deutsche Industriebank	Financials	Banks	1468.8	3
Nordstern Lebensversicherung	Financials	Life insurance	900	3
O&K Orenstein & Koppel	Industrials	Industrial engineering	542.4	3
Preussag	Consumer services	Travel & Leisure	5331.9	3
Rheinmetall	Consumer goods	Automobiles & Parts	651.6	3
Rheinmetall (pref. shares)	Consumer goods	Automobiles & Parts	241.2	3
Siemens	Industrials	General industrials	32768.4	3
Vereinte Versicherung	Financials	Non life insurance	26	3
Vereinte Versicherung (reg. shares)	Financials	Non life insurance	653.6	3
Victoria Versicherung	Financials	Non life insurance	1012	3
Victoria Versicherung (50% reg. shares)	Financials	Non life insurance	816	3
Westafrik. Pflanzungsgesell- schaft "Victoria"	Financials	Real Estate Investment & Services	78.9	3

*Notes:* This table provides information on all securities of firms that could be linked to Berlin in 1991 by either a corporate seat or a headquarters, or both. The category group identifies by which institution the firms were linked to Berlin. It follows the definition given in section 3: 1) firms that had their corporate seat and headquarters exclusively in Berlin; 2) firms that had a corporate seat and a headquarters in Berlin, but another corporate seat and/ or headquarters in another German city; and 3) firms that had a corporate seat in Berlin, but their headquarters (and possibly another corporate seat) in a different German city. Information on corporate seats and operational headquarters are from *Handbuch der deutschen Aktiengesellschaften*. Data on industry affiliation and market value are from Datastream. Market values are for June 20, 1991.



## Chapter 2

# Female Empowerment and Firm Values: The Introduction of Female Suffrage in Switzerland

## 2.1 Introduction

In many countries the pool of eligible voters constantly changes.<sup>1</sup> This is driven by changes in legislation for enfranchisement or by the naturalization of immigrants who become prospective voters.<sup>2</sup> The size of a country's electorate and corresponding changes in its composition have a systematic impact on policy-making of support-maximizing politicians. Franchise extensions that change the position of the decisive voter in the income distribution lead to increases in the size of the government (Meltzer and Richard 1981).<sup>3</sup>

Personal income is merely one dimension on which the position of the median voter may vary. In general, a newly enfranchised group is likely to differ from existing voters not only in terms of income but also in preferences regarding other policy variables. Legislators will respond to alterations in the distribution of policy preferences of the electorate. These can be adjustments in the size and scope of government spending or the regulation of specific industries, technologies, or products. These adjustments can have far-reaching consequences for individual firms. For instance, if a newly enfranchised group pressures the government to increase spending in a particular sector, then firms operating in that sector are likely to be better off following the franchise extension. On the other hand, if the new voters oppose a specific technology more than the preceding electorate, then this could generate laws and regulations that have adverse effects for firms working with that specific technology. If firms are indeed affected by variations in the electorate in such way, then decision-makers in these firms should anticipate and react accordingly to the impacts on their respective business areas.

In this paper, I analyze an historical event to quantify the value effects on firms from a large franchise extension. I study a unique setting, the introduction of female suffrage in Switzerland. Voting rights were granted to women by means of a referendum on February 7, 1971. At the time of the referendum, income differences between men and women in Switzerland were substantial (Abrams and Settle 1999). In

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<sup>1</sup> Beginning in the nineteenth century several countries experienced a transformation towards democracy. The Great Reform Act of 1832 that extended the franchise to a larger share of the population of Britain “is seen as a watershed” in this process (Aidt and Franck 2013). The following Second and Third Reform Act extended the franchise further. In the North German Confederation, Bismarck introduced equal manhood suffrage in 1867 and did so again in the unified Reich in 1871. The years following these reforms were marked by several social reforms with considerable consequences for taxation and public spending.

<sup>2</sup> From 2004 and 2013, on average more than 700,000 immigrants were naturalized every year in the United States (Yearbook of Immigration Statistics: 2013 Naturalizations).

<sup>3</sup> The distribution of income is generally skewed to the right, which means that mean income lies above the median income. Franchise extensions, at least in the past, typically included more voters with income below the mean. They have a higher incentive for redistribution of income. Therefore, franchise extensions should result in more redistribution and, accordingly, in an increase of the size of the government.

addition, the literature has identified significant differences in preferences on many policy relevant dimensions between women and men (e.g. Shapiro and Mahajan 1986, Lott and Kenny 1999, Edlund and Pande 2002, Funk and Gathmann 2015). These differences should have had a marked impact on Swiss government spending as well as on Swiss politics after 1971. I evaluate the findings of the literature to form hypotheses on which Swiss firms were expected to gain or be adversely affected by the introduction of female suffrage.

Naturally, it is difficult to determine to what extent the enfranchisement caused differences in the performance of firms in the more than 40 years following the referendum. Many factors unrelated to the enfranchisement may confound such effects on firm performance. In order to tackle this issue, I analyze changes in firm valuation via security price changes in financial markets. Rational agents incorporate new information instantly in their valuation of assets. This is observable in prices in financial markets. Therefore, if the introduction of female suffrage in Switzerland had effects on particular firm valuations, this should have shown in security prices immediately following the referendum. I analyze financial market reactions of publicly listed firms in Switzerland around the time of the referendum to test the hypotheses. If markets are rational, then expected firm value effects could have been measured in the market once the results of the referendum became public.

The evaluation of the literature leads to the predictions that firms generating nuclear energy or promoting its use, firms in the tobacco and brewery business, as well as insurance companies and weapon producers should suffer from the political empowerment of women. On the other hand, firms that operate in the health and pharmaceuticals business, as well as firms that deal with non-nuclear, environmentally sound energy should benefit.<sup>4</sup> This latter group of firms indeed strongly outperforms in financial markets. Within the two months following the referendum, these firms, on average, gain about 6.5 to 7.5 percentage points more in value than the Swiss market. In contrast, firms that are identified to be negatively affected experience a performance that is 3 to 3.5 percentage points worse than the market.

Figure 2.1 shows the cumulated returns of these two samples of firms. The graph depicted “Winners” represents the cumulated weekly average returns of the sample of Swiss firms that are expected to benefit from the political empowerment of women. The graph “Losers” accordingly represents the returns for those firms that are expected to be adversely affected. In the two months prior to the referendum there was hardly any difference in performance between the two samples. In addition, the performance of the two samples was very similar to the performance of the entire Swiss market. However, in the two months following the referendum, the “Winners” sample strongly outperforms the market sample, while the “Losers” sample performs substantially worse than the market. The performance patterns of the samples strongly suggest that the enfranchisement of women in Switzerland caused substantial value effects across different firms.

The introduction of female suffrage in Switzerland provides a very good setting to identify firm value effects caused by franchise extensions. On February 7, 1971, the eligible Swiss voters, men of full age, decided in a referendum to grant the right to vote on federal ballots to Swiss women. This provides a clear-cut date for the dissemination of information of female political empowerment. An additional advantage of this setting

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<sup>4</sup> Cf. Section 4 for the development of the hypotheses.

is the large size of the newly enfranchised group and its marked differences in various socio-economic characteristics and preferences from the existing electorate. This assists in identifying significant effects on firms. Today, changes in the electorate are rather smooth and of lower magnitude. Impacts on firms would be much more difficult to identify. Switzerland was one of the last countries in Europe to extend the franchise to women. The relatively late adoption of female suffrage has the benefit that it took place during a period that was not confounded by other major political or economic events. In most European countries, female suffrage was introduced in the first half of the 20th century, a period with a multitude of major events and respective confounding factors.

This paper relates to several strands of literature. Many studies analyze preference differences between men and women and their respective consequence for policy outcomes. Lott and Kenny (1999) find that women's suffrage produced a much more liberal Congress in the United States. They also report that women dominated the temperance movement and find strong evidence that female enfranchisement directly led to the implementation of prohibition laws.<sup>5</sup> Shapiro and Mahajan (1986) evaluate U.S. surveys between 1952 and 1983 and find strong gender differences for force/violence issues.<sup>6</sup> They also report that women show more support for spending on education and welfare.<sup>7</sup> In addition, U.S. women have expressed stronger opposition than men to nuclear power plants and more support for banning cigarette advertising and sales. Funk and Gathmann (2015) analyze gender gaps in policy preferences in Switzerland by evaluating surveys conducted shortly after federal ballots between 1981 and 2003. They find that female voters care more about the environment, public health, social welfare and are more skeptical than men regarding nuclear energy or the military.<sup>8</sup>

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<sup>5</sup> Chaney, Alvarez, and Nagler (1998) analyze the gender gap in U. S. presidential elections between 1980-1992. They find that women have consistently shown more support for Democratic presidential candidates than have men, and that women, in general, have more liberal beliefs about issues than men. In a similar fashion, Edlund and Pande (2002) describe a rise in the political gender gap in the United States during the last decades of the 20th century with more women favoring the Democratic party than men. They argue that this development is driven by a decline in marriage, which made men richer and women poorer.

<sup>6</sup> These issues are, e.g., issues such as defense, troop levels abroad, capital punishment, and gun control. Gender differences amount to an average of 8 percentage points and are almost completely due to men selecting more violent options than women.

<sup>7</sup> Carnaghan and Bahry (1990) find similar results for former Soviet citizens who arrived in the United States in the late 1970s/ beginning of the 1980s. Soviet women show more support for social and welfare spending, but are more opposed than Soviet men to higher defense outlays. Wirls (1986) analyzes the NORC General Social Survey from 1974 to 1984. He finds a consistent gender gap regarding opinions on government spending, with more men than women stating that the U.S. government spends too much on welfare and environment and too little on defense. Deitch (1988), using essentially the same data for a similar time period, confirms that U.S. men were more opposed to government spending than women during the period 1973 to 1974. Miller (1988) analyzes data from the National Election Survey for 1980 and 1984. He states that U.S. men are more in favor of decreasing government services and increasing defense spending than women. Norris (1988) exploits the Eurobarometer for 1983 and finds that for several countries in Europe men were more in favor of development of nuclear power than women. In addition, women were on average more pacifist than men on the issue of defense.

<sup>8</sup> For theoretical predictions, see Doepke, Tertilt, and Voena (2012) and Doepke and Tertilt (2014) who analyze the interaction between economic development and the expansion of women rights. For a related issue, see Chattopadhyay and Duflo (2004) who find that mandated representation of women in India affects policy decisions. Female leaders that were elected under the representation policy choose policies that better reflect the preferences of women.

Other scholarship provides empirical evidence that the extension of the franchise to women affected the scale and scope of government spending. According to Miller (2008), women's suffrage in the U.S. is associated with moderate increases in total municipal spending and spending on health conservation and sanitation. Moreover, women's suffrage led to strong increases in spending for charities, hospitals, and corrections.<sup>9</sup> Lott and Kenny (1999) show that the introduction of female suffrage in U.S. states coincided with increases in state government spending and revenue. They suggest that the large increases in spending on education, sanitation, and hospitals have been driven by the influence of female voters. Aidt and Dallal (2008) confirm an increase in social spending following the introduction of female suffrage in six Western European countries over the period 1869 to 1960.<sup>10</sup> Bertocchi (2011) shows in a cross-country analysis for the period 1870-1930 that the presence of women's suffrage had positive and significant impacts on pension expansions per GDP and health expenditures per GDP.<sup>11</sup> While Abrams and Settle (1999) provide evidence that the introduction of female suffrage in Switzerland increased social welfare spending as well as the overall size of the Swiss government, Funk and Gathmann (2007) state that female voters rather affected the scope of the government than its size.<sup>12</sup>

Several studies theoretically analyze the motives that induced the ruling elite to extend the franchise. Acemoglu and Robinson (2002), considering the fundamental reforms in Britain in the 19th century, argue that elites granted voting rights to a larger share of the population to avoid social unrest and revolution. In a similar fashion, Conley and Temimi (2001) identify credible threats of social unrest and social disobedience of the disenfranchised as the main motive for franchise extensions. Lizzeri and Persico (2004) argue that politicians want to improve the quality of political institutions. This can be accomplished by enlarging the franchise, which provides better incentives for politicians. Llavador and Oxoby (2005) see the cause for the enfranchisement of specific groups in conflicting parties among the elites. These parties seek the support of disenfranchised groups for the implementation of their preferred policies. Braun and Kvasnicka (2013) show that a low share of women was a crucial driver for the introduction of female suffrage in U.S. states between 1869 and 1919. A low female to male ratio reduced the political costs and risks for the men who were granting the suffrage.<sup>13</sup>

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<sup>9</sup> He finds that the greater local public health spending fueled hygiene campaigns, which decreased deaths from leading infectious childhood killers.

<sup>10</sup> Aidt, Dutta, and Loukoianova (2006) find that the introduction of female suffrage in different European countries weakly increased government expenditures through spending on health, education, and welfare.

<sup>11</sup> She does, however, not find significant impacts on welfare expenditures per GDP nor on housing expenditures per GDP.

<sup>12</sup> Funk and Gathmann (2007) find that Swiss women favor higher government spending for the environment and public transport, but oppose expenditures for defense and subsidies for the agricultural sector. However, they do not find strong evidence that women support a general increase in government spending more than men. Stutzer and Kienast (2005) even find a negative impact of female suffrage in Switzerland on total government expenditures. Cavalcanti and Tavares (2011) find strong evidence for a causal link between female market participation and government size. Krogstrup and Wälti (2011) analyze the impact of female enfranchisement in Switzerland on government budget deficits by making use of the time variation in female enfranchisement across the Swiss cantons. They find a relation between the introduction of female suffrage and lower budget deficits after a time lag of about ten years.

<sup>13</sup> Bertocchi (2011) presents a politico-economic model to explain the extension of the franchise to women. In her framework, the tax rate under a regime of universal suffrage is higher than under mere male suffrage because of differences in wages and preferences for public goods across genders. This tax

My work contributes to the existing literature by evaluating the consequences of franchise extensions on a more disaggregated level. Granting voting rights to previously disenfranchised groups can have substantial impacts on policy-making. If changes in scale and scope of government spending and legislation will affect particular business areas differently, then firms' decision-makers have to be aware franchise changes and adapt their strategies. This paper shows that there are indeed substantial value effects across different firms in the country. I analyze a historical case, and naturally, enfranchisements of such dimension do no longer take place these days. However, electorates continuously change and the results in this paper suggest that this should be an important consideration for firm decision-making.

The rest of the paper is structured as follows. Section 2 briefly summarizes the historical background of the introduction of female suffrage in Switzerland. In section 3, I develop the hypotheses to determine which Swiss firms should have been affected by the franchise extension. The data and methodology are described in section 4. Section 5 presents and discusses the results, and section 6 concludes.

## 2.2 Historical background

On February 7, 1971, Swiss eligible voters, the Swiss male population, decided in a referendum to introduce female suffrage in the country. This extension of the electorate took place very late compared to other countries. It does not, however, mean that the political empowerment of women was not an issue before in Switzerland. Political parties were promoting voting rights for women as soon as the beginning of the 20th century. In 1918, two motions that demanded the introduction of female suffrage were brought forward to the National Council (Nationalrat), though without success. The cornerstone in the process of the franchise extension was the *Petition of the Swiss Association for Female Suffrage* (Petition des Schweizerischen Verbandes für Frauenstimmrecht) of 1929. The petition counted 170,000 signatures by women and 79,000 by men and asked the Federal Assembly (Bundesversammlung) to grant the voting right to Swiss women. However, the Federal Council (Bundesrat), the responsible political institution, took its time in dealing with this and similar advances. As a consequence, the issue rested until the 1950s. The situation on the cantonal level was different.<sup>14</sup> As early as 1919, the first referendum on the issue took place in the canton of Neuchâtel, and 15 more followed in different cantons prior to the first referendum on the federal level in 1959. However, all of the cantonal referendums were declined.

In 1958, the parliament agreed to have a referendum on the introduction of female suffrage in Switzerland, which took place on February 1, 1959. The proposal was refused by a clear margin. Merely 33.1% voted in favor of the introduction. However, opinions on the issue were not uniformly spread across Switzerland. On the same day, the eligible voters of the canton Vaud decided to extend the franchise to

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rate decreases with economic development. Once it reaches a level where the cost of the higher tax rate under the regime of universal suffrage are lower than the societal cost of disenfranchisement, the male median voter will prefer women's suffrage. Doepke and Tertilt (2009) analyze why men agreed to grant more economic rights to women long before the female enfranchisement gave them same political rights as men.

<sup>14</sup> Switzerland has 26 cantons. These are the member states of the Swiss Confederation.

women on the cantonal level. This marked the beginning of a second wave of referendums on the cantonal level during the 1960s. As a consequence, by the time the next federal referendum was taken in 1971, 9 of the 26 Swiss cantons had already introduced female suffrage.<sup>15</sup> However, it took until 1990 before the last canton introduced female suffrage on the cantonal level.<sup>16</sup>

Swiss women were finally granted the right to vote on the federal level on February 7, 1971. The decision was taken by means of a referendum. The vote was clear-cut, with 65.7% of the votes in favor and 34.3% against the franchise extension. Voter turnout was 57.7%.

In Switzerland, a Direct Democracy, major decisions are taken by a referendum among the eligible voters. Proposals for changes of the legislation have to be submitted by the Federal Council (Bundesrat), the Swiss Federal Government, to the National Council (Nationalrat) and the Council of States (Ständerat). The National Council and the Council of States represent the respective cantons and jointly constitute the Federal Assembly (Bundesversammlung), which possesses the federal government's legislative power.<sup>17</sup> Once a proposal is approved, Swiss voters decide on the respective issue in a referendum. The Federal Council submitted the proposal for the introduction of female suffrage already at the end of 1969. The final approval of the proposal by the Federal Assembly took place on October 9, 1970, before the referendum was held on February 7, 1971. Female suffrage came into effect on March 16, 1971. Table 2.1 shows the chronology of the legislative process that led to the referendum.

The clear vote in the referendum suggests that it came not as a surprise to market participants. Given the clear tendency in the population towards the extension of the franchise, the mere approval of the referendum could already have generated effects on firm valuations. If effects on firm valuation were already incorporated, this could have weakened reactions in financial markets at the time the referendum was taken. In this case, the firm value effects I find in my analysis should constitute a lower bound of the overall effects.

## 2.3 Hypotheses development

The literature identifies several policy relevant dimensions on which men and women differ substantially in preferences. This section develops hypotheses regarding which Swiss firms should benefit or be adversely affected by the enfranchisement of women. According to the hypotheses, I form samples of firms that should gain (“Winners”) or, respectively, lose in value (“Losers”), because of legislative changes following the introduction of female suffrage.

**Hypothesis 1:** *Firms involved in the use nuclear energy should experience relative value losses following the referendum; firms operating with non-nuclear, environmentally sound energy should experience relative value gains.*

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<sup>15</sup> Cf. Appendix A for a chronology of referendums and their results on the cantonal and federal level as of 1959.

<sup>16</sup> Cf. Seitz (2004) for this part.

<sup>17</sup> Members of the National Council and the Council of States represent the cantons. The seats in the National Council are distributed in proportion to population, whereas each canton has two seats in the Council of States, except the six 'half-cantons' which have one seat each.



Funk and Gathmann (2015) analyze data from the VOX surveys that were conducted shortly after federal ballots in Switzerland between 1981 and 2003. They find that Swiss women show higher support for the allocation of funds to environmental protection<sup>18</sup> and are more opposed to nuclear energy than men. Shapiro and Mahajan (1986) evaluate the gender gap derived from survey responses in the U.S. between 1952 and 1983. They report that by the 1980s, 20 percent more women than men opposed power plants.<sup>19</sup>

With the enfranchisement of women, these marked differences in preferences regarding nuclear power could have had important impacts on Swiss energy policy. The shift of the median voter preferences may have increased the pressure on the Swiss government to reduce spending for nuclear power plant projects or to introduce regulations that make the use of nuclear power more costly or even impossible. In either case, one would expect negative effects for firms that were involved in projects that foster the use of nuclear power. On the other hand, firms that operated with environmentally sound energy should have been relatively better off.

At the time of the referendum, several publicly listed Swiss firms were active in the business of power generation and power distribution. Some of these were power plants and others were holding companies that had stakes in firms in the power industry. By then, none of the power plants was using nuclear energy. However, a share of firms in the power industry was participating in projects for the construction of nuclear power plants in the future. These firms should have experienced relative values losses following the referendum. In the empirical analysis, they enter the “Losers” sample. Firms that solely dealt with renewable energy resources (publicly listed hydro power plants), on the contrary, should have experienced relative values gains. They are included in the “Winners” sample.

**Hypothesis 2:** *Firms in the military or weapons industry should experience relative value losses following the referendum.*

Shapiro and Mahajan (1986) find that in the U.S., men were choosing more violent options than women on force and violence issues.<sup>20</sup> For instance, in September 1973, 58% women thought that spending of the government in Washington for national defense and military purposes was “too much”, while only 45% of men were of this opinion.<sup>21</sup> Swiss women are 6 percentage points less likely to support military spending than men (Funk and Gathmann 2015). Abrams and Settle (1999) find that while the enfranchisement of women increased social welfare spending in Switzerland, it seems to have reduced government consumption spending in the country. They suppose that at

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<sup>18</sup> Swiss women are 10 percentage points more likely to favor spending for environmental protection.

<sup>19</sup> Cf. also Baxter and Lansing (1983), quoting the Center for Political Studies, American National Elections Studies, 1980. They report that, in 1980, 50% of U.S. men favored building more nuclear plants, while only 24% of women did so.

<sup>20</sup> These are issues such as defense spending, troop levels abroad, capital punishment, and gun control, the withdrawal of troops from Vietnam, mining the harbors of North Vietnam, and providing arms to the Israelis and the Arabs.

<sup>21</sup> In 1980, 72% of U.S. men favored the increase of defense spending, while only 54% of women did so (Baxter and Lansing 1983, quoting the Center for Political Studies, American National Elections Studies, 1980)

least part of this reduction can be explained by cuts in military outlays in the years after 1971.<sup>22</sup>

The decrease in Swiss military public spending and the stronger opposition of women towards military spending suggests that women's enfranchisement should have adversely affected producers of weapons and military equipment. The effects could have been caused by either less government spending in defense or more rigorous laws, e.g., for weapon exports or arms possession. Some Swiss publicly traded firms in 1971 were operating as suppliers of weapons or military devices. While, these firms were also active in other business sectors, and it is hard to tell how much of their sales were realized in the arms industry, it is likely that female suffrage had a detrimental effect on parts of their business. These firms should have experienced relative value losses following the referendum. They enter the “Losers” sample.

**Hypothesis 3:** *Firms in the tobacco and alcohol business should experience relative value losses following the referendum.*

Lott and Kenny (1999) analyze the introduction of female suffrage in different U.S. states between 1870 and 1940 to determine whether it caused a growth of the government. They state that women dominated the temperance movement in the U.S., and they find strong evidence that female suffrage directly led to the passage of prohibition laws. According to Shapiro and Mahajan (1986), U.S. women, by the 1980s, were more in favor than men of banning cigarette advertising and sales. Swiss women are 16.3 percentage points more likely to approve measures that are targeted at reducing tobacco and alcohol consumption (Funk and Gathmann 2015).

Two securities from a big Swiss brewery were publicly traded in 1971. The enfranchisement of women could have incentivized government to campaign against the consumption of alcoholic beverages, charge higher taxes on alcohol, or introduce stricter regulations for the sale of alcoholic beverages. This should have affected producers of alcoholic beverages. The securities of the brewery are, therefore, included in the “Losers” sample.

**Hypothesis 4:** *Firms in the health industry should experience relative value gains following the referendum.*

Miller (2008) states that female suffrage in the U.S. is associated with a 6% increase in spending on health conservation and sanitation and a 36% increase in spending for charities, hospitals, and corrections. Lott and Kenny (1999) find that the enfranchisement of women raised total government spending and revenue in the U.S. They suppose that the influence of women is reflected in increases in education, sanitation, and hospital expenditures by local governments, as well as in the large increase in state transfers to local governments. Bertocchi (2011) shows for a sample of 22 countries over the 1870 to 1930 period that women's enfranchisement had a significantly positive impact on health expenditures as share of GDP. Funk and

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<sup>22</sup> Abrams and Settle (1999) quote the U.S. Arms Control and Disarmament Agency and state that in the period 1963-1971, military spending in Switzerland averaged 2.46 percent of GDP, whereas in the period 1972-1983 military spending merely averaged 1.99 percent of GDP.

Gathmann (2015) find that Swiss women are more supportive of health spending than men.

These findings suggest that the enfranchisement of women in Switzerland led to an increase in public spending in health related sectors. If this increased spending, e.g., consisted in firm subsidies for research and development, then firms in the chemicals and pharmaceutical industry should have been the main beneficiaries. Therefore, Swiss firms that operated in the chemicals and pharmaceutical industry should have experienced relative value gains following the referendum. Their securities form part of the “Winners” sample.

**Hypothesis 5:** *Insurance companies should experience relative value losses following the decision.*

Lott and Kenny (1999) argue that women prefer to use the government rather than other mechanisms to provide insurance. They explain this behavior by the relatively higher risk-aversion of women.<sup>23</sup> In the 1990s, more U.S. women than men thought that the government should guarantee medical care for all people without health insurance.<sup>24</sup> Once Swiss women received the right to vote, it is likely that pressure increased on the government to provide or improve desired insurance mechanisms. Evidence for this presumption can be found from two referendums, in 1992 and in 1994, on the issue of subsidization of the Swiss health insurance with public spending. In both referendums, substantially more women than men favored the proposed increase in government subsidies for the insurance.<sup>25</sup> Women's preference for increased governmental influence in citizen's insurance is likely to have detrimental effects on private insurance companies, as research has shown that public insurance crowds out private insurance.<sup>26</sup> This argument is likely to apply all insurance activities, not merely health insurance. Swiss women's relatively higher support of welfare spending (Funk and Gathmann 2015)<sup>27</sup> and the increased Swiss social welfare spending following female enfranchisement (Abrams and Settle 1999)<sup>28</sup> strengthen this argument, as a large share of government spending occurs in areas for which private providers can offer insurance.

Following female enfranchisement some insurance provision may have been passed over to the government. This should have had adverse effects on Swiss private insurance companies following the referendum. Securities of Swiss private insurers, therefore, enter the “Losers” sample.

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<sup>23</sup> Cf. Jianakoplos and Bernasek (1998)

<sup>24</sup> A poll by CBS/New York Times asked “Do you think the government in Washington should guarantee medical care for all people who don't have health insurance, isn't that the responsibility of the government in Washington?”. 69 percent of women answered with “Should guarantee”, while only 58 percent of men did so (Center for American Women and Politics 1997).

<sup>25</sup> The gender gaps (percentage of women approving the proposition minus percentage of men approving the proposition) were 8.77% and 3.85%, respectively.

<sup>26</sup> Cf., e.g., Cutler and Gruber (1996a) and Cutler and Gruber (1996b)

<sup>27</sup> Shapiro and Mahajan (1986) find that more U.S. men than women felt that social welfare spending is too high in a survey in 1976.

<sup>28</sup> Miller (2008) states that the enfranchisement of women in the U.S. is associated with a 24% increase in state social service spending.

## 2.4 Data and Methodology

This study uses three major data sources: The *Kleines Handbuch der Schweizer Aktien* and the *Schweizer Aktienführer* (editions for the years 1971 and 1972), two yearly compendiums that contain information on incorporated Swiss firms; contemporary official quotation lists of the Zurich Stock Exchange; as well as contemporary newspapers (*Neue Zürcher Zeitung*) to retrieve additional stock prices and market and industry indices. I combine these sources with information from firm web pages to compile a database of firms that were publicly listed on the stock exchanges in Zurich, Basel, and Geneva in 1970 and 1971.

The *Kleines Handbuch der Schweizer Aktien* and the *Schweizer Aktienführer* (editions for the years 1971 and 1972) provide a business profile for each firm. I analyze each of the profiles to determine which firms should be affected by the enfranchisement decision. Several firms are active in more than one line of business and it is not obvious how much of the sales are generated in each of the business areas. Therefore, the assignments of some firms to the samples rely on a qualitative judgment of all information available. Appendix B provides information on the business areas for each of the firms in the respective sample.

I retrieve security prices from contemporary official quotation lists of the Zurich Stock Exchange. In addition, I get security prices for firms listed at the stock exchanges in Geneva and Basel from contemporary newspapers (*Neue Zürcher Zeitung*). These newspapers also provide information on market and industry indices. Security trading for many firms was not very liquid in Switzerland in 1971. Several securities did not show price changes on a daily or even weekly basis. For the empirical analysis I, therefore, focus on returns on a four-weekly basis. If a security does not have a price quote for the four week reference date, I use the price quote of the trading day that is closest by. However, I only include securities with price quotes that were within a time period of at least five trading days of the reference day. Securities without price quotes within this five day window are treated as if they were not traded on the respective reference day. Some changed their capital stock or made dividend/ coupon payments during the observation period. I adjust security prices for these measures by normalizing the first price quote after the measure to the last price quote prior to the measure. For some firms more than one security was quoted.<sup>29</sup> In these cases, I include the stocks separately in the analysis. I cluster standard errors on the firm level.

The database includes weekly and monthly quotes of stock prices as well as firm specific information on market capitalization and dividends for most of the firms. Market capitalization is retrieved directly from the *Kleines Handbuch der Schweizer Aktien* as per end of the year 1970. In case a firm has more than one type of security outstanding, I retrieve the number of shares outstanding of the respective type and multiply by the security price at the beginning of 1971 to obtain the market capitalization for the specific type of security. Dividends yields are based on the dividends for the year 1970 and are provided the *Kleines Handbuch der Schweizer Aktien*. Dividend yields change with the security price of the respective trading day of interest. In total there are 121 securities in the database.<sup>30</sup> Table 2.2 provides descriptive

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<sup>29</sup> Typically these were preferred stocks or registered stocks, in addition to common stocks.

<sup>30</sup> Not all of these have price quotes on each reference date, or information on dividends and market capitalization. For that reason, the number of observations varies in the empirical analysis, depending on the observation period and the respective specifications.

statistics on the industry composition, market capitalization, and dividend yields of the samples that enter the analysis. The “Winners” and “Losers” samples are made up of only a fraction of all industries in the Swiss market in 1970/ 1971. The “Winners” sample is heavily dominated by securities from the chemicals and pharmaceutical industry and only includes securities from two different industries. The “Losers” sample is more heterogeneous with respect to industry composition. Still, more than 50 percent of the sample's securities are from insurance companies. These strong biases in the industry composition, of course, result from the hypothesis development, which makes predictions about the performance of entire industries. The average firm size in terms of market capitalization of the “Winners” sample is much larger than the average of the market sample. The average firm included in the “Losers” sample, on the other hand, has merely half the size of the market sample firms. There are also differences for the dividend yield across the sample. However, these are not that as substantial as for the firm size. In the econometric analysis, I control for market capitalization and dividend yield.

I calculate weekly and monthly log price returns for all the securities in my sample for the months prior to and after the referendum. To determine relative value effects for individual firms, I estimate the following cross-sectional regression:

$$R_i = \alpha_i + \beta_1 D_i + \beta_2 X_i + \varepsilon_i \quad (2.1)$$

where  $R_i$  is the return of security  $i$  for a given time period.  $D_i$  is an indicator variable that is equal to 1 if the respective security belongs to the “Winners” sample and 0 otherwise. Naturally, when I estimate the specification for the firms that are adversely affected,  $D_i$  becomes 1 if the respective security belongs to the “Losers” sample.  $X_i$  includes firm size, measured as log market capitalization, and dividend yield.  $\beta_1$  is the coefficient of interest. It measures how the respective sample of interest performs with respect to the rest of the market.

## 2.5 Results

In this section, I provide results for the financial markets performance of the two samples “Winners” and “Losers” around the date of the referendum. As shown in figure 2.1, there was hardly any difference in performance of the two samples and the market sample in the two months prior to the referendum. This changed dramatically in the weeks following the decision. The “Winners” sample strongly outperformed the market, while the securities of the “Losers” sample showed a much weaker performance than the market.

Table 2.3 shows the results of OLS regressions as presented in specification (1) of log returns for a specific time period on the indicator variable “Winners” and controls. “Winners” takes the value of 1 if the respective security belongs to the “Winners” sample and 0 otherwise. Columns 1 to 3 present results for the period from December to February. The “Winners” sample lost about 1 percent more of its value than the market. This difference increases to slightly more than 2 percent when adding the controls dividend yield and the log market capitalization. However, in the period from December to February, there was no significant difference between the

performance of the “Winners” sample and the market. The coefficient of the “Winners” dummy is not significantly different from 0 in any of the specifications. 50 percent of the securities with price data in the “Winners” sample outperformed the market and 50 percent showed worse price performance than the rest of Swiss securities. Columns 4 to 6 show the regressions for the two month period following the referendum. The security prices of the “Winners” sample outperformed the market by around 7.5 percent in the months February to April. This difference is statistically significant on the 95 percent level of confidence (regression 4). Once the two controls, dividend yield and log market capitalization, are added (regression 6), the difference in performance drops slightly to around 6.5 percent. It is still statistically significant, although merely on the 90 percent level of confidence. This, however, seems to be rather driven by the drop in the sample size when including the controls. The coefficients of dividend yield and log market capitalization are not statistically significant. More than 85 percent of the securities with price changes in the “Winners” sample outperformed the market. The outperformance in the period February to April was not driven by one or two outliers, but by the great majority of the sample.

Table 2.4 repeats the same exercise for the securities of firms for which negative value effects are expected. “Losers” is a dummy that equals 1 if the respective security belongs to the “Losers” sample and 0 otherwise. Regressions 1 to 3 show that the securities of the firms in the “Losers” sample performed about half a percentage point worse than the market from December 1970 to February 1971. This difference in performance with respect to the market was not statistically significant. Similarly to the “Winners” sample, the share of securities with price data that outperformed the market was 47 percent, while 53 percent did worse than the Swiss market. This even distribution of performance changed markedly in the two months following the referendum. In the period from February to April (regressions 4 to 6), the securities of the “Losers” sample experienced a 3 to 3.5 percent underperformance with respect to the market. The coefficient of the “Losers” dummy is fairly stable when the controls are included. It is statistically significant on the 95 percent level of confidence for all of the specifications. The great majority (87 percent) of the securities with price data in the “Losers” sample performed worse than the Swiss market.

In sum, the two samples, “Winners” and “Losers”, showed a similar performance in the two months prior to the referendum (December 1970 to February 1971) and a strongly diverging performance in the two months following the referendum (February to April). These results suggest that the introduction of female suffrage in Switzerland indeed had a substantial impact on Swiss firms. The individual effects are visible as changes for firm valuations in financial markets. Swiss financial markets discounted the value of firms that operated in sectors that experience less support from women than from men (the military sector, nuclear energy, breweries) or for which the government may be induced to crowd out private supply (insurance sector). On the other hand, those firms that operated in sectors that are more favored by women than by men (environmental sound technologies) or for which the government is induced to increase public spending (health sector) experienced a value premium in the market.

### 2.5.1 Discussion of results

The inspection of figure 2.1 reveals that these value effects in the market have not been realized immediately following the referendum. For about two weeks, there existed no clear difference in the performance of the “Winners”, “Losers”, and the market sample. Table 2.5 presents the coefficients for the sample dummies on a monthly basis. Panel A presents the coefficients of OLS regressions of log returns without any controls, while panel B adds dividend yield as a control. Panel C adds both dividend yield and log market capitalization as controls. The “Winners” sample outperformed the market in the period February to March, while the “Losers” sample showed a markedly weaker performance than the market. For both samples, this performance difference persisted in the period March to April and was even intensified (This is in particular true for the “Winners” sample). However, even though the “Winners” sample saw its prices increase by about 4.5 to 5 percent more than the market from March to April, this difference is not significant (although the t-statistic is close to a value that would indicate significance on the 90 percent level). The coefficient of the “Losers” dummy is consistently statistically significant merely for the period from February to March and from April to May (the t-statistic for the period March to April, however, is either significant on the 90 percent level or close to it).

The pattern of evolution of the coefficients of the “Winners” and “Losers” sample, suggests that it took some time until the Swiss financial markets fully realized the consequences of female enfranchisement for particular firm values. It is not obvious why it took about two weeks following the referendum before security prices reacted in the market. One explanation could be the rather illiquid trading. At the beginning of the 1970s, many Swiss securities did not show price changes on daily basis.

Table 2.5 reveals another concern regarding the robustness of the results. The “Losers” sample still showed a significantly weaker performance than the market in the four weeks from April to May. The period from May to June is the first month following the referendum in which the performance of the “Losers” sample resembled the market performance again. The security prices of the “Losers” sample performed similar to the market in the months prior to the referendum, underperformed the market in the 3 months following the referendum, and then returned to a performance that resembles the market performance, thereby maintaining their relative value losses. This is in line with the theory. However, contrary to this pattern, the “Winners” sample showed a strong reversal as of April 1971. While its average security prices increased by about 5 percent more than the market between March and April, the security performance was between 2.5 and 3.5 percent worse between April and May. This pattern was even more distinct between May and June, when the “Winners” sample underperformed the market by 5.5 to 6.5 percent. While the value losses for the “Losers” sample seem to have been persistent, the “Winners” sample, in the period from April to June, lost more than the entire value gains from the February to April period. This reversal was completely different from the price evolution of the “Losers” sample. The unadjusted monthly returns for the different samples, shown in table 2.6, confirm these findings. Table 2.7 presents OLS regressions of the log returns between April and June. Regressions 4 to 6 show that security prices of the “Losers” sample lost about 2 percent more than the market. This difference, however, is not statistically significant. The “Winners” sample security prices (regressions 1 to 3) dropped by about 9.5 to 10 percent compared to the market. The coefficient of the “Winners” dummy is statistically

significant on the 99 percent level of confidence for all three specifications. It is not clear why the relative value losses of the “Losers” sample persisted, but the relative value gains of the “Winners” sample reversed. One potential explanation is that the value gains were indeed persistent, as experienced by the rather “diversified” “Losers” sample. The “Winners” sample, on the other hand, is strongly dominated by chemicals and pharmaceutical companies. Negative economic factors in April 1971 that merely affected this particular industry could have driven the striking drop in chemicals and pharmaceuticals security prices and therefore the entire “Winners” sample.

## 2.6 Conclusion

Several studies provide empirical evidence that franchise extensions affect legislative behavior as predicted by models of electoral competition. Politicians respond to changes in the electorate as a formerly disenfranchised group acquires the right to vote. This has primarily been shown for the scale and scope of government spending. Especially if the former and the new electorate differ in the position of the decisive voter in the income distribution, government spending is the obvious variable to look at. In addition to income, there typically exist differences in preferences on policy relevant issues between former and new electorate. This is likely to have consequences for legislative behavior that goes beyond pure distributive politics. These modifications in policies are unlikely to affect individual agents in an economy in the exactly the same manner. In particular, the prospects of individual firms or entire industries should be asymmetrically affected when a substantial alteration in the composition of the electorate occurs.

In this paper, I show that the impact of franchise extensions can indeed have unequal impacts on individual firms. I analyze the effects of the introduction of female suffrage in Switzerland on firm values. Swiss women and men differed substantially in income at the time the referendum on the franchise extension took place. Empirical evidence shows that giving the right to vote to Swiss women was indeed followed by significant changes in size and scope of government spending. In addition, scholarship has identified various policy relevant issues for which women and men show distinct differences in preferences. This suggests that the introduction of female suffrage resulted in a perceptible change in the composition of the Swiss electorate. Swiss firms that operated in sectors that were affected the most by this variation in the electorate experienced striking deviations in their stock market performance in the weeks and months following the referendum. In particular, firms that should have benefited from the differences between the new and former electorate strongly outperformed in financial markets. On the other hand, firms that should have experienced detrimental effects saw their values deteriorate with respect to the market.

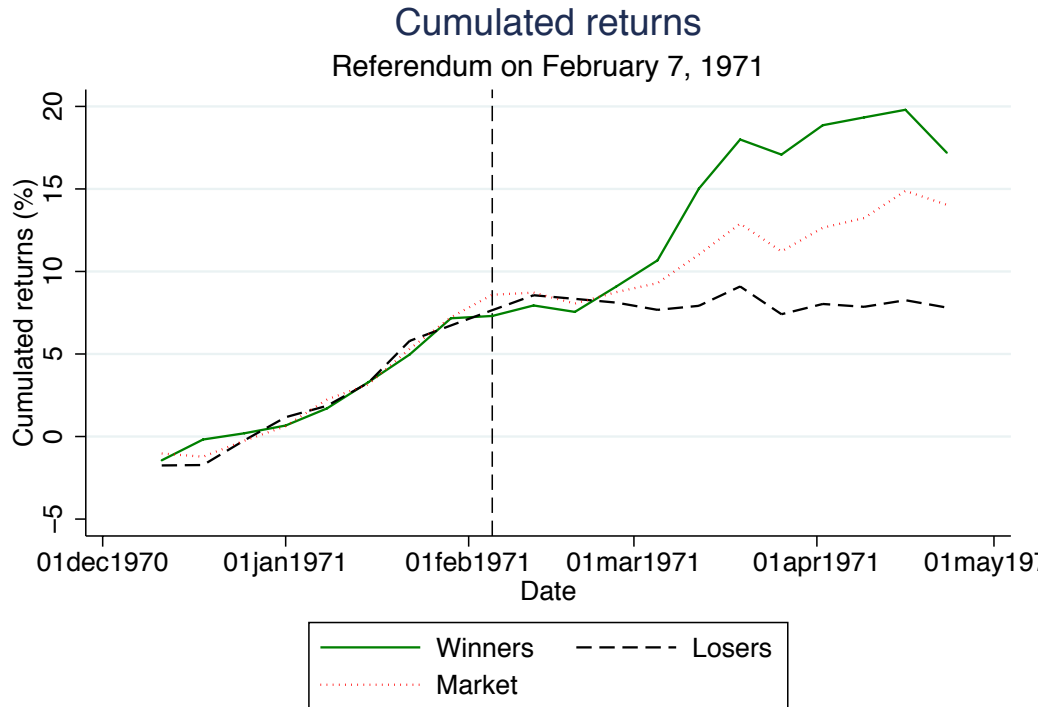
To the best of the author's knowledge, this is the first work that studies the effects of franchise extensions on the firm level. The results suggest that alterations in the composition of the electorate are important for the valuation of individual firms. Swiss financial markets attached a premium or discount, respectively, on firm values, depending on whether they were to gain or lose from the political empowerment of women as of 1971. These are important results for decision makers in firms. They must anticipate potential consequences for the corporate environment that changes in the composition of the electorate bring about.



Certainly, this paper uses a historical case, and these days women have the same political rights as men in industrialized countries. In addition, the newly enfranchised group in Switzerland was very large and there are clear differences between women and men on several issues. Franchise extensions with these characteristics do no longer take place. However, electorates continuously change, and this is still an important issue. Newly enfranchised groups typically differ from the existing electorate on several policy relevant dimensions. Firm managers need to incorporate resulting adjustments in the legislative environment in their strategies.

## 2.7 Figures and tables

Figure 2.1: Cumulated returns of “Winners”, “Losers”, and Market sample around the date of the referendum



*Notes:* This graph plots the cumulated log returns of the samples of firms that are expected to have experienced positive (Winners) and negative (Losers) relative value gains from female enfranchisement as well as the market sample (Market). The referendum on the introduction of female suffrage in Switzerland was taken on February 7, 1971. The graph is plotted using weekly returns.

Table 2.1: Chronology of referendum on introduction of female suffrage in Switzerland

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December 23, 1969	Submission of draft decision by Federal Council
June 23, 1970	National Council approves draft decision of Federal Council
September 23, 1970	Council of States approves resolution of National Council
October 1, 1970	National Council approves resolution of Council of States
October 9, 1970	National Council and Council of States unanimously accept draft decision in final vote; Decision by Federal Assembly of the Swiss Confederation to have a referendum on introduction of female suffrage in Switzerland
February 7, 1971	Referendum
March 16, 1971	Female suffrage comes into effect

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Table 2.2: Descriptive statistics

## Panel A: Industry composition

	Market sample	Winners	Losers
Banking	17 (14.1%)	0	0
Finance companies	19 (15.7%)	0	3 (15.8%)
Insurance companies	11 (9.1%)	0	11 (57.9%)
Metals, Machines, Tools	32 (26.4%)	0	1 (5.3%)
Chemicals & Pharmaceuticals	8 (6.6%)	7 (70%)	0
Consumption	23 (19%)	0	2 (10.5%)
Power plants & Power supply	7 (5.8%)	3 (30%)	2 (10.5%)
Transportation	3 (2.6%)	0	0
Others	1 (0.8%)	0	0
Number of securities	121 (100%)	10 (100%)	19 (100%)

Panel B: Market capitalization  
and dividend yield

	Market sample	Winners	Losers
Mean Market capitalization (million Swiss franc)	407.7	1559.5	219.3
Number of securities	92	7	18
Dividend yield	0.036	0.026	0.041
Number of securities	106	8	18

*Notes:* This table provides information on the industry composition (panel A) of the samples of the analysis as well as on market capitalization and dividend yield (panel B). The “Winners” sample includes the securities of those firms are expected to have experienced positive value effects following the referendum. The “Loser” sample includes, accordingly, securities of firms that are expected to have experienced negative value effects following the referendum. The “Market sample” represents the sample of all publicly traded Swiss securities that enter the analysis.

Table 2.3: OLS regressions - Winners. Dependent variable: Log returns

	December 1970 to February 1971			February 1971 to April 1971		
	Regression					
	1	2	3	4	5	6
Winners	-0.01 (0.64 )	-0.0183 (1.27)	-0.0216 (1.28)	0.0756** (2.32)	0.0634* (1.99)	0.0651* (1.68 )
Dividend yield		-0.5131 (1.07 )	0.1862 (0.41)		-0.4889 (0.95)	-0.4430 (0.73)
Market capitalization			0.0106** (2.43)			0.0008 (0.10)
Constant	0.0891*** (11.00)	0.1099*** (5.70 )	0.0417 (1.32)	0.0218** (2.08)	0.0428** (2.12)	0.0383 (0.66)
R-squared	0.0015	0.0170	0.0483	0.0558	0.0731	0.0714
Number of securities	101	96	81	97	92	81

*Notes:* This table shows the results of OLS regressions of the log returns for the time periods December 1970 to February 1971 and February 1971 to April 1971. Each period lasts 8 weeks. The December to February period measures the log returns from December 11, 1970 to February 5, 1971. The February to April period measures the log returns from February 5, 1971 to April 2, 1971. February 5, 1971 is the last trading day prior to the referendum on the introduction of female suffrage in Switzerland. Winners is a dummy that equals 1 for those firms that are identified to have experienced positive relative value gains following the referendum and 0 otherwise. The available controls are dividend yield and market capitalization, which is measured in logs.

t-statistics in parenthesis. Standard errors are clustered on the firm level. \*, \*\*, \*\*\* indicate significance on the 90%, 95%, and 99% levels of confidence.

Table 2.4: OLS regressions - Losers. Dependent variable: Log returns

	December 1970 to February 1971			February 1971 to April 1971		
	Regression					
	1	2	3	4	5	6
Losers	0.0063 (0.33)	0.0054 (0.28 )	-0.0056 (0.28)	-0.0313** (2.14)	-0.0333** (2.21)	-0.0362** (2.25)
Dividend yield		-0.4725 (1.05 )	0.0287 (0.64)		-0.6154 (1.14)	-0.5177 (0.83)
Market capitalization			0.0094** (2.22)			0.0053 (0.65)
Constant	0.0874*** (10.51 )	0.1062*** (6.04 )	0.0435 (1.37)	0.0321** (2.62 )	0.0573** (2.64)	0.0302 (0.52)
R-squared	0.0010	0.0128	0.0434	0.0186	0.0540	0.0658
Number of securities	101	96	81	97	92	81

*Notes:* This table shows the results of OLS regressions of the log returns for the time periods December 1970 to February 1971 and February 1971 to April 1971. Each period last 8 weeks. The December to February period measures the log returns from December 11, 1970 to February 5, 1971. The February to April period measures the log returns from February 5, 1971 to April 2, 1971. February 5, 1971 is the last trading day prior to the referendum on the introduction of female suffrage in Switzerland. Losers is a dummy that equals 1 for those firms that are identified to have experienced negative relative value gains following the referendum and 0 otherwise. The available controls are dividend yield and market capitalization, which is measured in logs.

t-statistics in parenthesis. Standard errors are clustered on the firm level. \*, \*\*, \*\*\* indicate significance on the 90%, 95%, and 99% levels of confidence.

Table 2.5: Coefficients on different sample dummies for four-weekly periods from December 1970 to June 1971

Panel A: Without controls						
	Dec-Jan	Jan-Feb	Feb-Mar	Mar-Apr	Apr-May	May-Jun
Winners	0.0059 (0.78)	-0.0197 (1.23)	0.0220* (1.85)	0.0499 (1.63)	-0.0270** (2.02)	-0.0566** (2.36)
Losers	0.0107 (0.92)	-0.0103 (0.78)	-0.0158** (2.14)	-0.0228* (1.83)	-0.0223* (1.95)	0.0020 (0.17)
N	98	96	97	97	98	99

Panel B: Adding dividend yield as a control						
	Dec-Jan	Jan-Feb	Feb-Mar	Mar-Apr	Apr-May	May-Jun
Winners	0.002 (0.23)	-0.0215 (1.28)	0.0203 (1.59)	0.0441 (1.44)	-0.0255* (1.76)	-0.0558** (2.30)
Losers	0.0127 (1.07)	-0.0126 (0.96)	-0.0163** (2.09)	-0.0204 (1.56)	-0.0221* (1.95)	0.0018 (0.16)
N	95	93	93	95	95	98

Panel C: Adding dividend yield and log market capitalization as controls						
	Dec-Jan	Jan-Feb	Feb-Mar	Mar-Apr	Apr-May	May-Jun
Winners	-0.016 (0.991)	-0.0002 (0.11)	0.0143 (1.00)	0.05 (1.63)	-0.0348** (2.25)	-0.0669*** (3.07)
Losers	0.0132 (1.06)	-0.0192 (1.46)	-0.0176** (2.10)	-0.0211 (1.48)	-0.0269** (2.21)	0.0083 (0.68)
N	79	79	79	82	83	82

*Notes:* The table presents the log stock market returns for different sample dummies in four-weekly periods, starting in December 1970. The “Winner” sample includes the securities of those firms that I identified as firms that were expected to experience positive value effects following the referendum. The “Loser” sample includes accordingly securities of firms that were expected to experience negative value effects and no value effects following the referendum. The inclusion of the dividend yield and market capitalization as controls decreases the sample size which mainly has an impact on the coefficients due to the change in sample size. I, therefore, present results in panels A, B, and C. Panel A merely presents the coefficients on the sample dummies without controls, while panel B controls for dividend yield. Panel C controls for dividend yield and market capitalization.

t-statistics in parenthesis; clustered on firm level; sample includes firms that were traded at the stock exchanges in Zurich, Basel, and Geneva.

The return periods are periods of four weeks, starting on Friday December 11, 1970. This means, for instance, that the return period Feb-Mar lasts from February 5 to March 5. Friday February 5 is the last trading day prior to the referendum. By looking at four-week periods, I assure that all the periods start and end on a Friday. I use the monthly denomination for clarity. This means, however, that strictly speaking the periods Apr-May (from April 2 to April 30) and May-Jun (April 30 to May 28) end in the months of April and May (and not in May and June), respectively.

Table 2.6: Unadjusted log returns of different samples by month

Sample	Dec-Jan	Jan-Feb	Feb-Mar	Mar-Apr	Apr-May	May-Jun
Winners	0.0375 (8)	0.0417 (8)	0.0276 (8)	0.0672 (7)	-0.0023 (7)	-0.1015 (8)
Losers	0.0411 (15)	0.051 (15)	-0.0059 (15)	0.0023 (18)	0.0044 (17)	-0.0478 (16)
Market	0.0321 (98)	0.0597 (96)	0.0074 (97)	0.0209 (97)	0.0228 (98)	-0.0495 (99)

*Notes:* The table presents the unadjusted log stock market returns for different samples in four-weekly periods, starting in December 1970. The “Winner” sample includes the securities of firms that I identified as firms that were expected to experience positive value effects following the referendum. The “Losers” sample includes, accordingly, securities of firms that were expected to experience negative value effects. The sample “Market” represents the equally-weighted return of all Swiss securities that enter the analysis. The number of securities per sample with existing price data for the respective dates is shown in parenthesis.

The return periods are periods of four weeks, starting on Friday December 11, 1970. This means, for instance, that the return period Feb-Mar lasts from February 5 to March 5. Friday February 5 is the last trading day prior to the referendum. By looking at four-week periods, I assure that all the periods start and end on a Friday. I use the monthly denomination for clarity. This means, however, that strictly speaking the periods Apr-May (from April 2 to April 30) and May-Jun (April 30 to May 28) end in the months of April and May (and not in May and June), respectively.



Table 2.7: OLS regressions (April to June). Dependent variable: Log returns

	April 1971 to June 1971			April 1971 to June 1971		
	Regression					
	1	2	3	4	5	6
Winners	-0.096*** (3.47)	-0.0942*** (3.24)	-0.1003*** (4.01)			
Losers				-0.0186 (1.26)	-0.0204 (1.46)	-0.0188 (1.22)
Dividend yield		0.0576 (0.21)	-0.0760 (0.23)		0.3833 (1.19)	0.2454 (0.85)
Market capitalization			-0.0051 (0.82)			-0.0106 (1.47)
Constant	-0.0203* (2.44)	-0.0232 (1.54)	0.0030 (0.08)	-0.0242* (2.29)	-0.0381** (2.03)	0.0152 (0.40)
R-squared	0.1199	0.1189	0.1553	0.0092	0.0193	0.0658
Number of securities	96	94	81	96	94	81

*Notes:* This table shows the results of OLS regressions of the log returns for the time periods April 1971 to June 1971. The eight-week period lasts from April 2 until May 28. Winners is a dummy that equals 1 for those firms that are identified to have experienced positive relative value gains following the referendum and 0 otherwise. Losers is a dummy that equals 1 for those firms that are identified to have experienced negative relative value gains following the referendum and 0 otherwise. The available controls are dividend yield and market capitalization, which is measured in logs. t-statistics in parenthesis. Standard errors are clustered on the firm level. \*, \*\*, \*\*\* indicate significance on the 90%, 95%, and 99% levels of confidence.

## 2.8 Appendix A: Introduction of female suffrage on the cantonal and federal level

Table 2.A1: Chronology of introduction of female suffrage in Swiss cantons and on the federal level

Date	Canton	Result
February 1, 1959	Federal level	No
February 1, 1959	Vaud	Yes
September 27, 1959	Neuchâtel	Yes
March 6, 1960	Geneva	Yes
April 24, 1966	Ticino	No
June 26, 1966	Basel-Stadt	Yes
November 20, 1966	Zurich	No
May 28, 1967	Schaffhausen	No
February 18, 1968	Solothurn	No
June 26, 1968	Basel-Land	Yes
October 20, 1968	Grisons	No
September 14, 1969	Schaffhausen	No
October 10, 1969	Ticino	Yes
April 12, 1970	Valais	Yes
October 25, 1970	Lucerne	Yes
November 15, 1970	Zurich	Yes
February 7, 1971	Zug	Yes
February 7, 1971	Fribourg	Yes
February 7, 1971	Schaffhausen	Yes
February 7, 1971	Aargau	Yes
February 7, 1971	Federal level	Yes

Notes: Source: Bundesblatt. Volume 122, issue 2 (<http://www.admin.ch>).

## 2.9 Appendix B: Firms that should have experienced relative value effects following the referendum

Table 2.B1: Names and major business of firms that have negative expected value effects following the referendum

Firm name	Business area	Expected value effects
Elektro-Watt Elektr. U. Industr. Unternehmungen	Largest Swiss holding in power industry; deals with construction of power plants; this also includes nuclear power plants; managing nuclear power project Leibstadt	Negative
Motor-Columbus AG für elektr. Unternehmungen	Finance and holding company with major interests in Swiss domestic power industry; holds stakes in many power plants; managing nuclear power plant projects Kaiseraugst and Gösgen; participates in project Leibstadt	Negative
Südamerikanische Elektrizitäts- Gesellschaft	Operates as financing company for electricity plants in Peru; Südelektra is closely linked to Brown, Boveri & Cie and Motor-Columbus	Negative
Aare-Tessin AG für Elektrizität	Generation and supply of power; participation in nuclear power plants Kaiseraugst, Gösgen, and Leibstadt	Negative
Centralschweizerische Kraftwerke	Production and distribution of electrical power; member of the study consortia for the three nuclear power plants Kaiseraugst, Gösgen, and Leibstadt; has contracts that ensure the acquisition of nuclear energy from plants Mühleberg and Beznau	Negative
Bäloise-Holding	Insurance company	Negative
Berner Allgemeine Versicherungs- Gesellschaft	Insurance company	Negative
Helvetia Schweiz. Feuervers.-Ges.	Insurance company	Negative
Neuenburger, Schweiz. Allgem. Vers. Ges.	Insurance company	Negative
Schweiz. National- Versicherungs- Gesellschaft	Insurance company	Negative
Schweiz. Unfallvers.-Ges. (bearer shares)	Insurance company	Negative
Schweiz. Unfallvers.-Ges. (registered shares)	Insurance company	Negative

Table 2.B1 continued: Names and major business of firms that have negative expected value effects following the referendum

Firm name	Business area	Expected value effects
Schweiz Allgemeine Versicherungs-AG	Insurance company	Negative
Zürich Versicherungs-Gesellschaft	Insurance company	Negative
Schweiz. Rück. Genevoise Vie	Insurance company	Negative
Brauerei Eichhof (bearer shares)	Brewery	Negative
Brauerei Eichhof (registered shares)	Brewery	Negative
AG Brown, Boveri & Cie., Serie A	Third largest Swiss manufacturing company; engages in military electronics;	Negative

Notes: Source: *Kleines Handbuch der Schweizer Aktien* and *Schweizer Aktienführer* (editions for the years 1971 and 1972).

Table 2.B2: Names and major business of firms that have positive expected value effects following the referendum

Firm name	Business area	Expected value effects
CIBA-GEIGY AG	Largest Swiss chemicals company	Positive
CIBA-GEIGY AG (registered shares)	Largest Swiss chemicals company	Positive
CIBA-GEIGY AG (participating certificate)	Largest Swiss chemicals company	Positive
Lonza AG	Production of chemical primary and intermediary products, fertilizers, and plastic materials; export share of parent company (Stammhaus): 31.5%	Positive
Sandoz AG (registered shares)	Very internationally oriented company in the chemicals industry with a strong focus on pharmaceuticals; 15% of sales in EFTA region	Positive
Verbandstoff Schaffhausen	Producer of medical convenience goods	Positive
Zyma	Fourth largest producers of pharmaceuticals in CH	Positive
Aletsch AG	Hydro power plant	Positive
Energie Electrique du Simplon S.A. (bearer shares)	Hydro power plant	Positive
Emsler Werke	Chemicals company mainly in area of synthetic rubber; 80% of sales are exported; also of more than 50% participation in power plant Reichenau AG (hydro power)	Positive

Notes: Source: *Kleines Handbuch der Schweizer Aktien* and *Schweizer Aktienführer* (editions for the years 1971 and 1972).



## Chapter 3

# Expectations and Bubble Creation: The West Berlin Real Estate Market and the German Unification

### 3.1 Introduction

Following the recent housing bubble and its consequences in the US and other countries, the question whether global or regional real estate markets show characteristics of a bubble becomes increasingly important. Much controversy exists on how to determine whether prices are in line with the fundamentals or misaligned due to unrealistic expectations. In the years prior to the US housing bubble, some scholars did not find strong signs for large mispricings (see, e.g., Himmelberg, Mayer, and Sinai 2005; Smith and Smith 2006), while others clearly identified the presence of a bubble (see, e.g., Shiller 2005).<sup>1</sup> Testing for the existence of a bubble is not easy (Stiglitz 1990), and there are not many convincing models in the literature that explain when and why bubbles start (Brunnermeier 2008). Especially the prediction of turning points constitutes a great challenge for economists (Shiller 2008). One way to gain further insight into the existence and causes of bubbles is to investigate the characteristics of mispricings in the past as well as the circumstances that caused these mispricings.

In this paper, I provide a well-identified example of price exaggerations and their reversal. I find strong evidence of a bubble episode in the real estate market in West Berlin, caused by the expectations regarding the German unification. After the fall of the Berlin Wall at the end of 1989, real estate related prices in West Berlin strongly outperform benchmark indices until the mid 1990s. However, by the year 2000 or earlier, most of those prices had completely reversed to their benchmarks. This pattern exists in financial markets as well as in housing and building land markets. Rent price indices in Berlin also initially deviate from rent indices for the entire German market and subsequently reverse to the overall German rent level. While these price changes are consistent with the other markets, they are less pronounced, and by far not sufficient to explain the exaggerations in house prices. Misjudgments about West Berlin's future prospects are the drivers of this slow moving bubble.

The existing definitions of a bubble vary to some extent. In general, bubbles arise if an asset's price exceeds its fundamental value (Brunnermeier 2008). According to Stiglitz (1990), a bubble exists if the price for an asset is high today not because fundamentals justify it, but merely because investors think that the price will be high tomorrow. Himmelberg, Mayer, and Sinai (2005) consider a housing bubble as being driven by buyers who today pay inflated prices because they expect unrealistically high future house prices. Similarly, for Case and Shiller (2012) a bubble is a situation in which asset prices are temporarily elevated due to excessive public expectations regarding future price increases. The experience in the Berlin real estate market described in this paper can be considered a bubble in line with the above definitions. Real estate prices initially strongly deviate from their benchmarks and subsequently

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<sup>1</sup> Cf., e.g., Kholodilin (2015) for a brief summary of different views regarding the present German real estate market.

return to them, without any considerable changes in fundamentals. Buyers in Berlin expected much higher future prices than were justified by the fundamentals.

The definition and determination of fundamental values is crucial for the analysis of price behavior. Many scholars use income or housing rents to determine what the correct price of a house should be (see, e.g. Kholodilin 2015). Himmelberg, Mayer, and Sinai (2005), however, emphasize the importance of calculating the user cost of owning a house or imputed rent in order to determine whether house prices are too high or too low. In this paper, I use conventional measures like price-rent ratios to show how prices in Berlin deviate from fundamentals. However, I also use prices of comparable assets that show similar price movements to Berlin assets prior to the events that affected expectations in Berlin as a benchmark or proxy for fundamental values. The existence of a bubble for an asset can then be shown as an initial price deviation from this benchmark when expectations about future prices are too optimistic, followed by a reversal to the price level of the benchmark when it turns out that the expectations are not met. Figure 3.1 illustrates this. The upper graph presents the comparison of the cumulated daily stock market returns of Berlin real estate firms with the German market from the beginning of 1989 until 2000. The figure shows that throughout the year 1989 there is hardly any difference between the two indices. This changes markedly in the weeks and months after the Fall of the Berlin Wall. The Berlin sample shows a marked outperformance for several years. However, at the beginning of the mid 1990s, the outperformance comes to a halt, and in the following years, the Berlin sample performs much worse than the German market. By the end of the 1990s, the outperformance of the Berlin firms has not just been undone, but the firms actually suffer on average from a lower valuation than the market. The initial outperformance is more than fully reversed. This can also be seen from the lower graph of figure 3.1, which presents the evolution of the difference in cumulated returns of the Berlin sample and the German market.

On November 9, 1989, the Berlin Wall that divided East and West Berlin for almost three decades was opened. In the following year, the two Germanys were united, and in the summer of 1991, the parliament of the unified Germany decided by vote that the government of the Federal Republic of Germany would be relocated from Bonn to Berlin. The combination of these events caused real estate related prices in Berlin to start a strong outperformance with respect to prices in the rest of West Germany.

The setting of the analysis offers several advantages. Although Berlin is located in an island-like position in the former territory of the German Democratic Republic (“East Germany”), the city's western part always belonged to the Federal Republic of Germany (“West Germany”) during Germany's division. West Berlin shared the same economic and political environment as the rest of West Germany before and after the unification. I can therefore compare the price movements in a regional market (West Berlin) to the entire country (West Germany), which presumably have the same economic and legal environment, but for which investors have differing expectations regarding the future prospects.<sup>2</sup> Price differences in the two areas should consequently be driven by differences in these expectations. My analysis shows indeed that in the

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<sup>2</sup> The German Democratic Republic was a centrally planned economy prior to the unification and became a market economy afterwards, when acceding to the Federal Republic of Germany. Comparing prices or price indices before and after the unification will therefore not yield much insight for this part of Germany. In addition, East German companies were not publicly traded before 1992.



years prior to the fall of the Berlin Wall the price movements in West Berlin and West Germany are fairly similar. It is the unification process and the associated expectations that lead to strong divergences in price behavior.

Another advantage of the analysis is that the events that mark the beginning of the bubble period can be clearly identified. Moreover, the fall of the Berlin Wall occurred unexpected and its effects should not have been incorporated in the prices. Therefore, the effects on the West Berlin real estate prices can be readily be linked to specific political events. Depending on the respective market, the reactions appear either sooner or later, but show all the same pattern.

In addition, contemporaneous sources provide a good overview of the future expectations for Berlin that were formed and fueled by politicians and the general public. A comparison of these expectations to the actual microeconomic facts during the 1990s reveals how mistaken investors actually were.

The analysis focuses on three markets which all lead to the same conclusion of a bubbly episode in the West Berlin real estate market in the 1990s. In a financial markets analysis, I compare the price behavior of securities of publicly traded German real estate firms that are exposed to the Berlin real estate market to several benchmarks. These benchmarks are the German market index, industry indices for German public real estate firms, and a control sample of German real estate firms that are exposed to German metropolitan real estate markets other than Berlin. Prior to the fall of the Berlin Wall there are only minor differences in the average prices of the sample of Berlin exposed firms and the benchmarks. This changes in the aftermath of the fall of the Wall. Berlin real estate firms begin an outperformance with respect to the benchmarks. This movement is markedly accelerated by the decision to relocate the German federal government from Bonn to Berlin in the summer of 1991. It reaches its peak at the end of the year 1992. The outperformance with respect to the German market index reaches almost 80%. A simple event study approach shows that Berlin firms experience more than 100% higher cumulative abnormal returns in this period than a sample of German real estate firms that are not exposed to the Berlin market. Through the years of 1993 and 1994, the prices for the Berlin sample maintain a more or less stable , before they decrease heavily with respect to the market as of beginning 1995. By the year 1997, the average prices for the Berlin sample have completely reversed to the benchmark markets and are actually performing worse than the benchmarks.

The second market this paper analyzes is the market for house and building land prices. I use data from a transaction database, which includes every single transaction of buildings or land in Berlin, provided by the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). This allows me to compare price-rent multiples, housing prices, and building land values for West Berlin to West Germany. The pattern of price developments is very similar to the one in the financial markets. Prior to the fall of the Berlin Wall, the price changes in West Berlin and West Germany are very similar. However, this changes markedly at the end of the 1980s. Prices in West Berlin, for all three indicators, strongly deviate from the national benchmarks and reverse again as of the mid 1990s.

Price deviations in the renting market, the third market, naturally are not that pronounced. However, the same pattern of initial outperformance for Berlin rents and a subsequent reversal to the national rent level is present in this market as well. However, the increases in rents cannot account for the strong increase in housing prices in West Berlin.

I am not the first to investigate the Berlin real estate market in the 1990s. Holtemöller and Schulz (2011), e.g., analyze constant-quality multipliers (price-rent ratios) for the Berlin rental apartment house market between 1980 and 2004. Similar to my results, they find that prices were not set in a rationale manner following the fall of the Berlin Wall and the subsequent German reunification.

The paper is structured as follows. The next section gives a brief historical overview of the events and the chronology that led to the German unification and the decision to relocate the German Federal Government from Bonn to Berlin. In addition, it summarizes the main expectations that were formed regarding the future of Berlin and presents changes in the Berlin housing supply. Section 3 provides information on the data that I use in this paper. Section 4 discusses the results of the analysis of mispricing in several different markets, and section 5 concludes.

## **3.2 Historical background, expectations for Berlin, and the housing supply**

This section begins with a brief overview of the incidents that took place following the fall of the Berlin Wall and led to the unification of Germany and the decision to relocate the government from Bonn to Berlin. I then provide contemporaneous evidence on the expectations regarding the future of Berlin that were generated by the political events surrounding the unification. In a last subsection, I provide evidence on the evolution of fundamentals in Berlin, which shows that expectations were too optimistic. In addition, the section discusses developments of the housing supply by presenting data on construction permits and completion of apartments in Berlin.

### **3.2.1 Germany's unification and the government relocation decision**

The fall of the Berlin Wall, the subsequent German unification, and the decision to relocate the German government from Bonn to Berlin were followed by a remarkable deviation of real estate prices in Berlin from the prices in the rest of the country. This section describes the events that led to the unification of Germany and the subsequent decision to relocate the government to Berlin. Berlin real estate prices already rose in the aftermath of fall of the Berlin Wall. However, the analysis of financial markets suggests that the unification of the two countries and especially the government relocation decision at the least strongly intensified the optimistic expectations regarding the Berlin real estate market. This section, therefore, places particular emphasis on the chronology of incidents that resulted in the government relocation decision. Table 3.1 provides a chronology of the main events.

On November 9, 1989, the Berlin Wall, that divided the eastern and the western part of Berlin for almost three decades, was opened. In the following year, on August 31, 1990, the Unification Treaty (Einigungsvertrag) was signed. It came into effect on September 29, 1990, and settled the accession of the German Democratic Republic (“East Germany”) to the scope of application of the constitutional law of the Federal Republic of Germany (“West Germany”). The issue whether the capital city of the unified Germany should be Bonn or Berlin was very disputed during the elaboration of the Unification Treaty.

The subject was so controversial that the decision regarding the location of the federal government was postponed until after the unification. The decision was finally taken on June 20, 1991. Bonn was the seat of the government of the German Federal Republic during the division of Germany. Berlin served as Germany's capital before the country was divided. With the division, Berlin was divided into a western part that belonged to West Germany and an eastern part that belonged to East Germany. The eastern part served as the capital of East Germany.

Prior to the negotiations for the Unification Treaty, a public debate regarding the future capital of the unified Germany was already under way. The prime ministers of the West German federal states (Bundesländer) were opposed to Berlin as the location. They feared to lose influence and believed that German federalism could lose power in a metropolis like Berlin.<sup>3</sup> When East and West German politicians met for the first round of negotiations for the Unification Treaty on July 6, 1990, the prime minister of the German Democratic Republic, Lothar de Maizière, demanded that Berlin be the future capital of the unified Germany. He preferred to establish this claim in the Unification Treaty and not to postpone the decision until a joint government was elected for the unified Germany. However, Wolfgang Schäuble, the chief negotiator on behalf of the Federal Republic of Germany, countered that the issue should not be included in the treaty. He feared that including the demands of Lothar de Maizière in the Unification Treaty would impede the signature and ratification of the treaty in the West German parliament. The opposition of the ministers to Berlin as seat of the government was too strong. The first draft of the Unification Treaty showed that the balance of power leaned towards West German politicians. The draft's second article stated that the capital of Germany was Berlin and that the issue of where the government seat should be located would be decided after the completion of the German unification.<sup>4</sup>

While the formulation in the Unification Treaty assured the approval of the treaty by the prime ministers of the West German states,<sup>5</sup> it eroded the position of Berlin as the capital city. The concurrence of capital city and seat of the government had so far been taken for granted.<sup>6</sup> The negotiations ended on August 31, 1990. The wording in the treaty's second article was virtually unchanged from its earlier version in the first draft. On December 2, 1990, elections took place to the first German Parliament in the unified Germany. Prior to and following the elections, the contest between the proponents of either Bonn or Berlin as seat of the government intensified. The issue of the government location may be considered the most important dispute in German domestic politics during the first half of the year 1991.<sup>7</sup>

On April 23, 1991, in a meeting of the leading German politicians that took place in the office of the President of the German Bundestag (Bundestagspräsidentin), Rita Süßmuth,<sup>8</sup> Germany's leading politicians decided that the federal parliament would

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<sup>3</sup> Cf. Schäuble (1991), p. 131, 132 and Dreher (1999), p. 198.

<sup>4</sup> The original wording in the draft: **Artikel 2 Hauptstadt** "Hauptstadt Deutschlands ist Berlin. Die Frage des Regierungssitzes wird nach der Herstellung der Einheit Deutschlands entschieden." Cf., e.g. Handelsblatt, August 6, 1990, p. 6.

<sup>5</sup> Cf. Schäuble (1991), p. 131-133.

<sup>6</sup> For Lothar de Maizière and many others from the eastern part of Germany it had been a matter of course that the government would be located in Berlin. Cf. Kansy (2003), p. 16.

<sup>7</sup> Cf. Möller (2002), p. 10.

<sup>8</sup> Apart from Rita Süßmuth herself, the invitees were the Federal President (Bundespräsident), Richard von Weizsäcker, the Federal Chancellor (Bundeskanzler), Helmut Kohl, the President of the German Bundesrat (Bundesratspräsident), Henning Voss, the President of the Federal Constitutional Court

take a vote by roll call on the future location of government and parliament on June 20, 1991. This decision removed the uncertainty regarding date and procedure of the location decision.<sup>9</sup>

One day before the vote in the parliament, the general opinion among the MPs was that Bonn would win the vote.<sup>10</sup> Moreover, two newspapers, the *Bonner General-Anzeiger* and the *Kölner Express*, on June 14, 1991, published estimates that 310 of the 662 representatives in the German Parliament were in favor of Bonn, as opposed to only 250 in favor of Berlin. The *Bild am Sonntag* announced the results of a poll on June 16, 1991, that stated that, two weeks before the vote, 343 members of parliament favored Bonn, whereas only 267 supported Berlin.<sup>11</sup> However, in the late evening of June 20, 1991, after an almost 13 hours debate that preceded the vote, the parliament decided, with 338 to 320 votes, that the German Government and Federal Parliament would be relocated from Bonn to Berlin.

### 3.2.2 Expectations for Berlin

The fall of the Berlin Wall and the subsequent German unification generated expectations for the future of Berlin that turned out to have been overly optimistic. At least to some extent, these expectations were likely to have been fed by the quarrel regarding the future location of the government. In order to secure the government in the respective city, Bonn and Berlin advocates alike made several exaggerated statements regarding the future of their city with or without the government. The fact that Berlin finally won the vote on the government location should have given an additional push to already optimistic expectations.

Many officials were confident that Berlin's economy would clearly benefit from moving the capital to the city and that the city would experience a development process similar to the large West German cities.<sup>12</sup> Some examples for the predominant expectations are that Berlin would resume its place as the cultural hub of Central Europe,<sup>13</sup> become a city like Tokyo and Paris,<sup>14</sup> be a center of geo-political importance by 2000 or 2005,<sup>15</sup> or be the official stage for German and European politics.<sup>16</sup>

For East Berlin's former Mayor, Tino Schwierzina (afterwards the Deputy Mayor of the united city), and Berlin's government spokesman, Werner Kolhoff, the

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(Präsident des Bundesverfassungsgerichts), Roman Herzog, as well as the chairmen of the parliamentary groups (Fraktionsvorsitzende), Alfred Dregger, Hans-Jochen Vogel, and Hermann Otto Solms. See Dreher (1999), p.227-229.

<sup>9</sup> So far, several members of the Social Democratic Party (SPD) were proposing a plebiscite on the issue.

<sup>10</sup> Cf. Kansy (2003), p. 32.

<sup>11</sup> Cf. Dreher (1999), p. 238, 239.

<sup>12</sup> Cf. The New York Times, "German Unity Might Cost Berlin Billions in Subsidies".

<sup>13</sup> Cf. The New York Times, "Editorial Notebook; Germany's Once and Future Capital", June 25, 1991; The Globe and Mail (Canada), "BERLIN" A city of extremes and indulgences, this 'is where German reality is concentrated with all its tensions and dynamism' More than 750 years old..and still young at heart", June 21, 1991.

<sup>14</sup> Cf. The Advertiser, "Berlin counts cost of rebirth", June 22, 1991.

<sup>15</sup> Cf. The Guardian (London), "Germans revive Berlin as capital", June 21, 1990.

<sup>16</sup> Cf. The Guardian (London), "Europe: Metropolis Rising - Two years after the fall of the Berlin Wall, we celebrate one of Europe's greatest cities. With partner newspapers from Berlin, Vienna and Zurich this special issue lays bare the new Berlin. Barbara Sichtermann profiles the old city that is becoming the new Babylon", November 8, 1991.

decision regarding the government location was decisive for the future of Berlin. Schwierzina feared that the unemployment rate in Berlin could go up to 25% if the government stayed in Bonn. About 180,000 jobs in Berlin were about to get lost because of the dissolving bureaucracy of the former East German Communist Government. According to Kolhoff, "Berlin is on the razor's edge. It can be a great metropolis, or it can be a poverty zone. Both are possible." He argued that without Berlin as a locomotive - with the government located there - the economic prospects of the five eastern states were gloomy.<sup>17</sup> Prior to the relocation vote, the mayors of both Bonn and Berlin announced that should their respective city lose the vote, it would tumble into "a dangerous collapse".<sup>18</sup> Still, some Berlin officials believed that apartment rents in the city would have increased irrespective of whether Berlin became the capital, just in anticipation of a revival of a great European center.<sup>19</sup>

Initially, there were expectations that 100,000 legislators, diplomats, and bureaucrats would move to Berlin, following the government from Bonn.<sup>20</sup> In the end, the government decided that the most important and largest ministries would move to Berlin. This meant a move of about 14,000 government employees.<sup>21</sup>

Already prior to the vote on the government relocation, some forecasters had predicted that the population of Berlin might increase from three and a half million to five or six million.<sup>22</sup> Companies were optimistic about Berlin's future prospects and they were entering the city to buy real estate and offices. Germany's largest manufacturing company, Daimler-Benz AG, bought property at Potsdamer Platz and so did Sony.<sup>23</sup> These sites were acquired with a large price subsidy from the Berlin government.<sup>24</sup>

Additional uncertainty and room for speculation came from the city's subsidies. West Berlin was receiving state subsidies during the time of the division. In 1990, the subsidies to the city totaled \$13 billion a year. They accounted for more than half of the West Berlin city government's annual budget and almost one third of the economic output.<sup>25</sup> In 1990, it was not clear to what extent Berlin would keep receiving subsidies.

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<sup>17</sup> Cf. The New York Times, "Berlin, the Capital, Fears for Future".

<sup>18</sup> Cf. The Washington Post, "Bonn or Berlin – Capital Issue Comes to Vote; Germans Divide, Loudly, On Site for Government".

<sup>19</sup> Cf. The New York Times, "Evolution in Europe; Germany's Capital: Will It Be Berlin?".

<sup>20</sup> Cf. The New York Times, "Berlin, Named Seat of Power, Now Wonders if It Has Room", The Guardian (London), "Divided MPs choose today between Bonn and Berlin", The Guardian (London), "Bundesrat's slow farewell to Bonn", The Guardian (London), "Germany's heart and soul: Argument is raging about the location of the pan-German capital city. Should it be Bonn or Berlin? As David Gow reports, the outcome will tell much about who the Germans are - and who they want to be", The Washington Post, "Berlin Voted Government; Move by Germans From Bonn to Take Nearly a Decade", The Washington Post, "For Bonn, A Not So Capital Idea; Foreign Missions Face Costly Move to Berlin", The Washington Post "Kohl Backs Move of Capital to Berlin; Decision Still Must Be Made by Evenly Split Parliament in Bonn", Thierse (1991), Küsters (2011).

<sup>21</sup> Cf. The New York Times, "Bonn Journal; Too Many Capitals (and Knee-Deep in Blueprints)".

<sup>22</sup> Cf. The New York Times, "Berlin, Named Seat of Power, Now Wonders if It Has Room", The Guardian (London), "Germany's heart and soul: Argument is raging about the location of the pan-German capital city. Should it be Bonn or Berlin? As David Gow reports, the outcome will tell much about who the Germans are - and who they want to be", The Guardian (London), "Germans revive Berlin as capital", Blüm (1991), Kujath (2005).

<sup>23</sup> Cf. Cochrane and Passmore (2001), The Globe and Mail (Canada), "BERLIN" A city of extremes and indulgences, this 'is where German reality is concentrated with all its tensions and dynamism' More than 750 years old..and still young at heart".

<sup>24</sup> Cf. Krätke (2004).

<sup>25</sup> Cf. The New York Times, "German Unity Might Cost Berlin Billions in Subsidies".

Bonn officials claimed that the subsidies could be reduced, possibly as soon as 1991, and eliminated entirely within a few years. Berlin officials, on the other hand, said that the city would need the subsidies for several years ahead.<sup>26</sup> Related to this are the huge discrepancies, ranging from DM5 billion to DM100 billion or more, that existed regarding the estimated cost of a move of the government to Berlin. Typically with Berlin proponents at the lower and Bonn advocates at the upper end of the range.<sup>27</sup>

Even before the decision to relocate the government to Berlin, a chronic housing shortage was reported for both halves of the city.<sup>28</sup> With real estate prices already increasing prior to the government relocation decision,<sup>29</sup> Eberhard Diepgen, Berlin's Mayor, promised to avoid a price and rent explosion<sup>30</sup> as well as curbs on land speculators.<sup>31</sup> The decision to move the government from Bonn to Berlin was seen as main driver of Berlin's attraction for developers and investors. They saw little growth elsewhere in Europe. Developers expected that Berlin's potential will turn it into a European metropolis.<sup>32</sup> Some believed that Berlin could challenge London as a natural magnet for property developers in Europe.<sup>33</sup>

In addition, Berlin was applying to host the Olympic Games in 2000.<sup>34</sup> This fueled positive expectations for the city's future even more.

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<sup>26</sup> Cf. Siebert (1991), *The New York Times*, "German Unity Might Cost Berlin Billions in Subsidies", *The Guardian* (London), "Berlin runs into wall of pain", *Australian Financial Review*, "THE PAST IMPOSES ITS PRESENCE", *The New York Times*, "Berlin, the Capital, Fears for Future".

<sup>27</sup> Cf. Küster (2011), *The New York Times*, "Bonn Journal; Too Many Capitals (and Knee-Deep in Blueprints)", *The New York Times*, "Berlin and Bonn Partisans Square Off as Vote for Germany's Capital Nears", *The Advertiser*, "Berlin counts cost of rebirth", *The Guardian* (London), "Germany United: Bonn presses case to continue to serve", *The Guardian* (London), "Germany's heart and soul: Argument is raging about the location of the pan-German capital city. Should it be Bonn or Berlin? As David Gow reports, the outcome will tell much about who the Germans are - and who they want to be", *The Guardian* (London), "Divided MPs choose today between Bonn and Berlin", *The Washington Post*, "Berlin or Bonn?", *The Washington Post*, "In German Debate, History Is a Capital Issue", *The Washington Post*, "Berlin Voted Government; Move by Germans From Bonn to Take Nearly a Decade", *The Washington Post* "Kohl Backs Move of Capital to Berlin; Decision Still Must Be Made by Evenly Split Parliament in Bonn", *The Washington Post* "Kohl Backs Move of Capital to Berlin; Decision Still Must Be Made by Evenly Split Parliament in Bonn".

<sup>28</sup> Cf. *The Guardian* (London), "Berlin runs into wall of pain", *The New York Times*, "Berlin, Named Seat of Power, Now Wonders if It Has Room", *The Guardian* (London), "Germany's heart and soul: Argument is raging about the location of the pan-German capital city. Should it be Bonn or Berlin? As David Gow reports, the outcome will tell much about who the Germans are - and who they want to be".

<sup>29</sup> Cf. *The New York Times*, "Berlin, Named Seat of Power, Now Wonders if It Has Room", *The Guardian* (London), "Europe: Born-again Berlin - Commercial property in Berlin is cheaper than in London, but for how much longer? Frederick Studemann looks at Europe's fastest-growing property market", *The Washington Post*, "For Bonn, A Not So Capital Idea; Foreign Missions Face Costly Move to Berlin".

<sup>30</sup> Cf. *The New York Times*, "Berlin, Named Seat of Power, Now Wonders if It Has Room".

<sup>31</sup> Cf. *The Advertiser*, "Berlin counts cost of rebirth".

<sup>32</sup> Cf. *The Guardian* (London), "Europe: Born-again Berlin - Commercial property in Berlin is cheaper than in London, but for how much longer? Frederick Studemann looks at Europe's fastest-growing property market".

<sup>33</sup> Cf. *The Guardian* (London), "Europe: Capital battle - London, Paris or Berlin? John Willcock reports on the stiff contest to be property business centre of the new Europe".

<sup>34</sup> Cf. *The New York Times*, "Berlin, Named Seat of Power, Now Wonders if It Has Room".

### 3.2.3 Fundamentals and the supply side

In general, the expectations for the future of Berlin were too optimistic. Figure 3.2 depicts the number of residents in Berlin between 1980 and 2001 provided by the German Federal Statistical Office (Statistisches Bundesamt). In the 15 years following the unification there is hardly any change in the population size of Berlin and clearly no trend to approach the number of five or six million.

Figure 3.3 presents the yearly growth rates and evolution of GDP in Berlin and West Germany. The data are provided by the German Federal Statistical Office (Statistisches Bundesamt). For the years 1980 to 1990, the Berlin graphs represent the figures for West Berlin. As of 1991, the figures are for the united Berlin. The GDP of West Berlin closely follows West Germany's GDP prior to the unification. In the years 1992 and 1993 the growth rate for GDP in Berlin is higher than in West Germany. However, the data for Berlin now also includes the former East Berlin. This may explain the marked outperformance. Moreover, as of the mid 1990s, GDP growth in Berlin is considerably lower than in West Germany. This is in strong contrast to the expectations that the united Berlin would experience a strong economic development process and quickly catch up to other German metropolitan areas.

The expectations and optimism about the future of Berlin and its housing prices at the beginning of the 1990s meet at rather fixed short-run Berlin housing supply. Glaeser, Gyourko, and Saiz (2008) show that the incidence and length of bubbles is affected by the existing housing supply. They argue that social welfare losses of housing bubbles may be higher the more elastic the supply side reacts, since this leads to more overbuilding during the bubble. Their model predicts that building during the existence of a bubble causes post-bubble prices to decrease below their levels prior to the bubble formation.

The supply side reaction in Berlin following the unification, indeed, seems to have fostered the strong reversal of real estate prices. Figure 3.4 shows the evolution of construction permits in Berlin. The data is provided by the regional statistical offices of Berlin ("Statistisches Landesamt Berlin" and "Statistik Berlin Brandenburg"). The upper graph presents the number of yearly permits for residential buildings, and the lower graph depicts the number of yearly permits for apartments. In both graphs the numbers until 1990 are for West Berlin and the united Berlin thereafter. The numbers of permits for residential buildings in West Berlin in 1991 coincides with the number for the united Berlin. This explains why there is no break in the series. This is not the case for the number of construction permits for apartments. Following the unification, there is a huge increase in number of construction permits in Berlin. The number of average yearly permits peaks in the mid 1990s, before it decreases with the same pace with which it rose. The completion of apartments in Berlin,<sup>35</sup> depicted in figure 3.5, shows the same pattern. Naturally, the peak in this series is reached with a delay compared to the series of construction permits.

The evidence in this section strongly suggests that the exuberant increases in real estate prices in Berlin were driven by overoptimistic expectations. Neither the change in population nor the growth in income in Berlin developed as expected. In addition, at the end of 1993, the hopes for Berlin to host the Olympic Games were disappointed as well, when Sydney was nominated instead. Changes in fundamentals do not justify the price

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<sup>35</sup> The data is also provided by the regional statistical offices of Berlin.

exaggerations in Berlin. Interest rates, another determinant of the fundamental price of houses, did also not favor the financing of housing purchases. The lower graph of figure 3.2 shows that the strong house price increases in Berlin coincided with an increase of the level of interest rates in Germany. The data for the interest rates are from the Deutsche Bundesbank. While the demand side developed contrary to the high expectations, the supply in the Berlin housing market increased markedly. This explains the burst of the bubble in the mid 1990s.

### 3.3 Data

This paper uses several data sources: the *Handbuch der deutschen Aktiengesellschaften* (edition for the years 1991-1992), a compendium that contains information on all incorporated German firms, Datastream, data from the Bank for International Settlements, the OECD Main Economic Indicators database, and historical price data from the German Federal Statistical Office (Statistisches Bundesamt) and from Berlin statistical regional authorities. In addition, I use data provided by the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin)

I use the *Handbuch der deutschen Aktiengesellschaften* to identify the German publicly traded firms that were active in the real estate business at the beginning of the 1990s. I determine which of these firms were to a strong extent exposed to the Berlin market. These firms enter the sample of the Berlin firms for the financial market analysis.

Datastream provides daily stock prices for German publicly traded firms for the period of the study. In addition, it offers daily adjusted price indices for the entire German market, as well as for the real estate sector. I use these prices and indices for the event study analysis.

To calculate price-rent multiples, the evolution of house prices, and the evolution of building land values for West Berlin, I use data from the transaction database provided by the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). In Germany, every transaction of buildings or land is certified by a notary. The title deeds are registered in the local land register. The committees for land price valuation (Gutachterausschuss für Grundstückswerte) maintain transaction databases based on the land registry data. I compare this data with aggregate data for entire West Germany, provided by the Bank for International Settlements and the OECD Main Economic Indicators database.

In order to compare the evolution of rental markets in West Berlin and West Germany, I use hand-collected data from the German Federal Statistical Office (Statistisches Bundesamt) and from the Berlin statistical regional office. These authorities provide a monthly-adjusted index for prices that represent the cost of living. The index is split into several subcategories, one of which is costs for rents.

### 3.4 Results

This section provides an analysis of the price exaggerations in the Berlin real estate sector for three different markets. The first subsection presents the financial markets performance of a sample of publicly traded real estate firms that were exposed to the



Berlin real estate market. The analysis then turns to the prices for housing and building land values in West Berlin. The final subsection, provides data on rent prices in Berlin.

### 3.4.1 Real estate firms in the financial markets

From the *Handbuch der deutschen Aktiengesellschaften* (edition for the years 1991-1992), a compendium that contains information on all incorporated German firms, I can identify German firms that were active in the real estate markets as of the end of the 1980s.<sup>36</sup> In this section, I show how firms that were exposed to the Berlin real estate market performed with respect to various benchmark markets following the fall of the Berlin Wall. The sample of Berlin exposed real estate firms strongly outperformed the benchmarks after the Fall of the Berlin Wall. This outperformance even accelerated after mid 1991, when the government relocation decision was taken. However, the outperformance stopped, and eventually reversed after a few years. At the end of the 1990s, the sample of Berlin firms had a lower performance than the benchmark indices.

The upper graph of figure 3.1 presents the comparison of the cumulated daily stock market returns from the beginning of 1989 until 2000. The Berlin sample consists of six publicly traded German companies that were active in the real estate business and fully or partially exposed to the West Berlin market as of 1989.<sup>37</sup> The German market index is provided by Datastream and represents the entire German stock market. The left vertical dotted line depicts the date of the fall of the Berlin Wall, November 9, 1989. The right vertical dotted line depicts the date of the government relocation decision, June 20, 1991. The figure shows that throughout the year 1989 there is hardly any difference between the two indices. This changes markedly in the weeks and months after the fall of the Berlin Wall. The outperformance of the Berlin sample with respect to the market is intensified following the government relocation decision. The difference in price levels for the two indices is maintained for some years. However, in the mid 1990s the stock market prices for the Berlin firms decrease to some extent, while the entire German stock market experiences strong returns. At the end of the 1990s, the Berlin firms have not only lost the gains from the outperformance with respect to the market, but actually suffer on average from a lower valuation than the market. The initial outperformance is more than fully reversed.

The lower graph of figure 3.1 illustrates the different performance of the two indices in the stock market. The figure plots the cumulated difference in daily returns between the Berlin sample and the German market index. It clearly depicts the inverse U-shape of the capital markets performance of the Berlin real estate sample with respect to the performance of the entire German market.

Figures 3.A1 through 3.A3 in the appendix show the repetition of the above exercise. The data for the graphs is provided by Datastream. Instead of the index for the entire

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<sup>36</sup> Appendix A shows a list with information on the German firms that I identify to have received all or a large part of their sales from rents, leases, or operations in the real estate business. It is important to note, however, that for some firms it is difficult to make a clear-cut decision of whether their main business was in real estate and, in particular, where exactly their assets were located. I analyze the company reports from the *Handbuch der deutschen Aktiengesellschaften* and try to classify the main business and the markets of the firms based on this information. Table 3.A1 in the appendix gives the description for each firm that motivated the decision to include it in the respective sample.

<sup>37</sup> Cf. the appendix (table 3.A1) for a more detailed description the firms that enter the financial markets analysis.

German market, figure 3.A1 uses the industry index for financial firms and figure 3.A2 the sector index for real estate firms as the benchmark index. In figure 3.A3, the benchmark consists of a sample of firms that were operating in the real estate sector and were exposed to German metropolitan areas, but not to the Berlin real estate market.<sup>38</sup> This control sample consists of 9 real estate firms.<sup>39</sup> Figures 3.A1 through 3.A3 confirm the strong initial outperformance of the Berlin sample with respect to the benchmarks. As of the mid 1990s, the outperformance is replaced by a reversal towards the price level of the respective benchmark. This reversal is less pronounced in figure 3.A3, though.

For a more technical examination, I perform a simple event study for the 15 real estate firms (six Berlin real estate firms and nine real estate firms exposed to other German metropolitan areas) for the two events of interest. The first event is the fall of the Berlin Wall on November 9, 1989 and the second is the decision of the government relocation on June 20, 1991. I start with the market model specification:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it} \quad (3.1)$$

where  $R_{it}$  is the return of stock  $i$  on day  $t$ .  $R_{mt}$  is the return of the market index.<sup>40</sup>

The model is fitted for each stock of the real estate firms within an estimation window of -240 to -20 trading days prior to the event. The fitted values of these regressions yield a predicted value of individual stock returns. I use these predicted values to calculate the abnormal returns as difference between actual and predicted returns within different event windows:

$$AR_{it} = R_{it}^* - (\hat{\alpha}_i + \hat{\beta}_i R_{mt}^*) \quad (3.2)$$

where  $AR_{it}$  is the abnormal return for stock  $i$  on day  $t$ .  $\hat{\alpha}_i$  and  $\hat{\beta}_i$  are the fitted coefficients from the estimation window.  $R_{it}^*$  and  $R_{mt}^*$  are the respective returns on day  $t$  within the event window. The abnormal returns for individual securities are aggregated across the trading days  $D_i$  of the respective event window, which yields the cumulative abnormal returns for each security:

$$CAR_i = \sum_{t=D_i}^{D_e} AR_{it} \quad (3.3)$$

To analyze the effect of the fall of the Berlin Wall and the government relocation decision on Berlin real estate firms in comparison to other German real estate firms, I estimate the following cross-sectional regression:

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<sup>38</sup> I consider as German metropolitan areas relevant for the real estate sector the following cities: Berlin, Hamburg, Munich, Frankfurt, Cologne, Stuttgart, Dusseldorf.

<sup>39</sup> Cf. Appendix 1 for a list of firms that enter the sample and a more detailed description.

<sup>40</sup> I use the German market index provided by Datastream.

$$CAR_i = \alpha + \beta_1 Berlin + \beta_2 X_i \quad (3.4)$$

where  $CAR_i$  is the cumulative abnormal return for firm  $i$ ,  $Berlin$  is equal to one if the respective firm is exposed to the Berlin real estate market and equal to zero otherwise, and  $X_i$  includes firm size captured by  $Log(\text{Market value})$ .

The results for the two events are summarized in table 3.2. Panel A presents the results for the specification in (4) for the event of the fall of the Berlin Wall for two different event windows. Columns (1) and (2) show the performance of the Berlin real estate sample with respect to other German real estate firms in a short-term perspective, using a ten-day event window. Berlin real estate firms, on average, outperform real estate firms that are not exposed to the Berlin market by more than five percent in the ten days following the Fall of the Berlin Wall. However, the difference is not statistically significant. Columns (3) and (4) present the cross-sectional results in a long-term perspective, with an event window of over 800 trading days. The length of the event window is determined by the date (mid December 1992) for which the outperformance of the Berlin sample with respect to the German market reaches its maximum. The outperformance of Berlin firms with respect to other German real estate firms reaches more than 100% in that period.

Panel B reports the results for an event study, using the government relocation decision as the event day. As can be seen from columns (1) and (2), Berlin firms outperform other German real estate firms by around six percent in the immediate aftermath of the relocation decision. Columns (3) and (4) show that the outperformance between the relocation decision and the date (mid December 1992) of the maximum difference between Berlin firms and the German market amounts to more than 40%.

The financial markets analysis documents a fairly similar performance of the sample of Berlin exposed *real* estate firms and several benchmarks in the late 1980s. This shifts abruptly to a marked outperformance of the Berlin sample following the fall of the Berlin Wall and the decision to relocate the German government from Bonn to Berlin. By looking at the financial market behavior, one can clearly identify the political events that triggered and intensified the initiation of the bubble.

### 3.4.2 Berlin housing prices and building land values

This subsection discusses the evolution of Berlin housing prices and building land values during the 1980s and 1990s and compares it to the evolution of prices in the rest of Germany. The data for Berlin is provided by the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). In Germany, every transaction of buildings or land is certified by a notary. The title deeds are registered in the local land register. The committees for land price valuation (Gutachterausschuss für Grundstückswerte) maintain transaction databases based on the land registry data. The analysis focuses on all transactions of homes and land for West Berlin from 1980 through 2000. I merely examine prices for West Berlin because the transactions for East Berlin are not recorded before the unification. I calculate yearly averages of price-rent multiples from the data.

While some scholars claim that price-rent and price-income ratios generally are not able to accurately reflect housing costs, others state that the volatility of the price-rent ratios can be interpreted as an indication of inefficiencies in the real estate market

(see, e.g., Scherbina and Schluse 2012). Here, I present a strong increase of multiples, with a subsequent reversal to the initial level. Housing fundamentals did hardly change during these price movements. I do not try to answer the question whether at any point in time the Berlin multiples correctly predict inefficiencies in housing prices. I rather claim that the pattern of multiples during the 1990s is mainly driven by changes in expectations, rather than fundamentals. The upper graph of figure 3.6 presents average price-rent multiples for apartment houses in West Berlin. The multiples are fairly stable between 10 and 12 during the decade of the 1980s. They show an enormous increase following the fall of the Berlin Wall and almost double their value during the early 1990s. However, the striking increase is followed by an equally strong decrease as of 1993. In 2000, the multiples are back to the value that prevailed during the 1980s.

The lower graph of figure 3.6 compares the multiples for West Berlin to the average price-rent multiples for West Germany. The multiples data for West Germany are taken from the OECD's Main Economic Indicators Database. The series are normalized to 100 for the beginning of 1981. Except for a small jump in the multiples for Berlin, the multiples in Berlin and West Germany compare fairly well until the end of the 1980s. The Berlin multiples then deviate strongly from the entire country's market following the fall of the Berlin Wall. However, in 2000 the multiples for West Berlin have almost returned to the level for West Germany.

The upper graph of figure 3.7 shows the nominal yearly average house prices per square meter in West Berlin. The series is calculated with data provided by the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). The level of house prices in West Berlin is already increasing during the 1980s. However, it is rather stable after 1985 and then jumps up beginning in the end of 1989. The price level more than doubles between 1988 and 1993, just to begin a strong descent after 1993. Until the year 2000, the price level has almost reversed back to its level just before the fall of the Berlin Wall.

The lower graph of figure 3.7 compares the house prices in West Berlin to several indices for prices of houses of different characteristics in West Germany. The data for the German indices comes from the Bank for International Settlements, which compiles the data from German statistical authorities and companies (Deutsche Bundesbank and Ring Deutscher Makler). Prior to 1989, the house values in Berlin outperform the rest of the West German house values to some extent. However, this pattern is driven by large jumps in prices in West Berlin in 1983 and 1984. House prices in West Berlin and West Germany between 1985 and 1989 evolve fairly similar. Comparable to the before-mentioned markets, a huge gap in prices arises between the two indices as of 1989. The gap reaches its maximum in 1993/1994 and diminishes afterwards.

The upper graph of figure 3.8 presents the nominal average prices per square meter of building land in West Berlin. The series is calculated with data provided by the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). A very similar pattern as for the multiples and house prices prevails. I plot the series as of 1985 for illustration that the strong increase in prices after the fall of the Wall is fully reversed to the level in 1985. Between 1980 and 1985 a considerable increase in prices already takes place.

The lower graph of figure 3.8 compares the evolution of average prices per square meter of building land in West Berlin with average prices in West Germany. The data for the German index is taken from the German Federal Statistical Office

(Statistisches Bundesamt - Destatis). Prices in West Berlin grow much stronger than West Germany following the fall of the Berlin Wall. However, while by the mid 1990s the price levels in West Berlin begin to fall again, the prices for West Germany increase and eventually cross the prices in West Berlin and strongly outperform them.

The price movements for houses and building land confirm the financial markets analysis. The inverse U-shape pattern - similar to the pattern in the adjusted returns for the Berlin financial markets sample - exists for housing and building land prices, as well as for the price-rent multiples. Depending on the respective market, the temporal occurrence and the characteristics of the patterns differ to some extent. But the initial deviation from the market benchmark and the subsequent return to it prevails in all markets.

### 3.4.3 Rent price indices

In this section, I compare prices in the renting markets of West Berlin and West Germany. Changes in this market are less pronounced. However, the pattern of a reversal following an initial outperformance of the prices in West Berlin, is clearly present for rents as well.

Figure 3.9 shows how price indices for rents for representative households evolve over time. I use hand-collected data from the German Federal Statistical Office (Statistisches Bundesamt) and from the Berlin statistical regional office. These authorities provide a monthly-adjusted index for prices that represent the cost of living. The index is split into several subcategories, one of which is costs for rents. The rents are on a monthly basis. The graph shows how the respective indices for West Berlin and West Germany compare between the beginning of 1988 and the end of 2001.<sup>41</sup> The indices are normalized such that they are equal to 100 in January 1988.

For several years, there is hardly any difference in the two indices. This changes, however, as of mid 1992. The index for rent prices for West Berlin begins to outperform the rent price index for entire West Germany. This outperformance accelerates and peaks in May, 1996. After that peak, the indices start to converge again, until they cross in March, 2001. For the rest of the observation period the index for Berlin lies below the one for Germany.

Table 3.3 shows a statistical comparison of the indices for Berlin and Germany prior (“before” period) to the major events and after (“after “ period) these events until the peak of the outperformance of the Berlin index. This peak is reached in May 1996. Each observation depicts the level of the respective index in a specific month in the time period from January 1988 until May 1996. I analyze how the mean of the differences of the two indices changes across time. Panels A through C provide results for three different “cutoff” dates that separate the time period from 1988 to 1996 into the “before” and “after” period. Panel A shows that the mean of the monthly differences between the two indices between January 1988 and November 1989, the month in which the Berlin Wall was opened (“before” period), is 0.29. The mean of the monthly differences between November 1989 and May 1996, is 3.41. The difference in the mean of the two indices within the “before” period is not statistically significant, while it is in the “after” period, although merely on the 90% level of confidence. The difference

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<sup>41</sup> As of September, 2001 the statistical office in Berlin merely provides data for the united Berlin.

between the mean differences in the “before” and “after” period is 3.12. It is statistically significant at the 99% level of confidence.

Panel B shows the results for using the government relocation decision as the cutoff date. The “before” period now lasts from January 1988 until May 1991. The “after” period begins in June 1991 and lasts until May 1996. Again the difference in the means of the two indices is not statistically significant in the “before” period, while it is in the “after” period, on the 95% level of confidence. The difference between the mean differences in the “before” and “after” period is 3.61. It is statistically significant at the 99% level of confidence.

Naturally, rent prices do not react immediately. It seems that the major event causing the divergence of the two rent price indices is the government relocation decision. Given the relatively slow adjustment of rent prices, it is likely that the future expectations regarding the relocation decision manifested in the rent price market with some delay. Panel C provides results on the difference in the two rent prices indices with May 1992, one year after the relocation decision, as the cutoff date. The results are even more striking than those for the other cutoff dates. The difference in the means of the two indices is not statistically significant in the “before” period, while it is in the “after” period, on the 99% level of confidence. The difference between the mean differences in the “before” and “after” period is 4.41. It is statistically significant at the 99% level of confidence.

The renting market shows a similar behavior to the previously discussed markets. The inverse U-shape that is symptomatic for the presence of a bubble is also present in this market. Changes in rent prices are often considered as changes in fundamentals. However, as can be seen from the price-rent multiples, the price behavior of rents in Berlin cannot explain the huge price exaggerations in the real estate market.

### **3.5 Conclusion**

In this paper, I present evidence of a bubble episode in the real estate market in West Berlin after the German unification. This is a well-identified example of price exaggerations and their reversal in a specific market. Following the fall of the Berlin Wall at the end of 1989, real estate related prices in West Berlin strongly outperform West German benchmarks. However, after the prices peak, they strongly decrease again, and by the year 2000 most prices have completely reversed to the benchmarks. The pattern exists in capital markets, in housing and building land markets, as well as in the renting market.

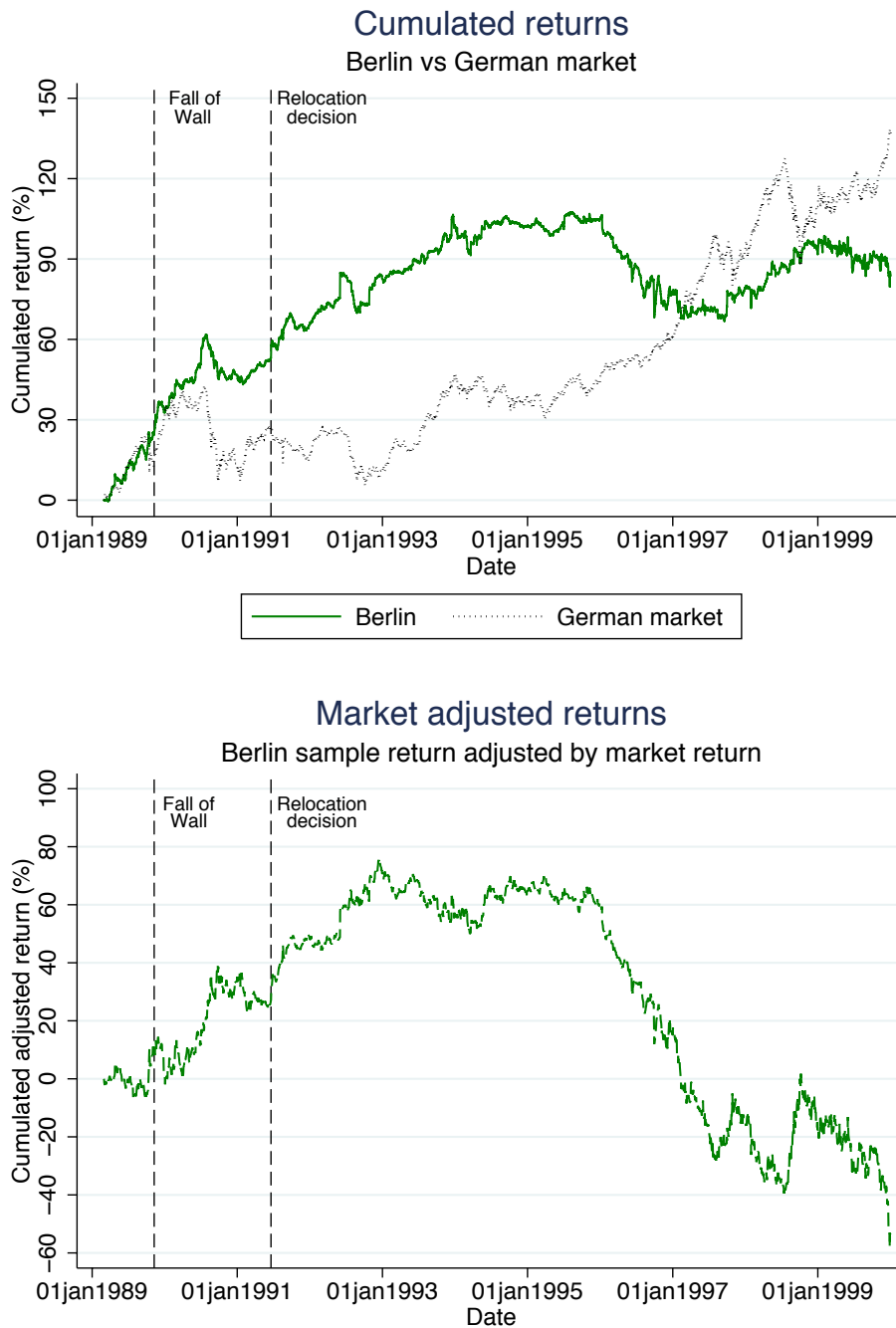
My analysis makes use of traditional measures of bubbles, like price-rent multiples. However, the specific circumstances of the events in Germany enable me to use prices in other West German markets as a benchmark for Berlin fundamentals. In the respective markets of the study, Berlin prices behave similar to these benchmark prices prior to the beginning of the unification process. The economic and political environment for West Berlin and West Germany was the same before the unification. There is no marked deviation in fundamentals between the two areas, following the fall of the Berlin Wall. Interest rates in Germany increased in the immediate years after the unification. This made the financing of housing purchases rather less than more attractive. Population and GDP growth in Berlin did not sufficiently outperform the rest of Germany to justify the marked deviations in prices at the beginning of the 1990s.

The price increases in Berlin after the fall of the Berlin Wall cannot be explained by changes in fundamentals. The provided evidence strongly suggests that investor's expectations regarding Berlin's future were far too optimistic. The initial price deviations in the Berlin markets, therefore, are merely driven by misguided expectations and cannot be rationalized by changes in the fundamentals.

The study provides insight into how bubbles in housing markets can form. In Berlin at the beginning of the 1990s, investors were betting on higher future prices. Expectations regarding the prospects of the city were unrealistic. Politicians, rather than dampening the expectations, enforced the expectations at least indirectly through dubious statements during the debates regarding the government location. The expectations met a fixed housing supply, which culminated in enormous price increases. Once the housing supply, with growth rates comparable to those of housing prices, caught up and expectations were revised the bubble in Berlin burst.

### 3.6 Figures and tables

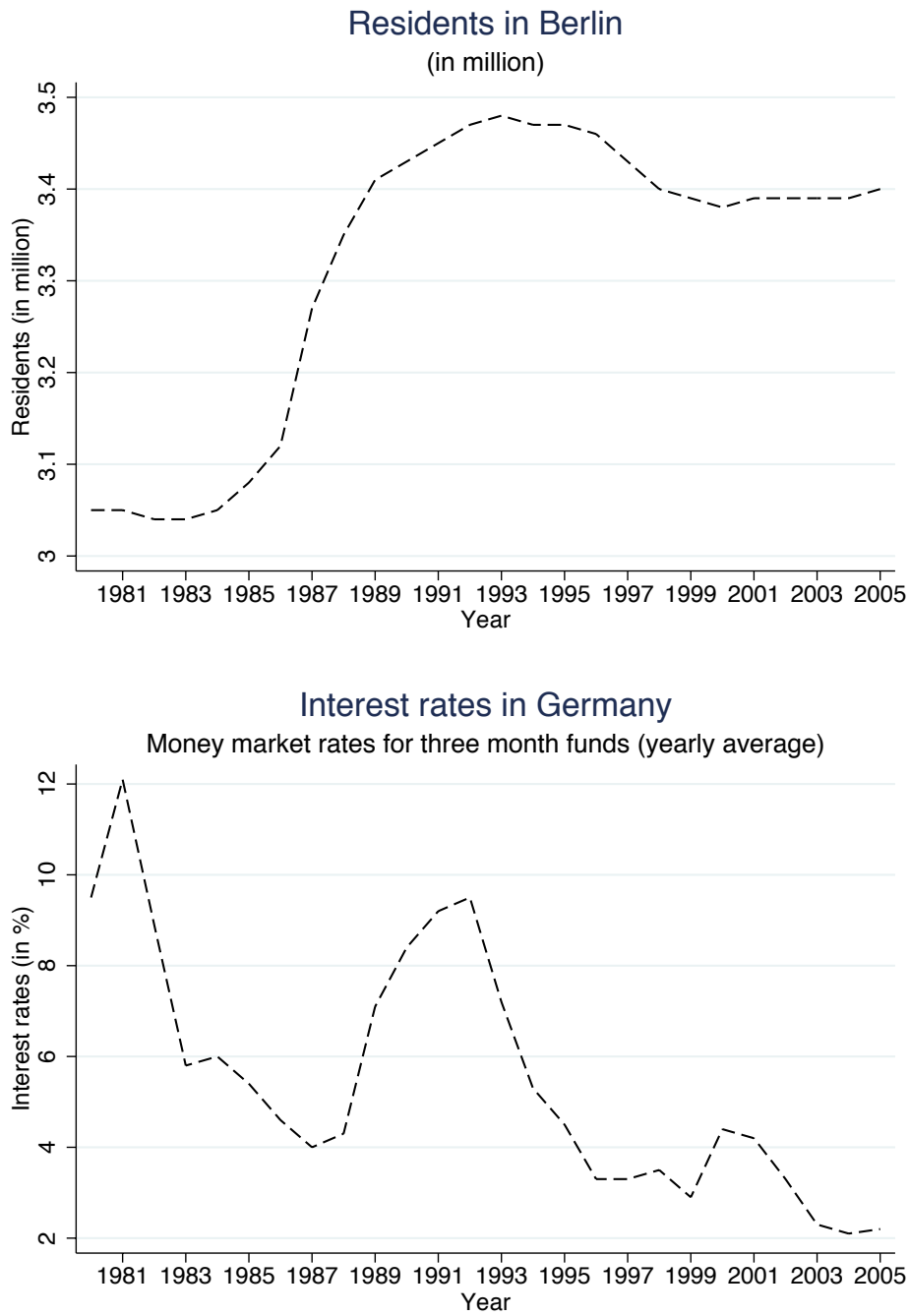
Figure 3.1: Real estate related stock market returns and the German stock market



Notes: The upper graph presents the comparison of the cumulated daily stock market returns from the beginning of 1989 until 2000. The Berlin sample consists of six publicly traded German companies that were active in the real estate business and fully or partially exposed to the West Berlin market as of 1989. The German market index represents the entire German stock market. The lower graph shows the difference of the cumulated returns between the Berlin sample and the German market index. The data is provided Datastream.

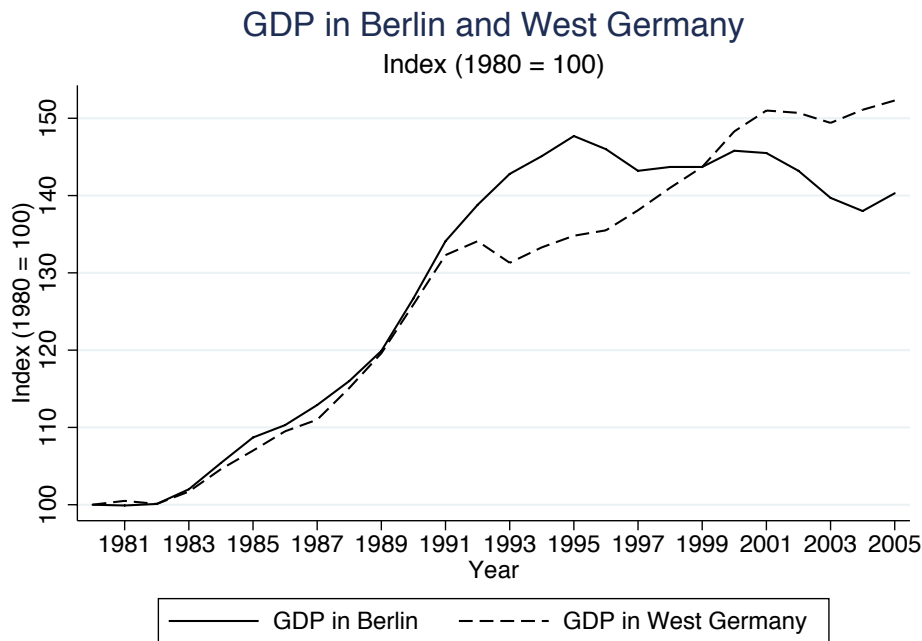
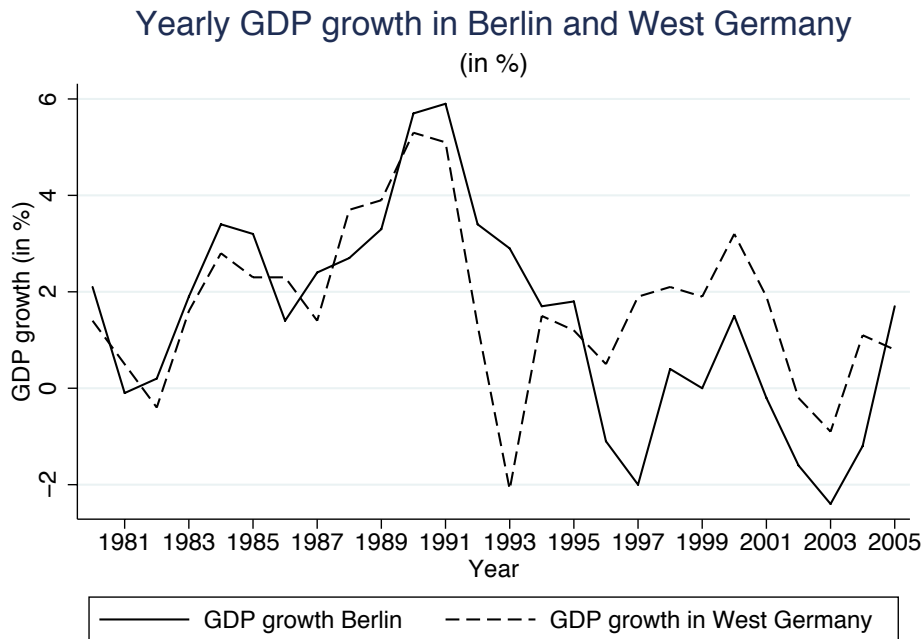


Figure 3.2: Berlin residents and German interest rates



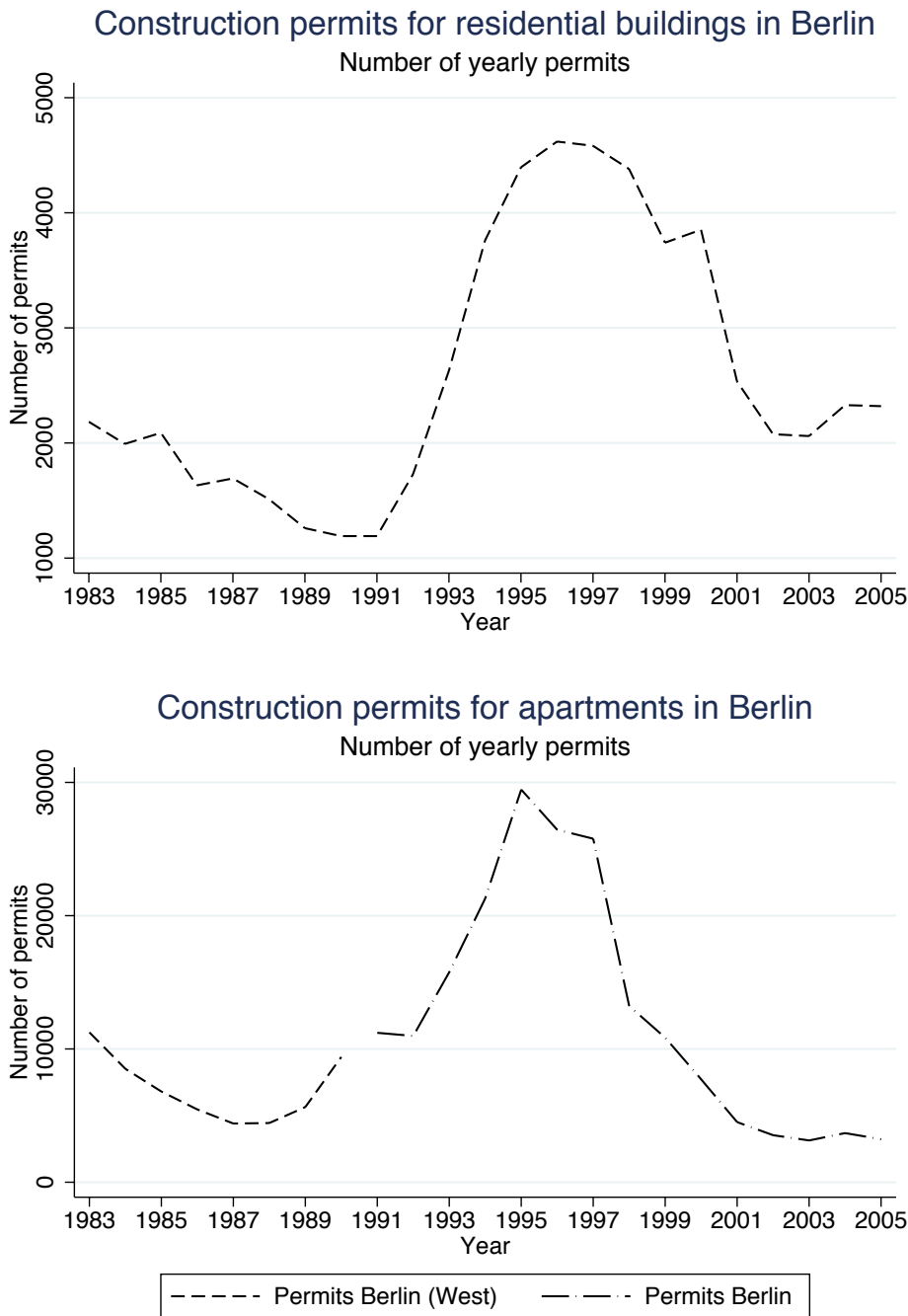
Notes: The upper graph presents the evolution of the number of residents in Berlin. The data is provided by the German Federal Statistical Office (Statistisches Bundesamt). The lower graph provides the evolution of German money market rates for three month funds (yearly average). The data is provided by the Deutsche Bundesbank.

Figure 3.3: GDP in Berlin and West Germany



*Notes:* The upper graph presents the yearly GDP growth rates in Berlin and in West Germany. The growth rates for Berlin between 1980 and 1990 are for West Berlin and thereafter for the united Berlin. The lower graph shows the evolution of GDP for Berlin and West Germany and is normalized to 100 in 1980. The index for Berlin between 1980 and 1990 is for West Berlin and thereafter for the united Berlin. The index for the united Berlin is normalized to the value in West Berlin in 1991 and thereafter presents the evolution for the united Berlin. The data is provided by the German Federal Statistical Office (Statistisches Bundesamt).

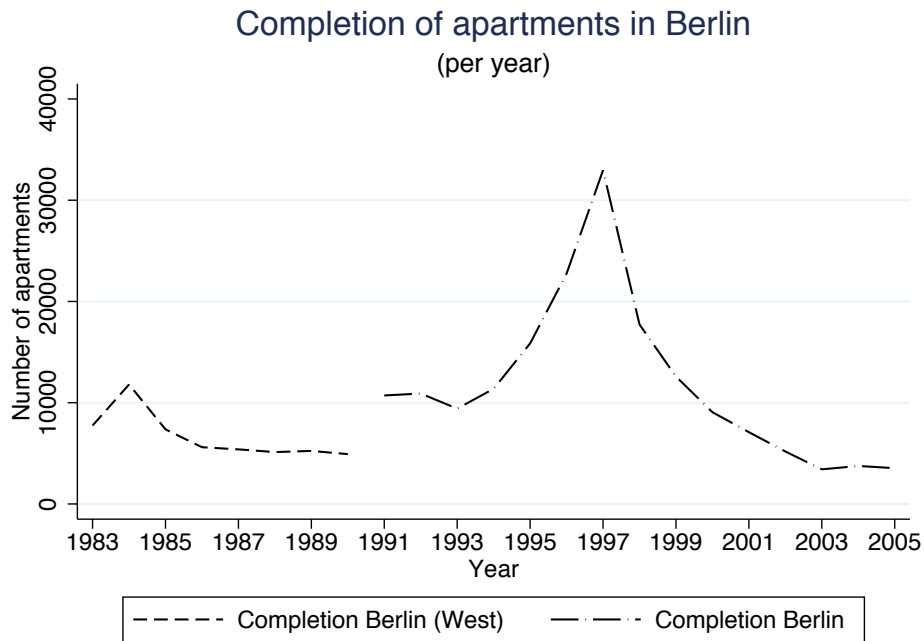
Figure 3.4: Construction permits in Berlin



Notes: The upper graph shows the yearly average of construction permits for residential buildings in Berlin. Between 1983 and 1990 the numbers are for West Berlin and for the united Berlin thereafter. The numbers for West Berlin in 1990 and the united Berlin in 1991 are essentially the same. Therefore, there is no break in the series. The data is provided by the regional statistical offices of Berlin (Statistisches Landesamt Berlin and Statistik Berlin Brandenburg).

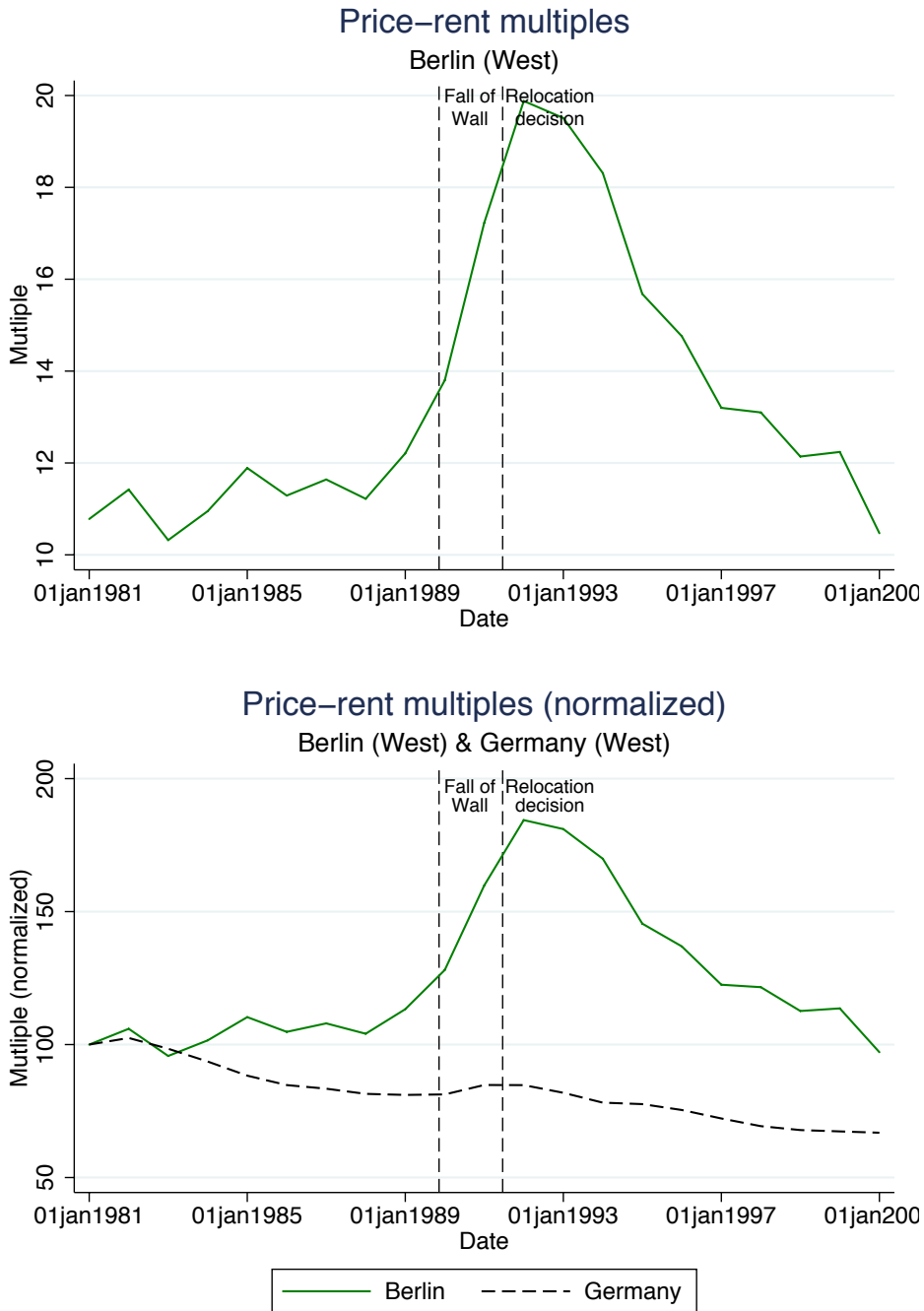
The lower graph shows the yearly average of construction permits for apartments in Berlin. Between 1983 and 1990 the numbers are for West Berlin and as of 1991 for the united Berlin.

Figure 3.5: Completion of apartments in Berlin



*Notes:* The graph presents the yearly average of completed apartments in Berlin. Between 1983 and 1990 the numbers are for West Berlin and as of 1991 for the united Berlin. The data is provided by the regional statistical offices of Berlin (Statistisches Landesamt Berlin and Statistik Berlin Brandenburg).

Figure 3.6: Price-rent multiples in West Berlin and Germany

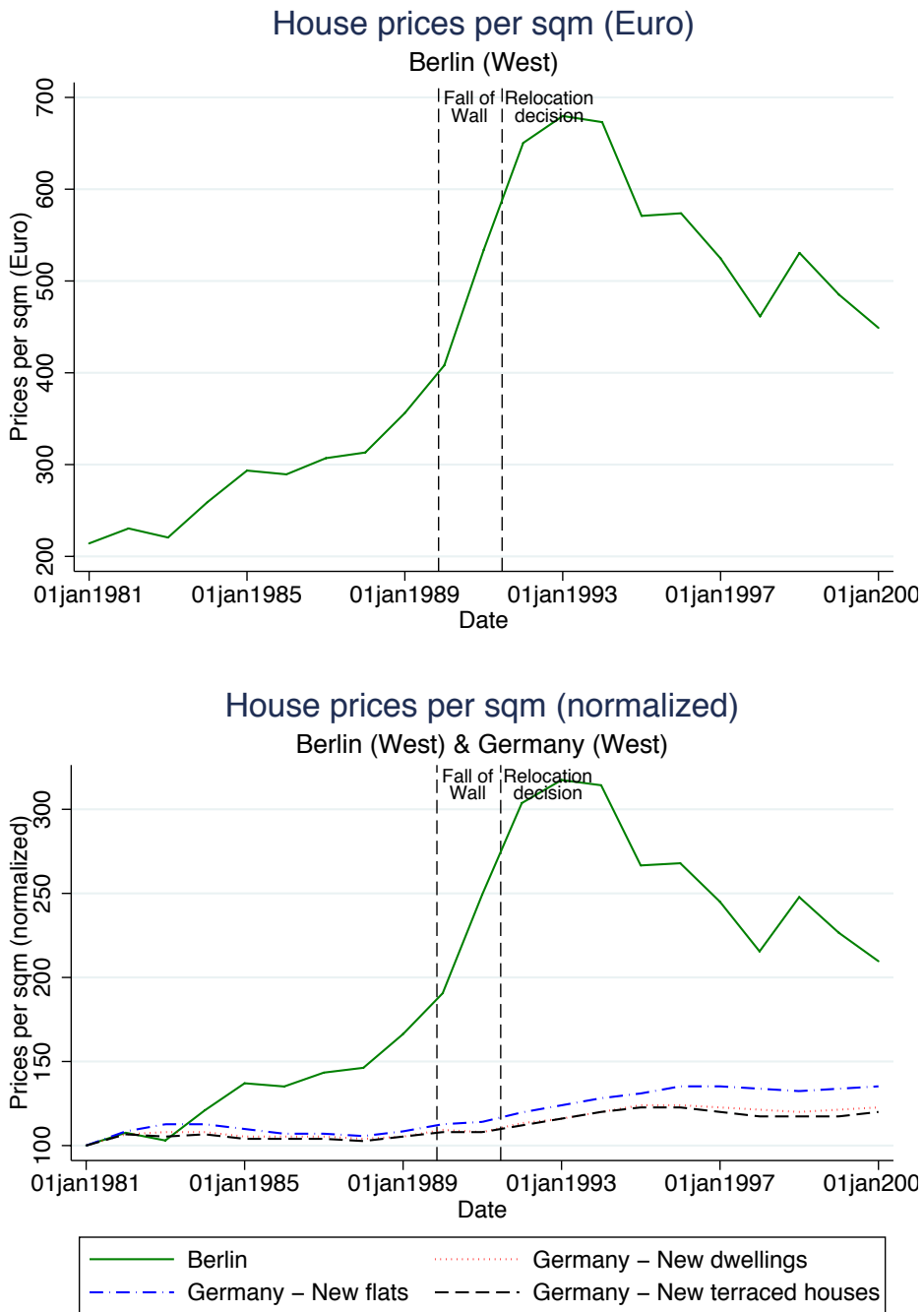


Notes: The upper graph presents nominal yearly averages of price-rent multiples for the West Berlin housing market.

The lower graph compares the evolution of West Berlin price-rent multiples to those in West Germany. The indices are normalized to 100 in 1980.

The graphs for Berlin are based on the author's own calculations using data from the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). The data for Germany is provided by the OECD.

Figure 3.7: House prices in West Berlin and West Germany

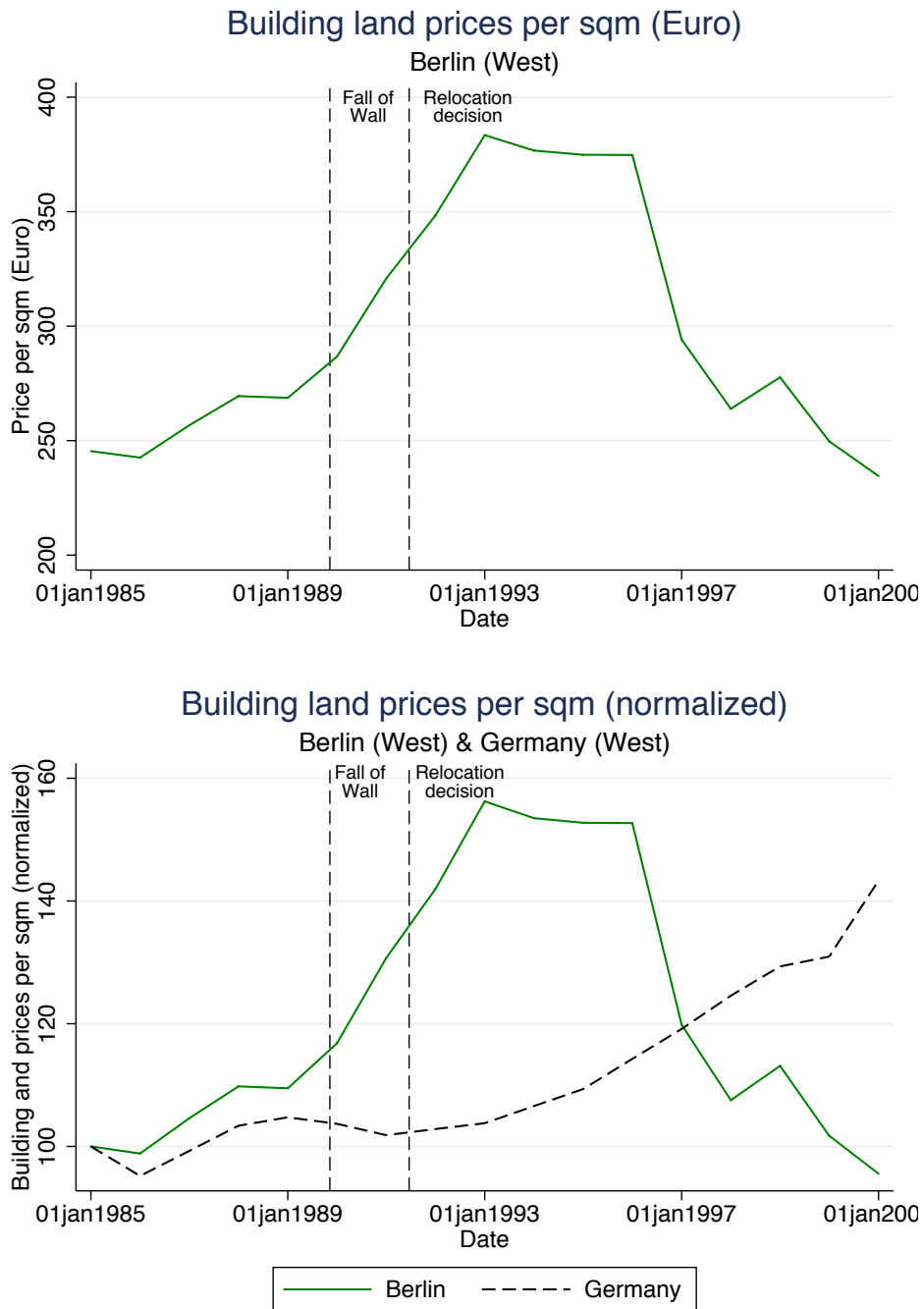


*Notes:* The upper graph presents nominal yearly averages of house prices per square meter in the West Berlin housing market.

The lower graph compares the evolution of West Berlin house prices to those in West Germany. The indices are normalized to 100 in 1980.

The graphs for Berlin are based on the author's own calculations using data from the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). The data for Germany is provided by the Bank for International Settlements.

Figure 3.8: Building land prices in West Berlin and West Germany

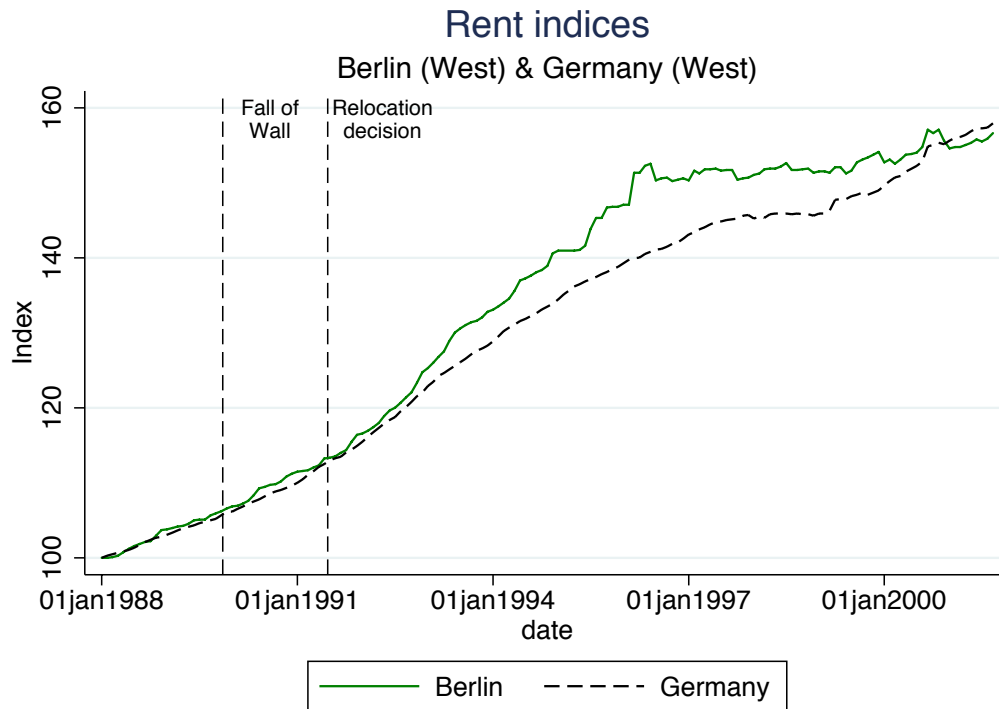


Notes: The upper graph presents nominal yearly averages of prices per square meter of building land in the West Berlin.

The lower graph compares the evolution of West Berlin building land prices to those in West Germany. The indices are normalized to 100 in 1985.

The graphs for Berlin are based on the author's own calculations using data from the Berlin committee for land price valuation (Gutachterausschuss für Grundstückswerte Berlin). The data for Germany is provided by the German Federal Statistical Office (Statistisches Bundesamt).

Figure 3.9: Rent price indices in West Berlin and West Germany



Notes: The graph presents the comparison of the monthly rent price indices for West Berlin and West Germany. Both indices are normalized to 100 for January 1988. The data for Germany is provided by the German Federal Statistical Office (Statistisches Bundesamt). The data for Berlin is provided by the Berlin regional statistical office.



Table 3.1: Chronology of main events

1989	November 9	Fall of the Berlin Wall
1990	May 18	Treaty on the Currency, Economic and Social Union (Staatsvertrag zur Währungs-, Wirtschafts- und Sozialunion) is signed; Chancellor Kohl: "hour of birth of the free and united Germany"
	July 6	First round of negotiations of the Unification Treaty
	August 6	Completion of first draft of the Unification Treaty
	August 31	Unification Treaty is signed
	October 3	Entry into force of the accession of the German Democratic Republic to the scope of application of the constitutional law of the Federal Republic of Germany
	December 2	First federal elections in the unified Germany
1991	April 23	Representatives of the German constitutional bodies decide that on June 20, 1991, the decision regarding the location of the government will be taken by vote in the parliament
	June 20	At 21.47pm the German parliament decides that Berlin will be the future seat of government and parliament

Table 3.2: Mean cumulative abnormal returns

Panel A: Event study for Fall of the Berlin Wall (November 9, 1989)				
	(1)	(2)	(3)	(4)
Event days	10 (0; 9)	10 (0; 9)	807 (0; 806)	807 (0; 806)
Berlin	0.0521 (0.19)	0.0541 (0.202)	1.1781** (0.041)	1.0145* (0.053)
Log(market value)		0.0039 (0585)		-0.3226** (0.014)
Constant	-0.0089 (0.511)	-0.0279 (0.452)	-1.7636*** (0.000)	-0.2013 (0.738)
Number of firms	15	15	15	15
R-square	0.161	0.169	0.274	0.471
Panel B: Event study for government relocation decision (June 20, 1991)				
	(1)	(2)	(3)	(4)
Event days	10 (0; 9)	10 (0; 9)	387 (0; 386)	387 (0; 386)
Berlin	0.0595*** (0.010)	0.0608*** (0.010)	0.4695** (0.044)	0.4194** (0.040)
Log(market value)		0.0026 (0.654)		-0.0988* (0.086)
Constant	-0.0033 (0.649)	-0.0157 (0.590)	-0.0594 (0.655)	0.4190 (0.169)
Number of firms	15	15	15	15
R-square	0.4718	0.4802	0.2803	0.3994

*Notes:* The table reports the OLS results from an event study examining the cumulated abnormal returns for two different events and two different event windows. Panel A shows results for the event of the fall of Berlin Wall, while panel B presents results for the government relocation decision as the event day. Columns (1) and (2) show the results for a 10-day event window, while columns (3) and (4) focus on the respective event window from the event day until mid December 1992, when the maximum difference between the Berlin sample and the German market index is reached. Abnormal returns are computed using the market model. The dependent variable in the OLS regression is the cumulative abnormal return of the respective German real estate firms. “Berlin” is a dummy that is equal to one if the real estate firm is fully or partly exposed to the Berlin real estate market and zero otherwise. P-values are based on robust standard errors and are reported in parentheses. \*, \*\*, and \*\*\* indicate significance at the 10%, 5%, and 1% levels, respectively.

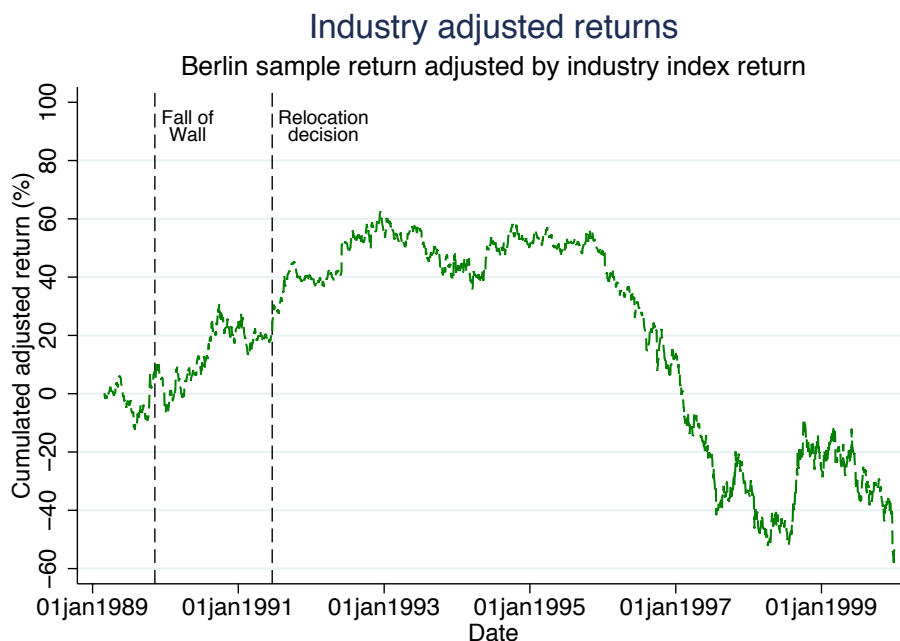
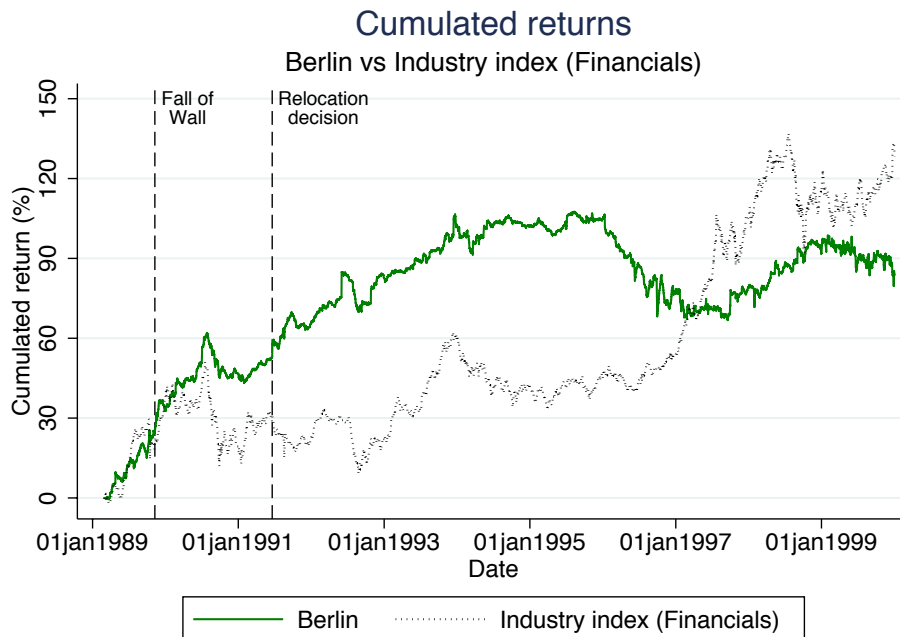
Table 3.3: Differences in rent price indices (assuming unequal variances)

Panel A: Cutoff that divides observations in “before” and “after” periods: Fall of Berlin Wall (Nov., 1989)				
	before	after	difference	t-stat
Mean of differences	0.29	3.41	3.12	9.22***
Observations	22	79		
t-stat (test: difference in mean = 0)	0.51	1.7*		
Panel B: Cutoff that divides observations in “before” and “after” periods: Government relocation decision (June, 1991)				
	before	after	difference	t-stat
Mean	0.59	4.20	3.61	9.36***
observations	41	60		
t-stat (test: difference in mean = 0)	0.72	2.27**		
Panel C: Cutoff that divides observations in “before” and “after” periods: 1yr after government relocation decision (June, 1992)				
	before	after	difference	t-stat
Mean	0.61	5.07	4.46	11.70***
observations	53	48		
t-stat (test: difference in mean = 0)	0.60	3.15***		

*Notes:* This table compares the differences in the rent price indices for West Berlin and West Germany before and after different (event determined) cutoff dates. The “before” period lasts from January 1988 to the respective cutoff date. The “after” period lasts from the respective cutoff date until May 1996, the month with the maximum difference between the two indices. Observations gives the number of months in each period, e.g., in Panel A there are 22 months in the “before” period that lasts from January 1988 to November 1989. The indices are provided on a monthly basis. Therefore, for each month there is one observation of the difference between the two indices.

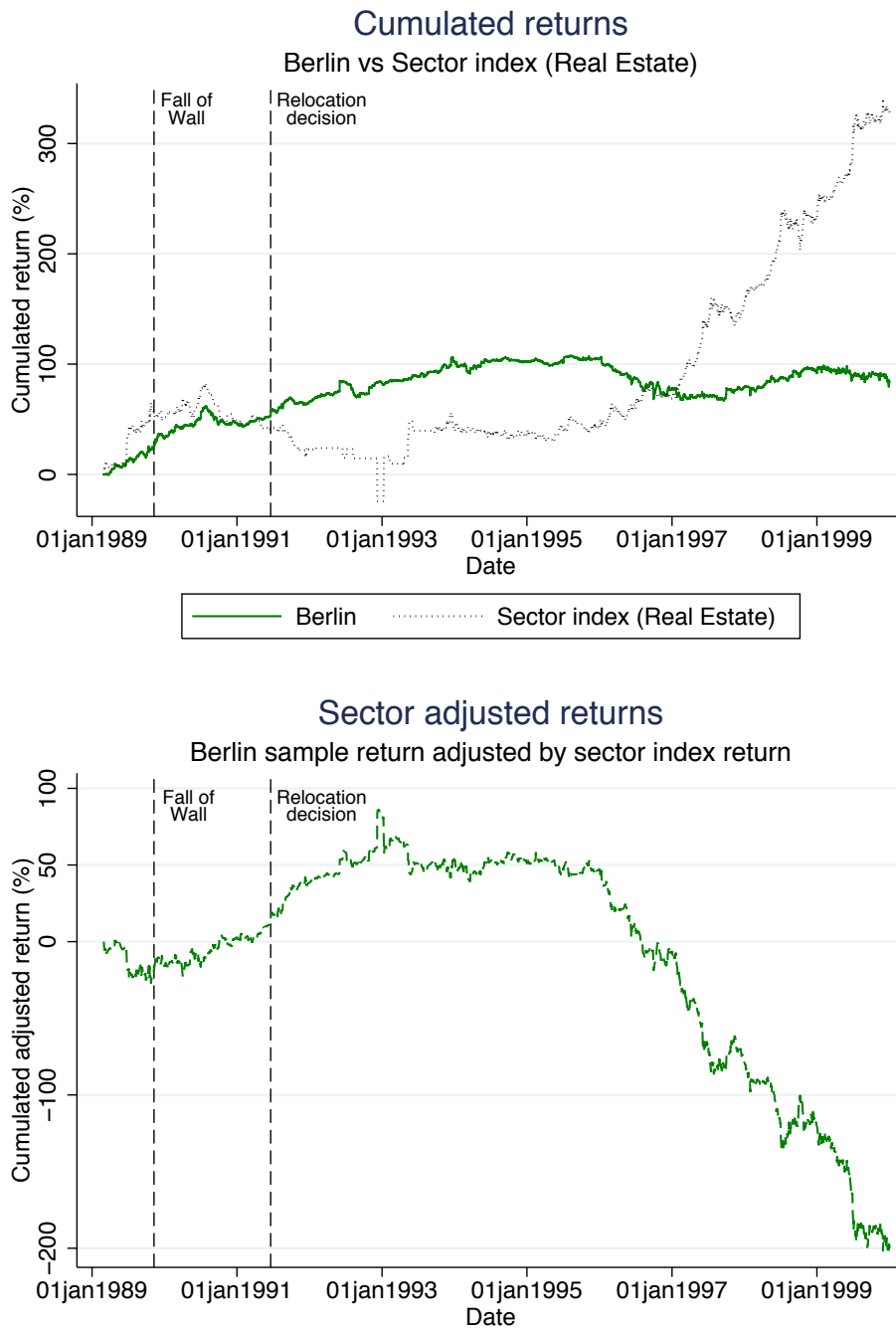
### 3.7 Appendix A: Supplemental figures and tables

Figure 3.A1: Real estate related stock market returns and financials industry returns



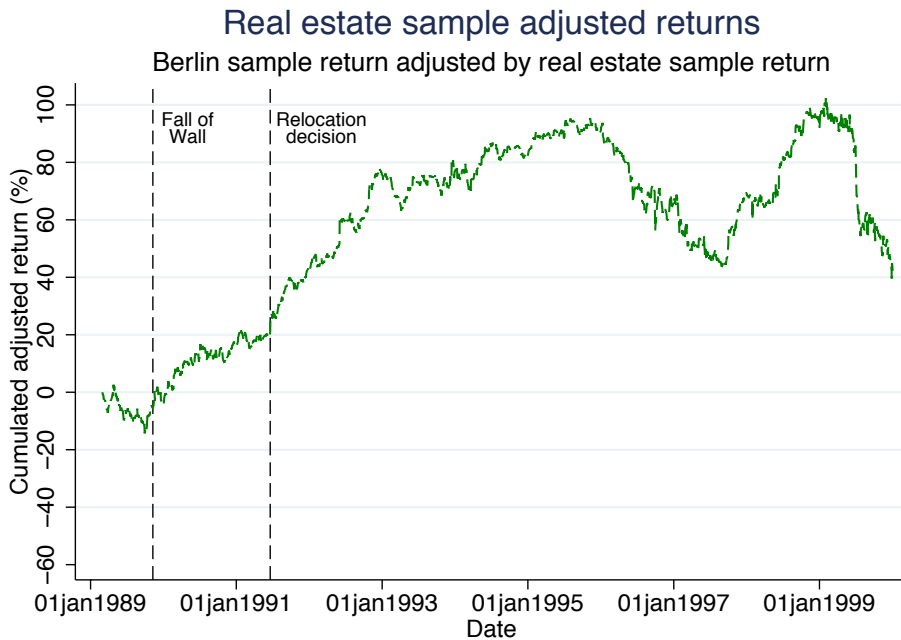
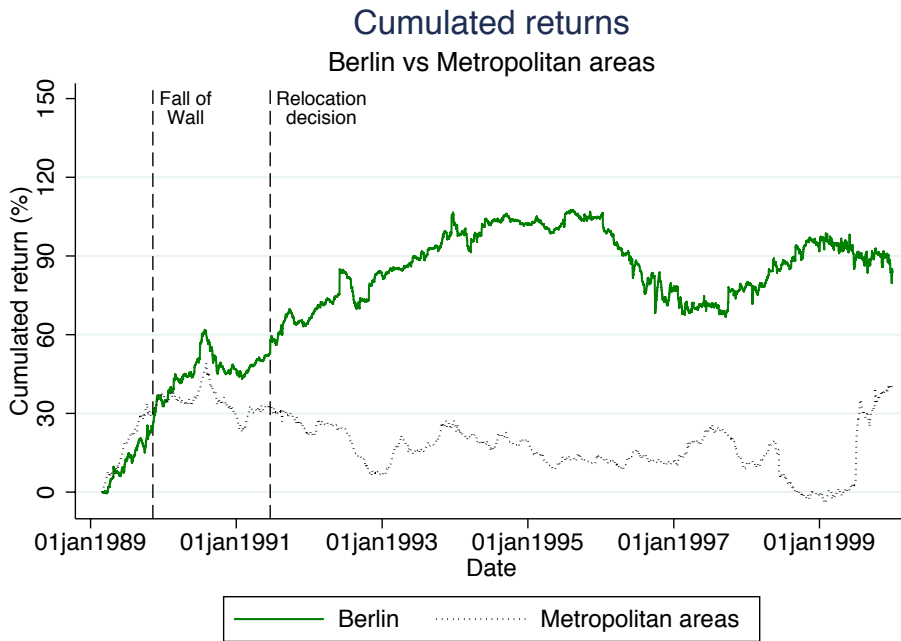
*Notes:* The upper graph presents the comparison of the cumulated daily stock market returns from the beginning of 1989 until 2000. The Berlin sample consists of six publicly traded German companies that were active in the real estate business and fully or partially exposed to the West Berlin market as of 1989. The industry index represents the stock market index for the German financials industry. The lower graph shows the difference of the cumulated returns between the Berlin sample and the financials industry index. The data is provided by Datastream.

Figure 3.A2: Real estate related stock market returns and real estate sector returns



Notes: The upper graph presents the comparison of the cumulated daily stock market returns from the beginning of 1989 until 2000. The Berlin sample consists of six publicly traded German companies that were active in the real estate business and fully or partially exposed to the West Berlin market as of 1989. The sector index represents the stock market index for the German real estate sector. The lower graph shows the difference of the cumulated returns between the Berlin sample and the real estate sector index. The data is provided by Datastream.

Figure 3.A3: Real estate related stock market returns in Berlin and other German metropolitan areas



*Notes:* The upper graph presents the comparison of the cumulated daily stock market returns from the beginning of 1989 until 2000. The Berlin sample consists of six publicly traded German companies that were active in the real estate business and fully or partially exposed to the West Berlin market as of 1989. The comparison sample “Metropolitan areas” consists of nine publicly traded German real estate firms that were exposed to German metropolitan areas other than Berlin. The lower graph shows the difference of the cumulated returns between the Berlin sample and the control sample. The data is provided by Datastream.

Table 3.A1: Firms considered in the financial markets analysis

<b>Firm name</b>	<b>Real estate exposure</b>	<b>Description</b>	<b>Berlin</b>
<b>Bastfaserkontor AG</b>	Berlin	Portfolio and property management	1
<b>Berliner AG für Industriebeteiligungen</b>	Berlin	Acquisition, liquidation, and administration of real estate	1
<b>Tempelhofer Feld AG für Grundstücksverwertung</b>	Berlin	Acquisition, liquidation, and administration of real estate	1
<b>Industrieverwaltungsgesellschaft AG</b>	HQs in Bonn; some of real estate located in Berlin	Acquisition, liquidation, and administration of real estate and other assets; 65% of sales are generated from renting	1
<b>Scheidemandel AG</b>	HQs in Eberbach/ Baden; factories in Berlin, Minden, Wiesbaden	Renting and leasing of real estate and chattels; administration of holdings; sales are rents from factories	1
<b>Concordia Bau und Boden AG</b>	HQs: Oberhausen; most of the real estate seems to be in Munich, Cologne, Stuttgart, Miami; after unification strong involvement in Berlin and Eastern Germany	Administration, liquidation, and holdings of real estate; building project organizer	1
<b>Adlerwerke vorm. Heinrich Kleyer AG (today: Adler Real Estate)</b>	HQs in Frankfurt	Portfolio management; Leasing of real estate to TA Triumph-Adler AG	0
<b>Bau-Verein zu Hamburg AG</b>	HQs in Hamburg; firm owns real estate in Hamburg and Schleswig-Holstein	Construction of all kinds of buildings; administration and disposition of real estate	0
<b>Fr. Hesser AG (today: 1st RED)</b>	HQs in Waiblingen; seems like at the end of 1980s, company had assets in Waiblingen and maybe Stuttgart	Entire fixed assets are rented to Robert Bosch GmbH; sales are rents	0

Table 3.A1 continued: Firms considered in the financial markets analysis

<b>Firm name</b>	<b>Real estate exposure</b>	<b>Description</b>	<b>Berlin</b>
<b>Gemeinnützige AG für Wohnungsbau Köln</b>	HQs in Cologne; real estate in North Rhine-Westphalia and mainly Cologne	Construction and management of apartments	0
<b>Hamborner AG (today: Hamborner REIT)</b>	HQs in Duisburg; real estate probably in the Ruhr area (Duisburg, Dinslaken, Mülheim (Ruhr), Düsseldorf)	Administration, liquidation, and acquisition of real estate and other assets	0
<b>Monachia Grundstücks-AG</b>	HQs in Munich; objects are located mainly in Upper Bavaria and Munich	Holding; administration and utilization of own real estate; property deals of any kind	0
<b>Rathgeber AG</b>	HQs in Munich; real estate in Munich	Administration of own real estate	0
<b>Schlossgartenbau AG</b>	HQs in Stuttgart; real estate in Stuttgart	Administration of real estate; holding in other real estate firms	0
<b>Kölner Bürgergesellschaft AG</b>	HQs in Cologne	Administration and utilization of commercial estate that is leased to Senats-Hotel GmbH	0

*Notes:* The table presents the firms that enter the financial markets analysis. The firms that have a 1 in the Berlin column constitute the sample of German public real estate firms that were exposed to the West Berlin real estate market. The firms with a 0 in the Berlin column constitute the sample of German public real estate firms that were exposed to German metropolitan real estate markets other than Berlin. The classification is based on the information of the *Handbuch der deutschen Aktiengesellschaften*.



## Bibliography

- Abrams, Burton A. and Russell F. Settle, "Women's suffrage and the growth of the welfare state," *Public Choice*, 100 (3-4) (1999), 289-300.
- Acemoglu, Daron and James A. Robinson, "Why did the West Extend the Franchise? Democracy, Inequality, and Growth in Historical Perspective," *The Quarterly Journal of Economics*, 115 (4) (2000), 1167-1199.
- Acemoglu, Daron, Simon Johnson, Amir Kermani, James Kwak, and Todd Mitton, "The Value of Connections in Turbulent Times: Evidence from the United States," *Working Paper 19701, NBER Working Paper Series*, (2013).
- Ades, Alberto F. and Edward L. Glaeser, "Trade and Circuses," *The Quarterly Journal of Economics*, 110 (1) (1995), 195-227.
- Ahlfeldt, Gabriel M., Stephen J. Redding, Daniel M. Sturm, and Nikolaus Wolf, "The Economics of Density: Evidence from the Berlin Wall," *Working Paper no. 20354 (July), NBER, Cambridge, MA*, (2014).
- Aidt, Toke S. and Bianca Dallal, "Female voting power: the contribution of women's suffrage to the growth of social spending in Western Europe (1869-1960)," *Public Choice*, 134 (3-4) (2008), 391-417.
- Aidt, Toke S. and Raphaël Franck, "How to get the snowball rolling and extend the franchise: voting on the Great Reform Act of 1832," *Public Choice*, 155 (3-4) (2013), 229-250.
- Aidt, Toke S., Jayasri Dutta, and Elena Loukoianova "Democracy comes to Europe: Franchise extension and fiscal outcomes 1830-1938," *European Economic Review*, 50 (2) (2006), 249-283.
- Albuquerque, Rui, Zicheng Lei, Jörg Rocholl, and Chendi Zhang, "Institutional Investors and Corporate Political Activism," *Working Paper*, (2015).
- Alesina, Alberto and Nicola Fuchs-Schündeln, "Goodbye Lenin (or Not?): The Effect of Communism on People," *American Economic Review*, 97 (4) (2007), 1507-1528.
- Australian Financial Review, "THE PAST IMPOSES ITS PRESENCE", November 9, 1990.
- Bank for International settlements, (sources: Deutsche Bundesbank and Ring Deutscher Makler).  
<https://www.bis.org/statistics/pp/pp.xlsx>;  
[http://www.bis.org/statistics/pp\\_detailed.htm](http://www.bis.org/statistics/pp_detailed.htm)
- Baxter, Sandra and Marjorie Lansing, *Women and Politics*, Ann Arbor: University of Michigan Press.

- Bel, Germà and Xavier Fageda, "Getting there fast: globalization, intercontinental flights and location of headquarters," *Journal of Economic Geography*, 8 (4) (2008), 471-495.
- Bertocchi, Graziella, "The enfranchisement of women and the welfare state," *European Economic Review*, 55 (4) (2011), 535-553.
- Binder, John J., "The Event Study Methodology Since 1969," *Review of Quantitative Finance and Accounting*, 11 (2) (1998), 111-137.
- Blanes i Vidal, Jordi, Mirko Draca, and Christian Fons-Rosen, "Revolving Door Lobbyists," *American Economic Review*, 102 (7) (2012), 3731-3748.
- Blüm, Dr. Norbert, Plenary minutes 12/34, Lower House of German Parliament (Deutscher Bundestag), stenographic report, 34th meeting, Bonn, Thursday, June 20, 1991.
- Boubakri, Narjess, Omrane Guedhami, Dev Mishra, and Walid Saffar, "Political Connections and the Cost of Equity Capital," *Journal of Corporate Finance*, 18 (3) (2012), 541-559.
- Braun, Sebastian and Michael Kvasnicka, "Men, women, and the ballot: Gender imbalances and suffrage extensions in the United States," *Explorations in Economic History*, 50 (3) (2013), 405-426.
- Brown, Stephen J, and Jerold B. Warner, "Measuring security price performance," *Journal of Financial Economics*, 8 (3) (1980), 205-258.
- Brown, Stephen J, and Jerold B. Warner, "Using daily stock returns: The case of event studies," *Journal of Financial Economics*, 14 (1) (1985), 3-31.
- Brülhart, Marius, Céline Carrère, and Federico Trionfetti, "How wages and employment adjust to trade liberalization: Quasi-experimental evidence from Austria," *Journal of International Economics*, 86 (2012), 68-81.
- Brunnermeier, Markus K., "Bubbles," *New Palgrave Dictionary of Economics*, Second Edition, 2008.
- Bundesamt für Statistik: Statistik Schweiz (Swiss Statistical Office). Available at: <http://www.bfs.admin.ch>.
- Bundesblatt. Volume 122, issue 2, Available at: <http://www.admin.ch>.
- Burchardi, Konrad B. and Tarek A. Hassan, "The Economic Impact of Social Ties: Evidence from German Reunification," *The Quarterly Journal of Economics*, 128 (3) (2013), 1219-1271.

- Bureau van Dijk, Amadeus Database [Online]. Available at: <https://amadeus.bvdinfo.com>.
- Bursztyn, Leonard and Davide Cantoni, "A Tear in the Iron Curtain: The Impact of Western Television on Consumption Behavior," *Discussion Paper* (2012).
- Campante, Filipe R. and Quoc-Anh Do, "Isolated Capital Cities, Accountability and Corruption: Evidence from US States," *American Economic Review*, 104 (8) (2014), 2456-2481.
- Campante, Filipe R., Quoc-Anh Do, and Bernardo Guimaraes, "Capital Cities, Conflict, and Misgovernance: Theory and Evidence," *Sciences Po Economics Discussion Paper*, 2014-13 (2014).
- Campbell, John Y., Andrew W. Lo, and A. Craig MacKinlay, *The Econometrics of Financial Markets*, 2nd edition (Princeton, New Jersey: Princeton University Press, 1997).
- Carnaghan, Ellen and Donna Bahry, "Political Attitudes and the Gender Gap in the USSR," *Comparative Politics*, 22 (4) (1990), 379-399.
- Case, Karl E. and Robert J. Shiller, "Is There a Bubble in the Housing Market?" *Brookings Papers on Economic Activity*, 2 (2003), 299-362.
- Cavalcanti, Tiago V. de V. and Jos\_ Tavares, "Women prefer larger governments: Growth, Structural Transformations, and Government Size," *Economic Inquiry*, 49 (1) (2011), 155-171.
- Center for American Women and Politics, "The Gender Gap Attitudes on on Public Policy Issues," *Fact Sheet*, retrieved at: <http://www.cawp.rutgers.edu/research/topics/documents/ggapissues.pdf>, (1997).
- Chan, Su Han, George W. Gau, and Ko Wang, "Stock Market Reaction to Capital Investment Decisions: Evidence from Business Relocations," *Journal of Financial and Quantitative Analysis*, 30 (1) (1995), 81-100.
- Chaney, Carole Kennedy, R. Michael Alvarez, and Jonathan Nagler, "Explaining the Gender Gap in U.S. Presidential Elections, 1980-1992," *Political Research Quarterly*, 51 (2) (1998), 311-339.
- Chattopadhyay, Raghendra and Esther Duflo, "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India," *Econometrica*, 72 (5) (2004), 1409-1443.
- Cochrane, Allan and Adrian Passmore, "Building a national capital in an age of globalisation: the case of Berlin," *Area*, 33 (4) (2001), 341-352.

- Combes, Pierre-Philippe, Gilles Duranton, Laurent Gobillon, Diego Puga, and Sébastien Roux, "The productivity advantages of large cities: Distinguishing agglomeration from firm selection," *Discussion Paper series, Forschungsinstitut zur Zukunft der Arbeit, No. 6502* (2012).
- Conley, John P. and Akram Temimi, "Endogenous Enfranchisement when Groups? Preferences Conflict," *Journal of Political Economy*, 109 (1) (2001), 79-102.
- Cutler, David M. and Jonathan Gruber, "Does Public Insurance Crowd Out Private Insurance?," *Quarterly Journal of Economics*, 111 (2) (1996a), 391-430.
- Cutler, David M. and Jonathan Gruber, "The Effect of Medicaid Expansions on Public Insurance, Private Insurance, and Redistribution," *The American Economic Review Papers and Proceedings*, 86 (2), 1996, 378-383.
- Davis, James C. and J. Vernon Henderson (2008), "The agglomeration of headquarters," *Regional Science and Urban Economics*, 38 (5) (2008), 445-460.
- Deitch, Cynthia, "Sex Differences in Support for Government Spending," in *The Politics of the Gender Gap: The Social Construction of Political Influence*, edited by Carol M. Mueller, Newbury Park, California: SAGE Publications, (1988), 192-216.
- Deutsche Bundesbank, "Times series databases".
- Diacon, Tyler and Thomas H. Klier, "Where the Headquarters are - Evidence from Large Public Companies 1990-2000," *Working Paper Series WP-03-35*, Federal Reserve Bank of Chicago (2003).
- Doepke, Matthias and Michèle Tertilt, "Women's Liberation: What's in it for Men?," *The Quarterly Journal of Economics*, 124 (4) (2009), 1541-1591.
- Doepke, Matthias and Michèle Tertilt, "Does Female Empowerment Promote Economic Development?," *NBER Working Paper No. 19888*, (2014).
- Doepke, Matthias, Michèle Tertilt, and Alessandra Voena, "The Economics and Politics of Women's Rights," *Annual Review of Economics*, 4 (1) (2012), 339-372.
- Dreher, Klaus, *Treibhaus Bonn-Schaubühne Berlin: Deutsche Befindlichkeiten*, (Stuttgart: Deutsche Verlagsanstalt, 1990).
- Dreher, Klaus, *Treibhaus Bonn-Schaubühne Berlin: Deutsche Befindlichkeiten* (Stuttgart: Deutsche Verlagsanstalt, 1990).
- Duranton, Gilles and Diego Puga, "From sectoral to functional urban specialisation," *Journal of Urban Economics*, 57 (2) (2005), 343-370.

- Duranton, Gilles and Diego Puga, "Micro-foundations of urban agglomeration economies" *Handbook of Regional and Urban Economics*, 4 (2004), 2063-2117.
- Edlund, Lena and Rohini Pande, "Why Have Women Become Left-Wing? The Political Gender Gap and the Decline in Marriage," *The Quarterly Journal of Economics*, 117 (39) (2002), 917-961.
- Ellison, Glenn and Edward L. Glaeser, "Geographic Concentration in U.S. Manufacturing Industries: A Dartboard Approach," *Journal of Political Economy*, 105 (5) (1997), 889-927.
- Ellison, Glenn, Edward L. Glaeser, and William R. Kerr, "What causes Industry Agglomeration? Evidence from Coagglomeration Patterns," *American Economic Review*, 100 (3) (2010), 1195-1213.
- Eurostat. Available at: <http://epp.eurostat.ec.europa.eu>.
- Evans, Alan W., "The Location of the Headquarters of Industrial Companies," *Urban Studies*, 10 (3) (1973). 387-395.
- Faccio, Mara and Davie Parsley, "Sudden Deaths: Taking Stock of Geographic Ties," *Journal of Financial and Quantitative Analysis*, 44 (1) (2009), 683-718.
- Faccio, Mara, "Politically Connected Firms," *American Economic Review*, 96 (1) (2006), 369-386.
- Faccio, Mara, Ronald W. Masulis, and John J. McConnell "Political Connections and Corporate Bailouts," *The Journal of Finance*, 64 (6) (2006), 2597-2635.
- Fama, Eugene F., and Kenneth R. French, "Common risk factors in the returns on stocks and bonds," *Journal of Financial Economics*, 33 (1) (1993), 3-56.
- Fama, Eugene F., and Kenneth R. French, "The Cross-Section of Expected Stock Returns," *The Journal of Finance*, 47 (2) (1992), 427-465.
- Fama, Eugene F., Lawrence Fisher, Michael C. Jensen, and Richard Roll, "The Adjustment of Stock Prices to New Information," *International Economic Review*, 10 (1) (1969), 1-21.
- Feldkamp, Michael F., *Der Parlamentarische Rat und das Grundgesetz für die Bundesrepublik Deutschland 1948 bis 1949. Option für die Europäische Integration und die Deutsche Einheit.* (Konrad-Adenauer-Stiftung e.V., 2008).
- Ferguson, Thomas and Hans-Joachim Voth, "Betting on Hitler-The Value of Political Connections in Nazi Germany," *The Quarterly Journal of Economics*, 123 (1) (2008), 101-137.

- Fisman, Raymond, "Estimating the Value of Political Connections," *American Economic Review*, 91 (4) (2001), 1095-1102.
- Fuchs-Schündeln, Nicola and Matthias Schündeln, "Precautionary Savings and Self-Selection: Evidence from the German Reunification Experiment," *The Quarterly Journal of Economics*, 120 (3) (2005), 1085-1120.
- Fuchs-Schündeln, Nicola, "The Response of Household Saving to the Large Shock of German Reunification," *American Economic Review*, 98 (5) (2008), 1798-1828.
- Funk, Patricia and Christina Gathmann, "Gender Gaps in Policy Making: Evidence from Direct Democracy" *Economic Policy*, 30 (81) (2015), 141-181.
- Funk, Patricia and Christina Gathmann, "What Women Want: Suffrage, Gender Gaps in Voter Preferences and Government Expenditures," *Working Paper*, (2007).
- Garcia-Milà, Teresa and Therese J. McGuire, "Tax Incentives and the City," *Brookings-Wharton Papers on Urban Affairs*, (2002), 95-132.
- Ghosh, Chinmoy, Mauricio Rodriguez, and C. F. Sirmans, "Gains from Corporate Headquarters Relocations: Evidence from the Stock Market," *Journal of Urban Economics*, 38 (3) (1995), 291-311.
- Glaeser, Edward L., Joseph Gyourko, and Albert Saiz, "Housing supply and housing bubbles," *Journal of Urban Economics*, 64 (2008), 198-217.
- Goldman, Eitan, Jörg Rocholl, and Jongil So, "Do Politically Connected Boards Affect Firm Value?," *Review of Financial Studies*, 22 (6) (2009), 2331-2360.
- Greenstone, Michael and Enrico Moretti, "Bidding for Industrial Plants: Does Winning a 'Million Dollar Plant' Increase Welfare?," *Working Paper no. 9844 (July)*, NBER, Cambridge, MA, (2004).
- Greenstone, Michael, Richard Hornbeck, and Enrico Moretti, "Identifying Agglomeration Spillovers: Evidence from Winners and Losers of Large Plant Openings," *Journal of Political Economy*, 118 (3) (2010), 536-598.
- Handbuch der deutschen Aktiengesellschaften*, volume 44, edition 1939, (Berlin: Hoppenstedt & Co., 1939).
- Handbuch der deutschen Aktiengesellschaften: das Spezial-Archiv der Deutschen Wirtschaft*, volume 50, edition 1949, (Darmstadt (et al.); Wien; Zürich: Hoppenstedt, 1949).
- Handbuch der deutschen Aktiengesellschaften: das Spezial-Archiv der Deutschen Wirtschaft*, volume 51, edition 1950/51, (Darmstadt (et al.); Wien; Zürich: Hoppenstedt, 1951).

- Handbuch der deutschen Aktiengesellschaften: das Spezial-Archiv der Deutschen Wirtschaft*, volume 92, edition 1991/92, (Darmstadt (et al.); Wien; Zürich: Hoppenstedt, 1992).
- Handbuch der deutschen Aktiengesellschaften: das Spezial-Archiv der Deutschen Wirtschaft*, volume 92, edition 1991/92, (Darmstadt (et al.); Wien; Zürich: Hoppenstedt, 1992).
- Handelsblatt*, “Bekenntnis zum geeinten Europa in neuer Grundgesetz-Präambel,” *Handelsblatt* No. 149, (August 6, 1990), 6.
- Henderson, J. Vernon and Yukako Ono, “Where do manufacturing firms locate their headquarters?,” *Journal of Urban Economics*, 63 (2) (2008), 431-450.
- Himmelberg, Charles, Christopher Mayer, and Todd Sinai, “Assessing High House Prices: Bubbles, Fundamentals and Misperceptions,” *Journal of Economic Perspectives*, 19 (4) (2005), 67-92.
- Hogan, Dick, “Hertz picks Fla. county for headquarters,” *The (Fort Myers, Fla.) News-Press*, (May 7, 2013).
- Holloway, Steven R. and James O. Wheeler, “Corporate Headquarters Relocation and Changes in Metropolitan Corporate Dominance, 1980-1987,” *Economic Geography*, 67 (1) (1991), 54-74.
- Holtemöller, Oliver and Rainer Schulz, “Investor Rationality and House Price Bubbles: Berlin and the German Reunification,” *German Economic Review*, 11 (4) (2010), 465-486.
- Jayachandran, Seema, “The Jeffords Effect,” *Journal of Law and Economics*, 49 (2) (2006), 397-425.
- Jianakoplos, Nancy Ammon and Alexandra Bernasek, “Are Women More Risk Averse?,” *Economic Inquiry*, 36 (4) (1998), 620-630.
- Johnson, Simon, and Todd Mitton, “Cronyism and capital controls: evidence from Malaysia,” *Journal of Financial Economics*, 67 (2) (2003), 351-382.
- Kansy, Dietmar, *Zitterpartie: Der Umzug des Bundestages von Bonn nach Berlin*, 1st ed. (Hamburg: Germa Press, 2003).
- Kansy, Dietmar, *Zitterpartie: Der Umzug des Bundestages von Bonn nach Berlin*, 1st ed. (Hamburg: Germa Press, 2003).
- Kholodilin, Konstantin, “Speculative Bubbles in Urban Housing Markets in Germany,” *55th Congress of the European Regional Science Association: "World Renaissance: Changing roles for people and places"*, 25-28 August 2015, Lisbon, Portugal, (2015).

- Kim, Sukkoo, "Expansion of Markets and the Geographic Distribution of Economic Activities: The Trends in U. S. Regional Manufacturing Structure, 1860-1987," *The Quarterly Journal of Economics*, 110 (4) (1995), 881-908.
- Kleines Handbuch der Schweizer Aktiengesellschaften, edition 1971, (Basel, Schweizerischer Bankverein).
- Kleines Handbuch der Schweizer Aktiengesellschaften, edition 1972, (Basel, Schweizerischer Bankverein).
- Klier, Thomas and William Testa, "Location trends of large company headquarters during the 1990s," *Economic Perspectives*, (2002).
- Klier, Thomas H., "Where the Headquarters Are: Location Patterns of Large Public Companies, 1990-2000," *Economic Development Quarterly*, 20 (2) (2006), 117-128.
- Krätke, Stefan, "City of Talents? Berlin's Regional Economy, Socio-Spatial Fabric and 'Worst Practice' Urban Governance," *International Journal of Urban and Regional Research*, 28 (3) (2004), 511-529.
- Krogstrup, Signe and Sébastien Wälti, "Women and Budget Deficits," *Scandinavian Journal of Economics*, 113 (3) (2011), 712-728.
- Kujath, Hans Joachim, "Restructuring of the metropolitan region of Berlin-Brandenburg: economic trends and political answers," *Geographia Polonica*, 78 (1) (2005), 117-136.
- Küsters, Hanns Jürgen, "Der Bonn/Berlin-Beschluss vom 20. Juni 1991 und seine Folgen" Extended version of the lecture in course of the event "20 Jahre Bonn/Berlin- Beschluss" (May 24<sup>th</sup>, 2011; Königswinter) (2011).
- Lizzeri, Alessandro and Nicola Persico, "Why did the Elites Extend the Suffrage? Democracy and the Scope of Government, with an Application to Britain's 'Age of Reform'," *The Quarterly Journal of Economics*, 119 (2) (2004), 705-763.
- Llavador, Humberto and Robert J. Oxoby, "Partisan Competition, Growth, and the Franchise," *The Quarterly Journal of Economics*, 120 (39) (2005), 1155-1192.
- Lott, Jr., John R. and Lawrence W. Kenny, "Did Women's Suffrage Change the Size and Scope of Government?," *Journal of Political Economy*, 107 (6) (1999), 1163-1198.
- Lovely, Mary E., Stuart S. Rosenthal, and Shalini Sharma, "Information, agglomeration, and the headquarters of U.S. exporters," *Regional Science and Urban Economics*, 35 (2005), 167-191.
- Marshall, Alfred, *Principles of Economics* (London: Macmillan and Co. 8th ed., 1920).



- Meltzer, Allan H. and Scott F. Richard, "A Rational Theory of the Size of the Government," *Journal of Political Economy*, 89 (5) (1981), 914-927.
- Miller, Arthur, "Gender and the Vote: 1984," in *The Politics of the Gender Gap: The Social Construction of Political Influence*, edited by Carol M. Mueller, Newbury Park, California: SAGE Publications, (1988), 258-282.
- Miller, Grant, "Women's Suffrage, Political Responsiveness, and Child Survival in American History," *The Quarterly Journal of Economics*, 123 (3) (2008), 1287-1327.
- Möller, Franz and Rainer Land, "*What about Bonn?*" *1948 wurde der Grundstein für Bonn als Bundeshauptstadt gelegt*, (1997).
- Möller, Franz, *Der Beschluss: Bonn/Berlin-Entscheidungen von 1990 bis 1994* (Bonn: Bouvier, 2002).
- Möller, Franz, *Der Beschluss: Bonn/Berlin-Entscheidungen von 1990 bis 1994* (Bonn: Bouvier, 2002).
- Norris, Pippa, "The Gender Gap: A Cross-National Trend?," in *The Politics of the Gender Gap: The Social Construction of Political Influence*, edited by Carol M. Mueller, Newbury Park, California: SAGE Publications, (1988), 217-234.
- OECD's Main Economic Indicators database.
- Opensecrets.org. Center for Responsive Politics. Available at: [opensecrets.org](http://opensecrets.org).
- Pirinsky, Christo and Qinghai Wang, "Does Corporate Headquarters Location Matter for Stock Returns?," *The Journal of Finance*, 61 (4) (2006), 1991-2015.
- Pommerin, Reiner, *Von Berlin nach Bonn. Die Alliierten, die Deutschen und die Hauptstadtfrage nach 1945*. (Köln: Böhlau, 1989).
- Porter, Michael E., *The Competitive Advantage of Nations* (London: The MacMillan Press Ltd, 1990).
- Redding, Stephen J., and Daniel M. Sturm, "The Costs of Remoteness: Evidence from German Division and Reunification," *American Economic Review*, 98 (5) (2008), 1766-1797.
- Roberts, Brian E., "A Dead Senator Tells No Lies: Seniority and the Distribution of Federal Benefits," *American Journal of Political Science*, 34 (1) (1990), 31-58.
- Rosenthal, Stuart S., and William C. Strange, "Evidence on the Nature and Sources of Agglomeration Economies," *Handbook of Regional and Urban Economics*, 4 (2004), 2119-2171.

- Rosenthal, Stuart S., and William C. Strange, "Geography, Industrial Organization, and Agglomeration," *The Review of Economics and Statistics*, 85 (2) (2003), 377-393.
- Rosenthal, Stuart S., and William C. Strange, "The Determinants of Agglomeration," *Journal of Urban Economics*, 50 (2) (2001), 191-229.
- Ross, Christopher O., "Organizational Dimensions of Metropolitan Dominance: Prominence in the Network of Corporate Control, 1955-1975," *American Sociological Review*, 52 (2) (1987), 258-267.
- Rudolph, Bernard, "Effekten und Wertpapierbörsen, Finanztermin- und Devisenbörsen seit 1945," *Deutsche Börsengeschichte* (Ed. Hans Pohl, Frankfurt am Main: Fritz Knapp, 1992), 291-375.
- Schäuble, Wolfgang, *Der Vertrag: wie ich über die deutsche Einheit verhandelte* (München: Droemer Knaur, 1991).
- Schäuble, Wolfgang, *Der Vertrag: wie ich über die deutsche Einheit verhandelte* (München: Droemer Knaur, 1991).
- Scherbina, Anna and Bernd Schlusche, "Asset Bubbles: an Application to Residential Real Estate," *European Financial Management*, 18 (3) (2012), 464-491.
- Schweizer Aktienführer, edition 1971, (Schweizerische Bankgesellschaft).
- Seitz, W., "Ein Streifzug durch 100 Jahre Kampf um die politische Gleichstellung der Frauen in der Schweiz. Gleichstellungspolitische Strategien und die ambivalenten Wirkungen der direkten Demokratie," *mimeo, Federal Office of Statistics, Switzerland*, (2004).
- Shapiro, Robert Y. and Harpreet Mahajan, "Gender Differences in Policy Preferences: A Summary of Trends from the 1960s to the 1980s," *The Public Opinion Quarterly*, 50 (1) (1986), 42-61.
- Shiller, Robert J., "Historic Turning Points in Real Estate," *Eastern Economic Journal*, 34 (2008), 1-13.
- Shiller, Robert, "The Bubble's New Home," *Barron's*, June 20, 2005. (<http://www.barrons.com/articles/SB111905372884363176>).
- Siebert, Horst, "German unification: the economics of transition," Kiel Working Papers, No. 468a (1991).
- Smith, Margaret Hwang and Gary Smith, "Bubble, Bubble, Where's the Housing Bubble?," *Brookings Papers on Economic Activity*, 2006 (1) (2006), 1-50.
- Statistik Berlin Brandenburg, Amt für Statistik Berlin-Brandenburg, "Lange Reihen".

- Statistisches Bundesamt (Destatis), Fachserie 17, Reihe 5, "Preise; Kaufwerte für Bauland".
- Statistisches Bundesamt (German Federal Statistical Office). Available at: <https://www.destatis.de>.
- Statistisches Bundesamt, "Entstehung, Verteilung und Verwendung des Bruttoinlandsprodukts in den Ländern der Bundesrepublik Deutschland 1991 bis 2015", Reihe 1, Band 5.
- Statistisches Bundesamt, Arbeitskreis "Volkswirtschaftliche Gesamtrechnungen der Länder".
- Statistisches Landesamt Berlin, "Berliner Statistische Monatsschrift", several editions.
- Statistisches Landesamt Berlin, "Statistisches Jahrbuch", several editions.
- Stehle, Richard, Christian Wulff, and Yvette Richter, "Die Rendite deutscher Blue-chip-Aktien in der Nachkriegszeit - Rückberechnung des Dax für die Jahre 1948 bis 1954, Incomplete Version (1999).
- Stiglitz, Joseph E., "Symposium on Bubbles," *The Journal of Economic Perspectives*, 4 (2) (1990), 13-18.
- Strauss-Kahn, Vanessa and Xavier Vives, "Why and where do headquarters move?," *Regional Science and Urban Economics*, 39 (2) (2009), 168-186.
- Stutzer, Alois and Lukas Kienast, "Demokratische Beteiligung und Staatsausgaben: Die Auswirkungen des Frauenstimmrechts," *Swiss Journal of Economics and Statistics*, 141 (4) (2005), 617-650.
- Süddeutsche Zeitung*. Several issues for October and November, 1949.
- The Advertiser, "Berlin counts cost of rebirth", June 22, 1991.
- The Globe and Mail (Canada), "BERLIN" A city of extremes and indulgences, this 'is where German reality is concentrated with all its tensions and dynamism? More than 750 years old...and still young at heart", June 21, 1991.
- The Guardian (London), "Berlin runs into wall of pain", December 4, 1990.
- The Guardian (London), "Bundesrat's slow farewell to Bonn, July 6, 1991.
- The Guardian (London), "Divided MPs choose today between Bonn and Berlin", June 20, 1991.

The Guardian (London), "Europe: Born-again Berlin - Commercial property in Berlin is cheaper than in London, but for how much longer? Frederick Studemann looks at Europe's fastest-growing property market", July 26, 1991.

The Guardian (London), "Europe: Capital battle - London, Paris or Berlin? John Willcock reports on the stiff contest to be property business centre of the new Europe", October 26, 1990.

The Guardian (London), "Europe: Metropolis Rising - Two years after the fall of the Berlin Wall, we celebrate one of Europe's greatest cities. With partner newspapers from Berlin, Vienna and Zurich this special issue lays bare the new Berlin. Barbara Sichtermann profiles the old city that is becoming the new Babylon", November 8, 1991.

The Guardian (London), "Germans revive Berlin as capital", June 21, 1991.

The Guardian (London), "Germany United: Bonn presses case to continue to serve", October 4, 1990.

The Guardian (London), "Germany's heart and soul: Argument is raging about the location of the pan-German capital city. Should it be Bonn or Berlin? As David Gow reports, the outcome will tell much about who the Germans are - and who they want to be", July 18, 1990.

The New York Times, "Berlin and Bonn Partisans Square Off as Vote for Germany's Capital Nears", June 17, 1991.

The New York Times, "Berlin, Named Seat of Power, Now Wonders if It Has Room", June 24, 1991.

The New York Times, "Berlin, the Capital, Fears for Future", November 1, 1990.

The New York Times, "Bonn Journal; Too Many Capitals (and Knee-Deep in Blueprints)", April 14, 1992.

The New York Times, "Editorial Notebook; Germany's Once and Future Capital", June 25, 1991.

The New York Times, "Evolution in Europe; Germany's Capital: Will It Be Berlin?", June 1, 1990.

The New York Times, "German Unity Might Cost Berlin Billions in Subsidies", April 17, 1990.

The Washington Post "Kohl Backs Move of Capital to Berlin; Decision Still Must Be Made by Evenly Split Parliament in Bonn", April 24, 1991.

The Washington Post, "Berlin or Bonn?", May 7, 1991.

The Washington Post, "Berlin Voted Government; Move by Germans From Bonn to Take Nearly a Decade", June 21, 1991.

The Washington Post, "Bonn or Berlin - Capital Issue Comes to Vote; Germans Divide, Loudly, On Site for Government", June 19, 1991.

The Washington Post, "For Bonn, A Not So Capital Idea; Foreign Missions Face Costly Move to Berlin", June 22, 1991.

The Washington Post, "In German Debate, History Is a Capital Issue", August 12, 1990.

Thierse, Wolfgang, Plenary minutes 12/34, Lower House of German Parliament (Deutscher Bundestag), stenographic report, 34th meeting, Bonn, Thursday, June 20, 1991.

Tschirch, Volker, *Der Kampf um Bonn* (Bonn: Bonner Werbe-GmbH, 1999).

Wiris, Daniel, "Reinterpreting the Gender Gap," *The Public Opinion Quarterly*, 50 (3) (1986), 316-330.

Yearbook of Immigration Statistics: 2013 Naturalizations; retrieved at <https://www.dhs.gov/publication/yearbook-immigration-statistics-2013-naturalizations>