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

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Abstract

In many countries, many company headquarters are located 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. In this paper, I solve this problem by examining a unique event – the relocation of the German Federal Government from Bonn to Berlin in 1991. Following reunification, there was a free vote in the German parliament. Berlin won by a narrow margin, an event that could not be anticipated even days before. I then examine the value of being co-located with the government by analyzing stock returns. Using a Fama-French Multi-Factor framework, I find that firms with operational headquarters in Berlin experienced mean cumulative abnormal returns of about 3 percent within the two days following the relocation decision. These returns were even higher two weeks later, do not seem to be driven by industry composition, and are robust to different model specifications.

1 Introduction

Company headquarters[1] are overwhelmingly concentrated in capital cities, more so than the rest of economic activity. Figure 1 illustrates the concentration of publicly listed

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[1]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.

firms in capital cities across the EU-28 and EFTA area.[2] 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.[3] The status of being a capital city remains a significant factor for headquarters agglomeration when controlling for population size.[4]

Do firms locate in the capital city because they want to be close to the government?[5] 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, Rosenthal and Strange 2001, 2003, 2004).[6] 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

[2]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.

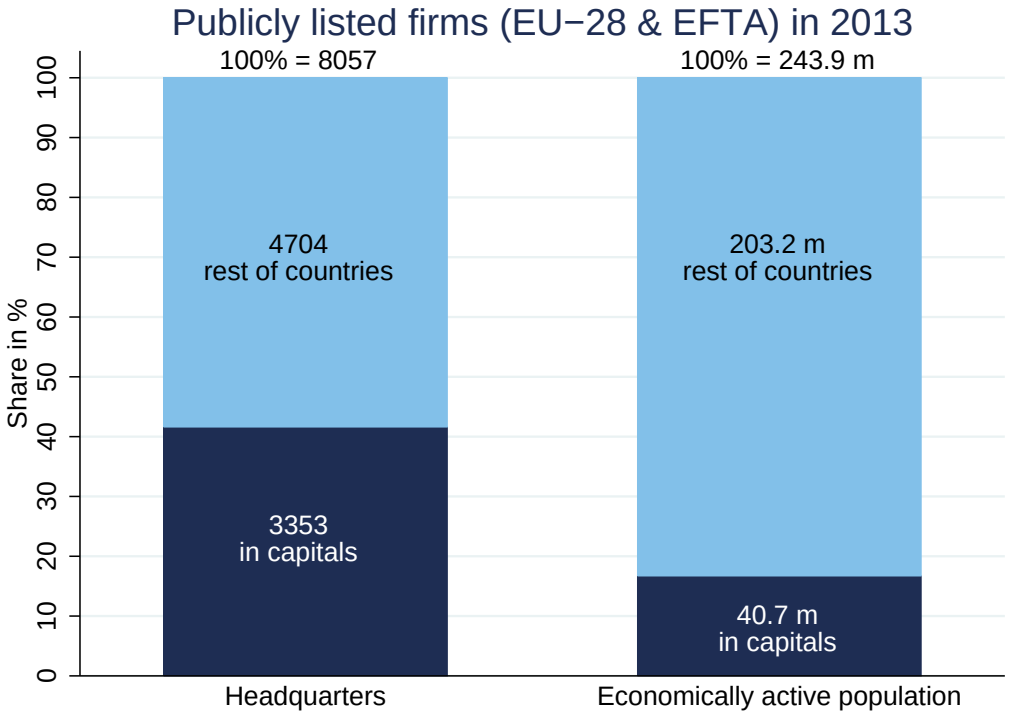
[3]The countries within the EU-28 & EFTA area differ markedly in the number of publicly listed firms and in population size. I, therefore, also evaluate, for each country separately, the share of publicly listed firms and the share of population in the respective capital city and take means across countries. 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.

[4]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.

[5]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.

[6]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.

Figure 1: **Concentration of headquarters and population in Europe.** This graph displays the share of headquarters of publicly listed firms and the share of economically active population in European capital cities in 2013.

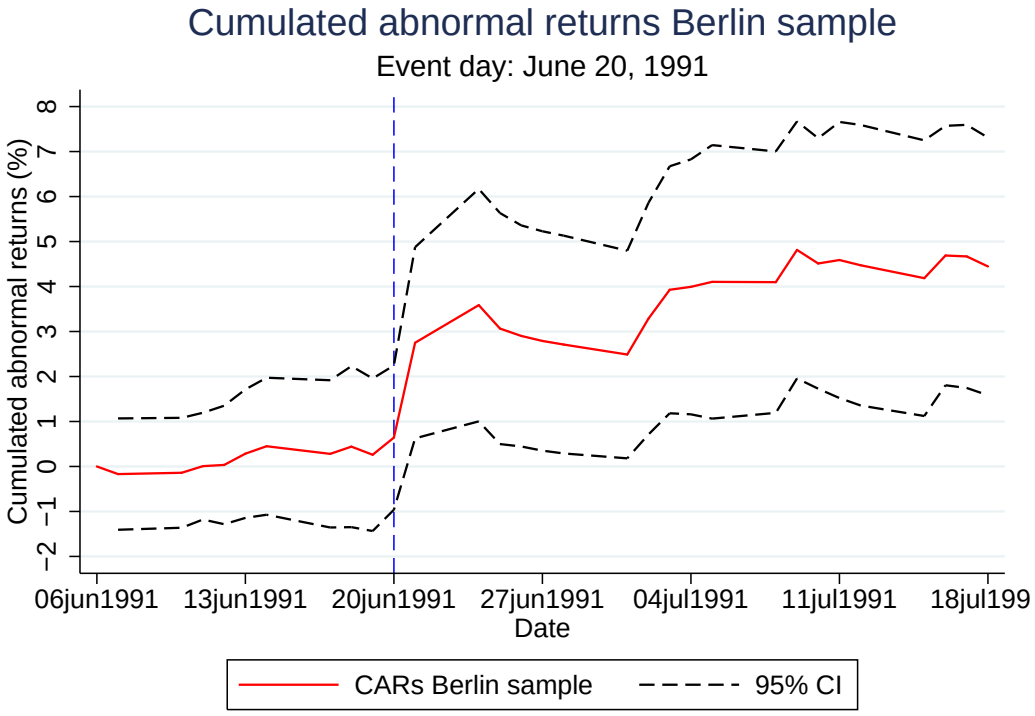


Government from Bonn to Berlin on June 20, 1991, and analyze the stock market reactions of German firms with headquarters in Berlin, at the time the decision was taken. Importantly, even days before the crucial vote, its outcome was highly uncertain. For these firms, I find mean cumulative abnormal returns (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.[7] There was no immediate reversal of these abnormal returns, and the result does not seem to be driven by industry composition. Figure 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

[7] 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.

Figure 2: **Cumulated abnormal returns for the relocation decision - Berlin sample.** 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.



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.[8] 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[9] is irreversible and

[8]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.

[9]The decision established the relocation of the German Parliament on the federal level (Deutscher

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.[10] 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).[11] 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.[12] This suggests that interactions with politicians, potentially beyond the pure negotiation and provision of tax incentives, matter for firm location decisions.

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.

[10] 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.

[11] Cf. Evans (1973) for an analysis of large British industrial companies and the high concentration of their headquarters in London.

[12] 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).

In this respect, my study relates to other influential scholarship, the literature on political connections. Roberts (1990), Jayachandran (2006), Goldman, Rocholl, and So (2008), and Acemoglu, Johnson, Kermali, Kwak, and Mitton (2013) 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 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).[13] These findings, combined with the rent-seeking motive (Ades 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 Brülhart, 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.[14] 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.[15]

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

[13] 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).

[14] 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.

[15] 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.

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.

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 on the chronology of incidents that resulted in the isolation of the government location decision from other events. Table 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.[16] 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.[17] Von Weizsäcker's announcement was highly criticized, especially by the Bonn proponents, since many expected neutrality from the President.[18] The reactions to his announcement document the increasing importance

[16] 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.

[17] 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.

[18] Cf. Tschirch (1998), p. 41-43.

Table 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

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.[19]

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.

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.[20] 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

[19] Cf. Schäuble (1991), p. 131, 132 and Dreher (1999), p. 198.
[20] Cf. Schäuble (1991), p. 170, 306.

made a decision in favor of Berlin as capital, but that the treaty would not include any statement regarding the location of the government.[21] This was in clear contrast to the East German proposition.[22] 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.[23] 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,[24] 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.[25] The negotiations ended at 02.08am on August 31, 1990, when the treaty was initialed by Günther Krause and Wolfgang Schäuble.[26] 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.[27]

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.[28] 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 could not hope to match the number of signatures collected by their opponents, they chose not to collect any.[29]

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[21] Cf. Tschirch (1998), p. 29.

[22] Cf. Schäuble (1991), p. 170.

[23] 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.

[24] Cf. Schäuble (1991), p. 131-133.

[25] 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.

[26] Cf. Schäuble (1991), p. 309.

[27] Cf. Möller (2002), p. 10.

[28] The recently elected German Parliament had 662 members.

[29] Cf. Dreher (1999), p. 224, 225.

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.[30] 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.[31] On the same day, Helmut Kohl announced his preference for Berlin.[32]

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.[33]

One day before the debate, the general opinion among the MPs was that Bonn would win the vote.[34] In addition, the two newspapers *Bonner General-Anzeiger* and *Kölner Expreß,* 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.[35] 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.

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

[30] 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.

[31] So far, several members of the Social Democratic Party (SPD) were proposing a plebiscite on the issue.

[32] Cf. Dreher (1999), p. 227-229.

[33] Cf. Ibid., p. 240, 241.

[34] Cf. Kansy (2003), p. 32.

[35] Cf. Dreher (1999), p. 238, 239.

information on all incorporated German firms, Datastream, contemporary quotation lists and newspapers, Bureau van Dijk's Amadeus Database, and Eurostat.

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;[36] 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.[37] 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.[38] I drop firms that did not experience

[36] 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.

[37] Firms from the former German Democratic Republic were not publicly traded before 1992.

[38] 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

Table 2: **Descriptive statistics.** 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.

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%)

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.

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.[39] Some firms had more than one quoted stock (usually 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[40] as well as the information on industry and sector classifi-

trading) default closing prices are taken from the Frankfurt exchange."

[39]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 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.

[40]Market value is defined as the product of stock price and the number of securities in issue.

cations[41] are from Datastream. In addition, Datastream provides performance indices for the German financial market as well as for specific industries, supersectors, sectors, and subsectors.[42] I use these indices in different model specifications. Table 2 displays descriptive statistics on market value and industry composition.[43] 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[44], 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.

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.

4.1 Model

I apply a multi-factor event study framework[45] in the spirit of Fama and French (1993) to estimate the effects of the relocation decision on the value of firms with headquarters in Berlin.[46] 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

[41] Datastream provides classification according to the Industry Classification Benchmark (ICB) created by FTSE and Dow Jones.

[42] 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.

[43] 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.

[44] Cf. section 4.7

[45] Cf. Fama, Fisher, Jensen, and Roll (1969), which is the reference that introduced the event study methodology.

[46] 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.

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:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \gamma_i SMB_t + \delta_i HML_t + \epsilon_{it} \tag{1}$$

$$E\left[\epsilon_{it}\right] = 0 \quad Var\left[\epsilon_{it}\right] = \sigma_{\epsilon i}^2$$

where R_{it} is the return of stock i on day t. R_{mt} is the return of the market index[47] 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. ϵ_{it} are the zero mean residuals of stock i on day t that are not explained by the three risk factors of the model.[48]

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:

$$AR_{it} = R_{it}^* - \left(\hat{\alpha}_i + \hat{\beta}_i R_{mt}^* + \hat{\gamma}_i SMB_t^* + \hat{\delta}_i HML_t^*\right) \tag{2}$$

where AR_{it} is the abnormal 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:

$$CAR_i = \sum_{t=D_1}^{D_e} AR_{it} \tag{3}$$

$$mean\ CARs_{(D_1,D_e)} = \frac{1}{n} \sum_{i=1}^{n} CAR_{i,(D_1,D_e)} \tag{4}$$

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

[47] I use the German market index provided by Datastream.

[48] Cf. Fama and French (1993) and the appendix for how these portfolios are constructed and for the results of fitting equation (1) by ordinary least squares to the portfolio of Berlin securities.

different from zero, this difference is assumed to be induced by the government location decision.

4.2 Baseline 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 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.

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

Table 3: **Mean CARs - Berlin sample.** 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.

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%

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 4: **Event-induced market value effects.** 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.

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

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

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 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.

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.[49] 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 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

[49] Cologne is the closest large city to Bonn with a distance of around 25 km as the crow flies.

Table 5: **Mean CARs - Bonn-Cologne sample.** 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 (%)).

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

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.

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

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

Table 6: **Mean CARs - other large German cities.** 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.

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

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.

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 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.

4.6 Effects from the Unification Treaty

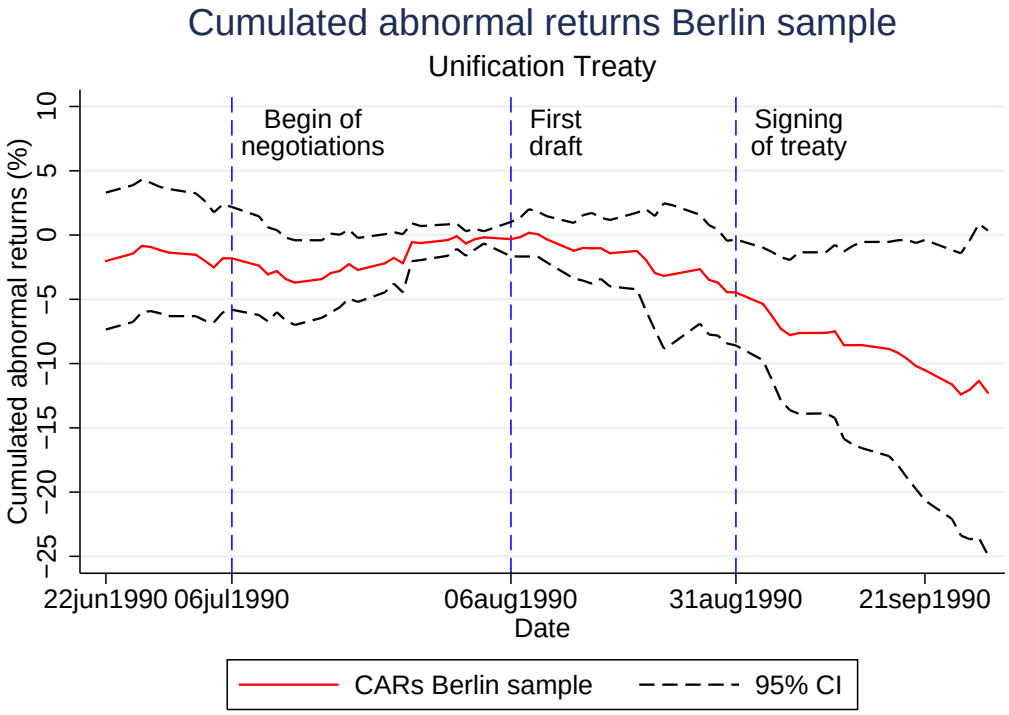
The negotiations of the Unification Treaty that arranged the accession of East Germany to West Germany began on July 6, 1990. As pointed out in section 2, East German politicians wanted to establish Berlin as seat of the government in the Unification Treaty. This position was opposed by the West German 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 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.

Figure 3: **Cumulated abnormal returns Unification Treaty - Berlin sample.** 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.



4.7 A similar event - the government location decision in 1949: Bonn versus Frankfurt

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

Table 7: **Descriptive statistics**
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.

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%)

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

and the occupants of the western zones accelerated fiercely. The politics of the Soviet Union in their occupation zone, the Allied Control Council[50], 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 Berlin city commander's office[51] 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

[50]The Allied Control Council (Alliierter Kontrollrat) was installed by the occupying powers as the primary governmental power after the end of World War II.

[51]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.

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).[52] The parliament refused the proposal that the preliminary seat of the leading political entities should relocate to Frankfurt with 200 to 176 votes.[53]

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.[54] 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.[55] 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 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 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

[52]The German Federal Parliament had been elected on August 14, 1949.

[53]For this section, cf. Pommerin, Möller, and Feldkamp (2008).

[54]Cf. Rudolph (1992).

[55]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.

Table 8: **Mean CARs (Market-Adjusted-Return Model) - Bonn-Cologne sample in 1949.** 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 (%)).

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

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.

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:

$$R_{it} = R_{indit} + \epsilon_{it} \tag{5}$$

$$AR_{it} = R^*_{it} - R^*_{indt} \tag{6}$$

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

Table 9: **Mean CARs (Market-Adjusted-Return Model) - Frankfurt sample in 1949.** 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 (%)).

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

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.

December.[56] 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 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 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, respectively. The

[56]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.

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.

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.

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.[57] This can be easily seen from the Market Model, that relates the return of stock i merely to the return of the market portfolio:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \xi_{it} \tag{7}$$

$$E\left[\xi_{it}\right] = 0 \quad Var\left[\xi_{it}\right] = \sigma^2_{\xi i}$$

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:

$$R_{it} = \mu_i + \varepsilon_{it} \tag{8}$$

$$E\left[\varepsilon_{it}\right] = 0 \quad Var\left[\varepsilon_{it}\right] = \sigma^2_{\varepsilon i}$$

[57] 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.

Table 10: **Mean CARs - alternative models.** 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.

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

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.

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

$$AR_{it} = R^*_{it} - \left(\hat{\alpha}_i + \hat{\beta}_i R^*_{mt}\right) \tag{9}$$

$$AR_{it} = R^*_{it} - \mu_i \tag{10}$$

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 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.

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 under-representation 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 (9) and (10) state the respective modifications:

Table 11: **Mean CARs - industry/ most specific index instead of market index.** 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 (%)).

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

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.

$$R_{it} = \alpha_i + \beta_i R_{indit} + \gamma_i SMB_t + \delta_i HML_t + \epsilon_{it} \quad (11)$$

$$R_{it} = \alpha_i + \beta_i R_{secit} + \gamma_i SMB_t + \delta_i HML_t + \epsilon_{it} \quad (12)$$

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 11. The results differ only slightly from the benchmark results in table 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.

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 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 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

Table 12: **Mean CARs - differing definitions of Berlin sample.** 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 (%)).

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

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 13: **Mean CARs - all firms somehow linked to Berlin.** 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 (%)).

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

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.

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 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.

6 The effect of political connections

The Berlin sample comprises firms from seven different industries as defined by the Industry Classification Benchmark (ICB). Table 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

Table 14: **Mean CARs by industry.** This table provides mean cumulative abnormal returns by industry for three different event windows.

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%

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

(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, because 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 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

Table 15: **OLS regressions Berlin sample - dependent variable: two-day cumulative abnormal return (in %).** This table provides results for OLS regressions of the two-day cumulative abnormal return (in %) on different variables.

	Regression					
	1	2	3	4	5	6
Political ties	5.35	4.99	6.17			4.87
	(1.65)	(1.52)	(1.11)			(1.47)
Lobby-intensive				1.89	1.46	0.32
				(0.90)	(0.68)	(0.16)
Market value		-0.0003	-0.00001		-0.0005	-0.0004
		(0.73)	(0.02)		(0.82)	(0.73)
Industry dummies	no	no	yes	no	no	no
Constant	1.95*	2.53*	-0.13	2.03	2.85*	2.40
	(2.02)	(2.03)	(0.03)	(1.49)	(1.79)	(1.41)
R^2	0.154	0.153	0.426	0.032	0.030	0.154
N	27	26	26	27	26	26
	Regression					
	7	8	9	10	11	12
Pol.ties*Lobby-int.		7.05*	6.77*	10.86*	9.50**	14.10**
		(2.03)	(1.93)	(1.82)	(2.28)	(2.29)
Political ties	6.17				-2.28	-3.16***
	(1.11)				(1.29)	(-3.10)
Lobby-intensive	1.69				-0.94	4.51
	(0.38)				(0.49)	(0.92)
Market value	-0.00002		-0.0004	-0.0005	-0.0005	-0.0007
	(0.02)		(0.92)	(0.54)	(0.92)	(0.66)
Industry dummies	yes	no	no	yes	no	yes
Constant	-1.82	1.90*	2.52	2.53	3.03	-1.28
	(1.16)	(2.05)	(2.13)**	(0.50)	(1.68)*	(0.66)
R^2	0.426	0.224	0.231	0.556	0.242	0.567
N	26	27	26	26	26	26

t-statistics 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.

did indeed outperform other firms in the Berlin sample, I perform simple OLS regressions of the two-day cumulative abnormal returns on several variables within the Berlin sample. Table 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 and the row *Industry dummies* depicts whether dummies on the industries are included in the regression or not. Regressions 1-3 and 6-7 show that the coefficient on the *Political ties* dummy is positive and very large. This confirms that the politically connected firms outperformed their unconnected peers by around 5-6 percentage points. However, none of the coefficients is statistically significant. The coefficients on the *Lobby-intensive* variable (regressions 4-7) show a similar pattern, though the magnitude is lower. 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 8-12 illustrate that this interaction term is very large in magnitude and statistically significant either on the 90 or 95 percent levels of confidence. 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.

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 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.

Table 16: **Comparison to results of other studies.** This table provides a summary of study results that are related to the present analysis.

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:[a] coming to power of Nazi regime	Connected to Nazi regime vs unconnected	2 months	5% to 8%
Worldwide:[b] sudden death of politicians	HQs in politician's hometown vs market	3, 7, 11 days	-0.6% to -1.7%
Indonesia 1995 - 1997:[c] adverse rumors regarding Suharto's health	Most connected to Suharto	6 events, 1 to 6 days	-0.6%

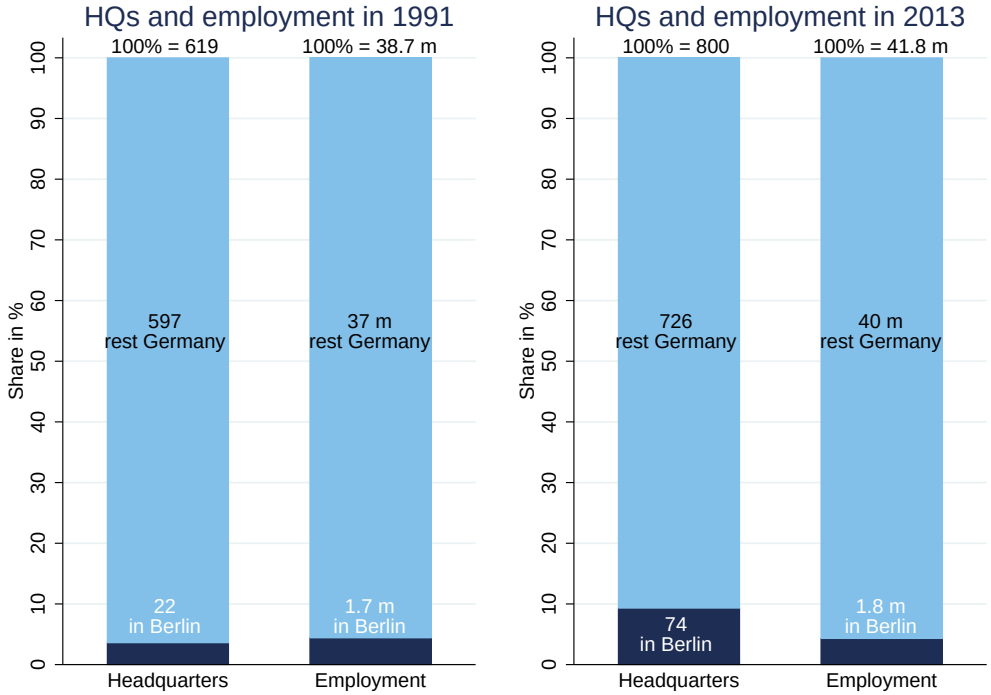
[a]Ferguson and Voth (2008); [b]Faccio and Parsley (2009); [c]Fisman (2001)

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.[58] 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 obsta-

[58]Cf. Schäuble (1991), p. 132.

Figure 4: **Share of headquarters of publicly listed firms in Berlin.** 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.



cles 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 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.[59]

[59]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)

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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.[60] The number of areas that enter the sample differ per country, with larger countries being overrepresented in the sample.[61] In order to test whether headquarters of publicly traded firms are disproportionately concentrated in capital cities, I run the following simple OLS regression:

$$HQs_i = \alpha_i + \beta_i pop_i + \gamma_i (pop_i)^2 + \delta_i D_{cap} + \varepsilon_i \tag{13}$$

where HQs_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 A.1 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 A.1 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

[60] 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.

[61] 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.

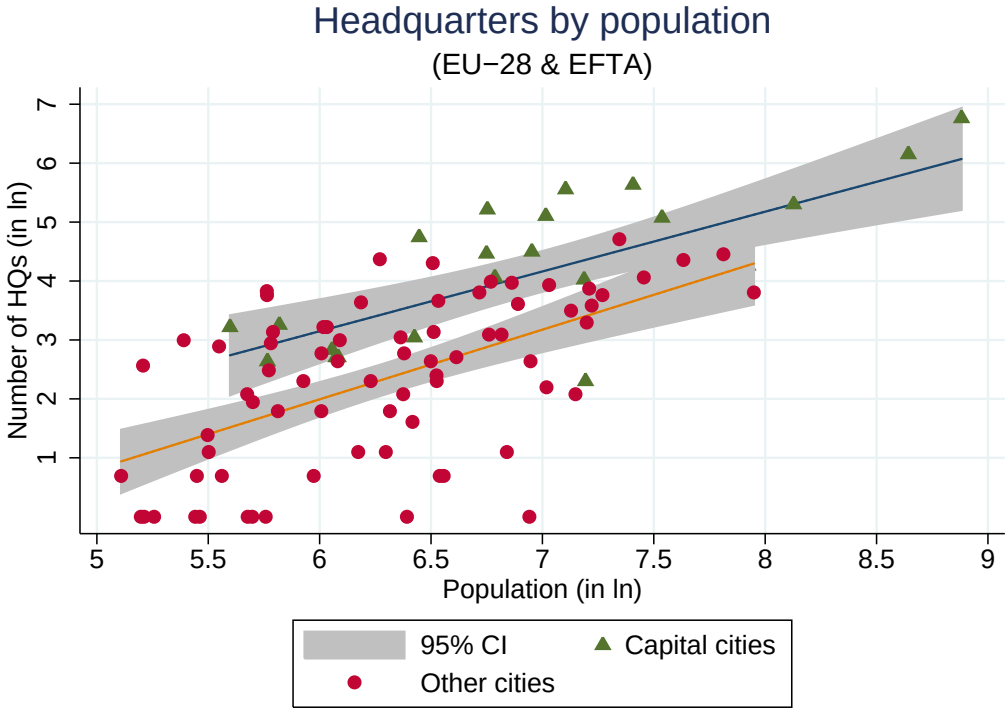
Table A.1: **OLS regressions headquarters concentration - dependent variable: number of headquarters.** This table provides results for OLS regressions of the number of headquarters in a metropolitan area on the economically active population in the respective area and an indicator variables on whether 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.

	Regression					
	1	2	3	4	5	6
D_{cap}	108.57***	34.41**	47.18***	63.65***	46.37***	45.88***
	(3.01)	(2.36)	(3.30)	(4.10)	(3.36)	(3.37)
pop_i		0.083***	0.022**		0.035***	0.039***
		(4.22)	(2.48)		(7.25)	(4.14)
$(pop_i)^2$			0.00002***			-4.15e-06
			(7.46)			(0.53)
Constant	20.39***	36.89***	19.57***	20.39***	27.43***	29.48***
	(4.84)	(4.83)	(3.74)	(4.84)	(7.42)	(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

t-statistics in parenthesis. Standard errors are based on Huber-White heteroscedasticity-consistent estimates and clustered on the country level. *, **, *** indicate significance at the 90%, 95%, and 99% level of confidence, respectively.

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

Figure A.1: **Headquarters by population in Europe.** 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.



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[62] and to those securities for which Datastream provides data on the market value and the market-to-book equity.[63] 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 B.1, 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.

[62] This follows the approach of Fama and French (1993).

[63] 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 B.1: **Fit of the Fama-French Three-Factor Model.** 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.

	Coefficient
Constant	-.0005623**
	(.0002842)
Market return	.7470555***
	(.0481819)
SMB	.5079158***
	(.0827066)
HML	-.2070603***
	(.0731615)
R-squared	0.6970

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

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

Table C.1: **Securities of firms in Berlin in 1991**. 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.

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

Table A.3 continued

Firm name	Industry	Sector	Market value (m)	Group
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 Wachstuch-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
AEG	Industrials	Electronic & Electronical 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 A.3 continued

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

Table A.3 continued

Firm name	Industry	Sector	Market value (m)	Group
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