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Identity, Instability, and Investors

An Empirical Investigation of the Home Bias

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Identity, Instability, and Investors
An Empirical Investigation of the Home Bias *

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September 26, 2022

Abstract

In this paper, we present novel data from the German-speaking area on 13,422 venture capital investments between 1999 and 2019, and document a novel and yet unexplained contributor to investors' home bias. We propose a new measure of regional identity based on a recent vehicle license plate liberalization in Germany, and leverage on a unique dataset of historical borders to show how regional identity is formed. We use an instrumental strategy to establish a causal link between historical political instability, regional identity, and the home bias. Our results indicate that a common regional identity is highly relevant for investment decisions. (100 words)

Keywords: home bias, venture capital, start-ups, investor behavior, common regional identity, historical political instability

JEL Classification: G11, G24, G41, N20, Z19

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"Home wasn't built in a day"
Jane Sherwood Ace (1897–1974)

What determines investment decisions? The traditional answer to this question has often relied on the assumption of rational agents who are concerned with the future of their potential assets. In this paper, we investigate to what degree the past is relevant for the understanding of investment decisions. We argue that experiences in the past can explain a significant share of investors' long-observed bias towards geographically closer investments, the home bias.[1] We investigate whether venture capitalists in the German-speaking area are prone to home bias. We then study whether investors which are located in places with a longer-standing regional identity are more prone to home bias than ones in places where the formation of such an identify was interrupted by wars, conflicts, and changing borders.

Venture capitalists are a main source of finance for start-ups. A developed entrepreneurial culture and a dynamic start-up scene are essential for the long-run prosperity of regions and countries. Therefore, looking closer on these kinds of investment activities and to understand how these decisions are made and in which way they might be influence by macro-level and historical experiences and shocks seems to be particularly valuable.

The German-speaking area is particularly suitable for studying these questions. Including the largest economy in Europe, the data on investments by venture capitalists are rich, the area is relatively homogeneous in terms of language and legal framework, meanwhile the heterogeneity in historical states is well documented, for example due to the unique structure of the Holy Roman Empire, a decentralized collection of smaller and larger territories of various nature.

We have collected a new dataset of thousands of venture capitalist transactions in Germany, Austria, and Switzerland between 1999 and 2019 based on data from

[1] The home bias, also called "local bias" or "proximity bias", refers to the "tendency of investors to over-invest in assets and shares from their home region" (Coeudacier and Rey 2013).

Thomson Reuters' EIKON database. We have then geo-located these data to connect them to a myriad of spatial historical information, such as the position of historical borders 1100–1990 from Huning and Wahl (2021b), Kunz (2008) and the Census Mosaic project.[2] From these historical data, we create a variable that reports historical political instability as the number of different states to which a municipality belonged from 1250 until 1925.[3] We have also collected publicly available data on the CVs of managers of the investors, to investigate to what degree of personal connections to the start-up location, expressed as place of study or residence, among others, are relevant for investment decisions.

Our study links the study of financial decisions with concepts on economic groups and identity going back to Akerlof and Kranton (2010). Their research shows how the degree to which agents act "groupy", which means that they prefer members of their own group over members of another group, affects their cooperation. Here, we focus on the role of spatial components of what distinguishes one group from another, regional identity, and propose that a sense of historical belonging contributes to the perceived common identity in agents.[4] Our argument regarding the relationship between political instability and the formation of regional identity is also inspired by research of Giuliano and Nunn (2021). They hypothesize that change and persistence of cultural norms and values are decisively influenced by the stability or instability of the environment across generations. We argue that the spatial dimension of identity is affected by political instability. People living in areas of high political instability have less incentive to develop and upheld traditions related to their region, and to transmit conservative values and traditions like identities to their children.

A unique sequence of political decisions also helps us to measure regional iden-

[2] `https://censusmosaic.demog.berkeley.edu/`

[3] The results are robust to alternative measure featuring time-discounted political instability levels.

[4] For more on the concept of social identity the reader is referred to Tajfel (1974). Important qualitative contributions to the understanding of the spatial component of identity are Paasi (2002), Proshansky, Fabian, and Kaminoff (1983), and Sedlacek, Kurka, and Maier (2009).

tity. Standard German vehicle license plates consist of an *Unterscheidungszeichen (UZ)*, an abbreviation two to three letters, followed by two letters and three to four numbers, for example M-PM 1234. The UZ allows anyone to understand that this car was first registered in M (for Munich). These UZs are so widely known by Germans that guessing the place from the abbreviation is a common game for bored children on long rides, and there is a vivid culture of epithets for neighboring counties.[5] As such, UZs (and hence German license plates) have evolved in a marker of group identity. Until 2012 vehicle owners automatically received the UZ of the county they live in. When a county was dissolved as part of an administrative reform (these were especially common in the 1970s), no new license plates with this UZ were distributed. This procedure was heavily criticized by the public and led to the 2012 license plate liberalization, which allowed counties to re-introduce the UZs of abolished counties. Since then, 170 counties give vehicle owners the choice between their standard UZ and the UZ of one of the 355 abolished counties that once existed within their boundaries. The latter comes with a fee of 10 Euro, the same fee that also applies for any choice of plate.[6] In a survey of Bochert (2014), the majority of the participants said that the old acronyms are important for them to identify with their region,.[7] We calculate the share of such UZs of abolished counties ("Altkreise") in each municipality to measure regional identity of the inhabitants.

We begin our empirical analysis with a descriptive analysis of the venture capitalist investments in our region, aggregated to the municipality level. We present evidence on the prevalence of a home bias in investment decisions. We classify an investment as local using different categories based on whether the distance between start-up in and investors' headquarter is less than 100km, they lie in the

[5]For example, people from Hamburg would sometimes call their more rural neighbors from PI (Pinneberg) "provincial idiots". A database of these epithets is provided here `https://www.kennzeichen-direkt.de/kennzeichen-bedeutungen`.

[6]It is relatively common for vehicle owners to select their initials for the part after the UZ.

[7]This is something that was also noted by Germany's largest automobile association the ADAC ("Allgemeiner Deutscher Automobil Club"), license plates act as a means to express identification with one's home area (ADAC Executive Committee 2018).

same city, or within the same federal state. We find a significant home bias in the investment decisions of venture capitalists. Already 14% of investments are found in the same city as the investor. As much of 40% of all investments in the German-speaking countries are within the 100km distance threshold. We find a significant negative effect of distance on investment decisions.

We move on to regression analysis by creating a matrix of all possible combinations between investors and start-ups, to then create a dummy variable equal to one if this investment is within our dataset. Our main explanatory variables are different measure of the home bias, most importantly, the distance between the investor and the start-up. Controls include differences between socio-economic characteristics of the two places, to rule out that measures of similarity other than regional identity drive our results. The distance measure remains a sizeable, and yet unexplained, explanatory of investment decisions.

In the second part of our analysis, we explain this home bias. We establish that historical political instability is detrimental for the formation of a regional identity. We proceed by estimating a reduced-form relationship between a dummy whether investments took place within a 100km threshold of the investor and measures of regional identity, as expressed by the choice of license plates on the municipality level. Results imply a small, yet statistically significant, negative effect of regional identity on the home bias. Given our theoretical and historical reasoning, finding a negative effect is surprising and could reflect the existence of a downwards bias of OLS caused by a third, unobserved factor. Such an omitted variables bias is very likely as regional identity is naturally a highly complex and endogenous process, and reverse causality might be an issue of any naive approach too, given that investment decisions can shape regional investment..

To establish causality between regional identity and the home bias, we therefore exploit the historical roots of the home bias in past levels of political instability. We focus on the variation in political instability that results from historical accidents—border changes caused by the death of a ruler who was not survived by a male heir. The results indicates an economically and statistically significant causal effect

of regional identity on today's investment decisions. The 2SLS results imply an average of a 1% increase in the number of reintroduced license plates is linked to an increase in the the share of home bias investments by 0.175%. This confirms our result and indicates that the OLS coefficents are downward biased.

Our empirical conclusions are robust to a battery of robustness checks, such as standard errors accounting for spatial autocorrelation, including additional control variables, and applying alternative definitions of the home bias.

The remainder of the paper is organized as follows. Section 1 provides a comprehensive review of the relevant literature. We introduce the data in section 2, and the empirical analysis follows in section 3. Section 4 concludes.

1 Related Literature

Since the first systematic discussion of the home bias in French and Poterba (1991), the literature has proposed ample reasons for the fact that investors prefer to invest in assets which have their headquarter in geographically close proximity. Van Nieuwerburgh and Veldkamp (2009) have famously highlighted the role of information in the sense of Akerlof (1970) as as central element of this bias.[8] It has also been noted that this pattern persists among venture capitalists (see Hoban Jr. 1976; Coval and Moskowitz 1999; Zacharakis and Shepherd 2001; Cumming and Dai 2010).[9] There are arguably dozens of reasons why geographic proximity makes it practically easier for investors to observe what is happening in the place they have invested in, but a corollary of geographic proximity and its influence on investment decisions is yet understudied: People who live close together have

[8]Important empirical contributions to the home bias are Bernartzi (2001), who investigate that employees overinvest their retirement accounts in the firms in which they are employed. Demarzo, Kaniel, and Kremer (2004) argue that in regions where there is one dominant firm or sector, individual under-diversify their portfolio. Hornuf, Schmitt, and Stenzhorn (2020) show that investors over-invest in proximate firms even after controlling for network effects such as friends and families.

[9]Some venture capitalists are quoted to have a "20-minute rule", which is the maximum door-to-door travel time to be considered as an investment (*New York Times 22 October 2006* 2006).

a shared feeling of belonging, a common identity based on a multitude of visible and invisible shared characteristics, such as common dialects, preferences, world views, and not to forget a shared regional history. We argue that these invisible characteristics are an important aspect of the investment decision, as they initiate trust in the relationship between those involved in the investment.[10]

It is established in the literature that investment decisions are decided by individuals, and their individual characteristics shape their investment decisions as much as they shape their behavior in general.[11] A large literature going back to Akerlof and Kranton (2010) has developed a theoretical framework that link individuals' behavior to their feeling of belonging to groups, from there to conceptualize how this affects cooperative decisions. They termed the concept of 'groupiness' as the degree to which an individual prefers members of their own group over non-members. Since investment decisions are cooperative decisions, this framework applies to our context. Groups are likely to be formed between individuals who share characteristics (the social homophily theory, Lazarsfeld and Merton 1954; McPherson, Smith-Lovin, and Cook 2001).[12] Cable and Shane (1997), Franke et al. (2006), and Murnieks et al. (2011) provide empirical support for our context, and show that characteristics shared between the individuals representing venture capitalists and individuals representing the start-ups is relevant. Characteristics they are interested in are similar educational or work background, "way of thinking", demographic characteristics, work values, and perceived power equality. In this paper, we investigate how history has affected the degree to which regional identity shapes individuals' (perceived) shared characteristics and as such

[10]For a discussion of trust and its role for investments, see Gusio, Sapienza, and Zingales (2004) and Guiso, Sapienza, and Zingales (2008).

[11]Previous research has shown that the socioeconomic characteristics—such as gender, age, education, income and investment experience—influences the expectations of the individuals involved in investment decisions (Jianakoplos and Bernasek 1998; Barber and Odean 2001; Goetzmann and Kumar 2008; Kumar 2009; Sapienza, Zingales, and Maestripieri 2009).

[12]Important empirical contributions have highlighted the role of religious (Benjamin, Choi, and Fisher 2016), ethnic (Benjamin, Choi, and Strickland 2010; Desmet, Ortin-Ortuno, and Wacziarg 2017), political (Kranton et al. 2013) or language (Rustagi and Veronesi 2016) similarity between individuals to increase willingness to cooperate.

investments.

The idea that history is important for the understanding of group formation, especially regional identity, is also established in the literature. The argument that geographic regions—even regions as large as nations—come with a sense of shared characteristics is as old as Anderson (1983). Recent economic (Fritsch et al. 2021) and social psychological literature (Plaut et al. 2012; Rentfrow, Gosling, and Potter 2008; Rentfrow, Jokela, and Lamb 2015) have shown that psychological characteristics are clustered in space, suggesting a link between shared characteristics and regional identity. The reason for this clustering is widely seen in inter-generational transmission (see Bisin and Verdier 2000; Tabellini 2008; Guiso, Sapienza, and Zingales 2016). Rustagi and Veronesi (2016) show how parents and grandparents pass down their sense of regional belonging. Migration is not found to affect this sense dramatically. First, because a strong sense of regional identity reduces emigration from these regions, as outlined in Kremer (2021). Second, Rentfrow, Gosling, and Potter (2008) show that if someone from regions with a strong identity migrates to another region, this second region is more likely to have a strong regional identity as well, because a strong regional identity is a characteristic itself, and individual self-selects into this shared characteristic.[13]

In our empirical part, we show that this sense of regional identity is less developed where historical events—here: the (unexpected) change of political borders—disturbed its establishment. The idea that single events are relevant for the foundation of a regional identity is established. To name some important contributions, Dehdari and Gehring (2022) shows that the annexation of Alsace-Lorraine between 1870 and 1918 caused a measurable increase of regional identity, a decrease of national (French) one, and an increase of European one. The complementarity between regional and national identity in the German context is discussed in Mühler and Opp (2004) and Hanns Seidel Stiftung (2009). Shared experiences have been

[13] As shown by shown by Rios and Moreno-Jimenez (2012), those who migrate from a place with weak regional identity to a place with strong regional identity will form strong feelings of attachment to this region. Their study compares natives and migrants in Malaga, Spain and finds that, after some years, immigrants reach the same level of regional identity as the natives.

shown to affect individuals and their sense of belonging to a group. Depetris-Chauvin, Durante, and Campante (2020) conducted surveys about national and ethnic identity, before and after soccer games of the South African national team. Their results suggest that national identity increased and ethnic identity and inter-ethnicity violence decreased after victories of the national football team. Ochsner and Roesel (2019), with Austrian data, show how the relevance of past events for national identity could be re-activated by a political campaign.

Our empirical strategy relies on the idea that a sequence of such events, culminating in a relatively stable political history of one place compared to a place that was part of many different historical states is relevant for today's feeling of regional identity. The idea that stability is relevant for the transmission of cultural traits (so shared characteristics) has recently been proposed by Giuliano and Nunn (2021). They argue that the degree to which cultural traits (so shared characteristics) are passed down generation is dependent on the similarity of the environment between generations. We focus on the instability of the environment induced by historical events that changed political borders, relying on a long-standing literature on the predecessor states of Europe and the German-speaking area, especially the Holy Roman Empire (see Acemoglu et al. 2011; Huning and Wahl 2021b). In this aspect, the recent study by Abramson, Carter, and Ying (2022) is closely related to ours. They show that there is a negative relationship between historical border changes and individuals' political and social trust. They argue that this is because border changes prevent successful state-building efforts. One of our instruments, ruler's death without a male heir, is also established in this literature on early statehood, Acharya and Lee (2019).

To conclude on our reading of the literature, it is established that investments are affected by the characteristics of the individuals involved in the decision-making process, this also applies in the context of venture capitalists, and that some of these shared characteristics are clustered in space and contribute to a sense of regional identity. The formation of this identity and the degree to which it affects cooperation between individuals from more distant places is dependent on histor-

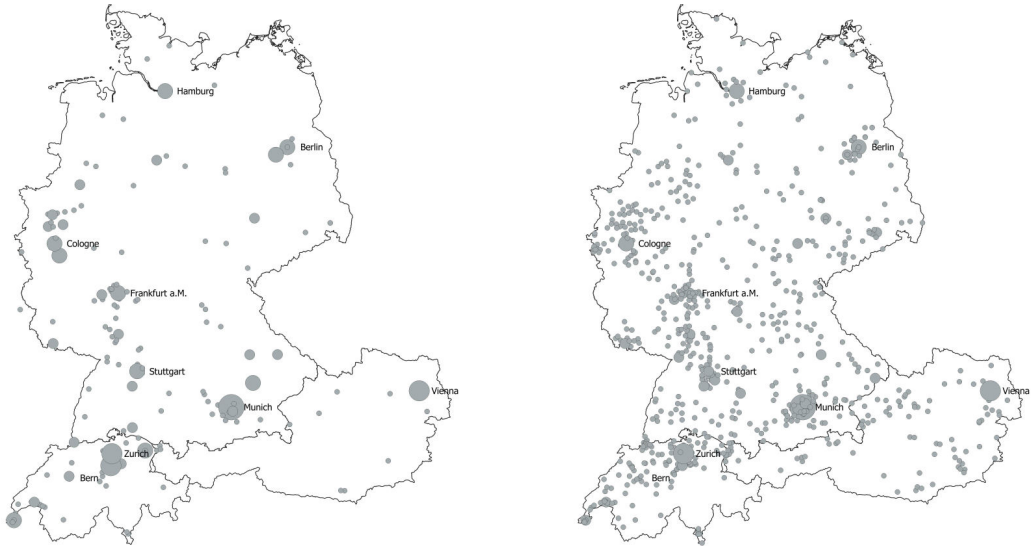
ical events. We can group similar historical events, in our case changes of political borders, to develop a measure of historical political instability, and hypothesize that this measure correlates with the degree to which individuals identify with their regions. A prudent way of establishing causality between political stability and an outcome is to focus on rulers' death without a heir.

2 Data

Data on venture capital transactions. We have retrieved transaction data on venture capital investments in Germany, Austria and Switzerland for the time period from 2.11.1999 to 5.8.2019 from Thomson Reuter's EIKON database. Augmenting these data with information from the EIKON database on the location of the headquarters of venture capitalists and start-ups yields 13,422 observations in total, and 8,590 observations of which both the venture capitalist and the invested firm are headquartered in the German speaking area. We geo-coded the headquarters to calculate the distance using `gpsvisualizer.com`. Table 1 provides a descriptive summary of the Thomson Reuters EIKON database for Austria, Germany and Switzerland. Figure 1 shows the borders of Austria, Germany and Switzerland, the location and number of venture capitalists per municipality (Figure 1(a)). Figure 1(b) shows the same for start-ups. These maps are insightful on their own. First, the location of start-ups are significantly more scattered in space compared to the venture capitalist counterparts. Second, but less surprisingly, venture capital firms cluster in the largest agglomeration zones (especially Berlin, Cologne, Frankfurt, Hamburg, Munich and Vienna), but there is a considerable spread of start-ups in the more rural areas.

Data on the individuals on the venture capitalist side. We retrieve data on the central managing directors (such as CEO or COO) by matching the venture capital firms in the EIKON database with information in the German commercial register, which is available online from `northdata.org`. We then underwent a systematic search of publicly available data on these individuals, relying on their online cur-

riculum vitae, LinkedIn, and Wikipedia. We were able to find information on the places of birth, education, and current residence for 1,096 of the 6,365 managers, representing 282 firms.



(a) Location of Venture Capitalists **(b)** Location of Start-ups

Note: The gray dots show the location of Venture capitalists and start-ups, respectively. The size of the dots indicates the number of VC firms and start-ups per location.

Figure 1: Location of Venture Capitalists and Start-ups (Eikon data)

Table 1: Summary of Thomson Reuter's EIKON Database for the German-speaking area

	Austria	Germany	Switzerland	Rest	Total
No of venture capitalists	69	478	147		694
No of start-up	288	2,834	399	2,546	6,067
No of venture capitalist locations	13	114	38		165
No of start-up locations	95	542	132	770	1,539

Data on German vehicle license plates to measure regional identity. We purchased municipality-level on the distribution of vehicles from the German vehicle

registration office (*Kraftfahrtbundesamt*). These data provide us with the number of vehicle registered in a municipality, aggregated to the UZ on the license plate, and represent the state of January 1st 2019, seven years after the reform.[14] Here, we are interested in data on UZs that were re-introduced after the license plate liberalization of 2012. By then, 170 counties have decided to reintroduce a total of 355 UZs. These counties consist of 6,059 municipalities, and the share of cars with reintroduced UZs on their license plates was on average 19.41%. A list of these reintroduced UZs and their counties can be found in the Online Appendix, Table A.1.The information on the UZs is taken from an official list by the German vehicle registration office, (Kraftfahrt-Bundesamt 2018), augmented with information on reintroduced UZs from Wikipedia.[15] We use these data to calculate the share of vehicles with license plates of re-introduced UZs as a measure of regional identity. Figure 2 shows this share of reintroduced license plates per municipality. The darker the municipality is shaded, the higher is the share of vehicles with reintroduced UZs on their license plate. The borders are those of contemporary counties.[16]

Data on the stability of political borders in history. We have geocoded data for the position of historical borders for nine periods, 1250, 1378, 1477, 1556, 1648, 1789, 1820, 1871, and 1925. These data represent the states of the Holy Roman Empire (–1806), the German Confederation (1820), the German Empire (1871), and the Weimar Republic (1925). All data before and including 1789 comes from Huning and Wahl (2021b) who digitized an atlas of Wolff (1877), and is explained there. Kunz (2008) provides the data for more recent border changes. Before the unification of Germany in 1871, we consider the individual and independent states. Between 1871 and 1925, we use information of the borders of the member states of the German Empire.[17] We calculated our measure of political instability by con-

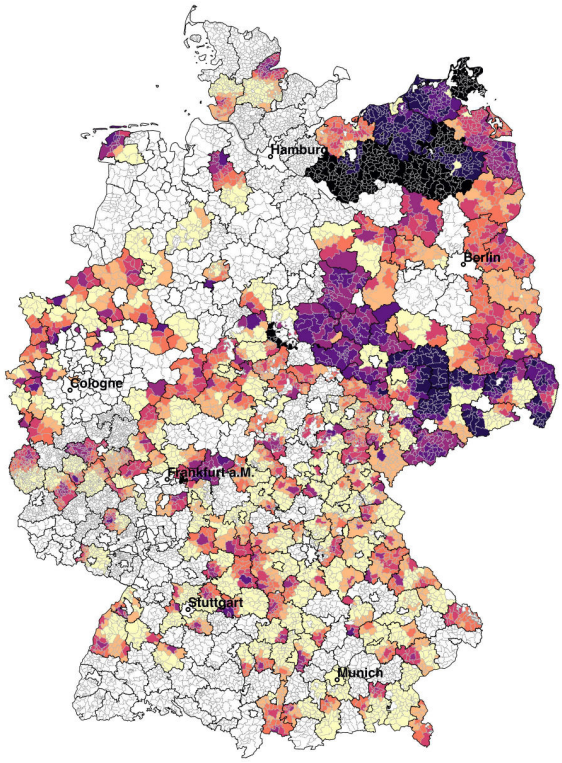
[14]The term UZ is explained on page 3.

[15]`https://de.wikipedia.org/wiki/Kennzeichenliberalisierung` (Last accessed on 15th July, 2022).

[16]The county is the level that decides over the reintroduction of UZs.

[17]The Data Appendix, section A.1.4 shows digitized versions of these maps (Figure A.2.). 1250 captures the effect of the collapse of the Staufer dynasty on state formation and city independence.

sulting the historical literature, such as Köbler (1988), to link the same territory over time.



Note: The figure shows the share of vehicles with reintroduced UZ in each municipality. The darker a municipality is shaded the higher is its share. The bold black borders are those of contemporary counties. The gray borders indicate municipalities without vehicles with reintroduced UZs.

Figure 2: Share of Vehicles with Reintroduced UZs in German Municipalities

1378 depicts the HRE around the peak of its fragmentation after the passing of the Golden Bull in 1356. 1477 is the year in which Charles the Bold, Duke of Burgundy, died in the battle of Nancy. 1556 is the year after the peace of Augsburg settled the confessional division of Germany for the next decades and ended the first wave of religious wars in the HRE. 1648 is the year when the Thirty Years War ended with the peace treaties of Westphalia. Finally, 1789 is the year when the French Revolution began. A more detailed historical overview of these critical points of Central European history is given in section A.1.3 of the Online Appendix. 1820 is chosen to represent the borders of the states constituting the German Confederation ("Deutscher Bund"), 1871 represents the borders of the newly formed German Empire, while 1925 depicts those of the German Empire after the territorial losses implied by the treaty of Versailles. Maps of the states and territories from 1820 to 1925 are shown in the Online Appendix in section A.1.6., Figure A.3.

We here abstract from changes in the status of the state. For example, we consider the Duchy of Württemberg and the Kingdom of Württemberg as the same state.[18] Our measure historical political instability is an index based on the number of different states a municipality belonged to historically. The index is formally defined as

$$HPI_i = \sum_{t=1250}^{1925} \cdot S_{it} \tag{1}$$

with

$$S_{it} = \begin{cases} 1, & \text{if state of municipality i changed in t.} \\ 0, & \text{otherwise.} \end{cases} \tag{2}$$

We also incorporate the rationale that more recent border changes should be of more importance than older changes. We therefore discount any change with the number of years that have passed since. This provides us with a weighted version of our index, formally defined as

$$WHPI_i = \sum_{t=1250}^{1925} \sum_{i=1}^{i=N} \frac{1}{2022 - t} \cdot S_{it} \tag{3}$$

with

$$S_{it} = \begin{cases} 1, & \text{if state of municipality i changed in t.} \\ 0, & \text{otherwise.} \end{cases} \tag{4}$$

[18] We ignore border changes after 1945 for several reasons. First, the effect of the German partition after 1945 is a discussion of its own (Wolf 2009; Becker, Mergele, and Woessmann 2020). Second, and most importantly, in the discussion of regional identity in Germany, the states before 1945 are significantly more relevant than the current 16 German states. These states were all founded after the detrimental—and common—shock of the war.

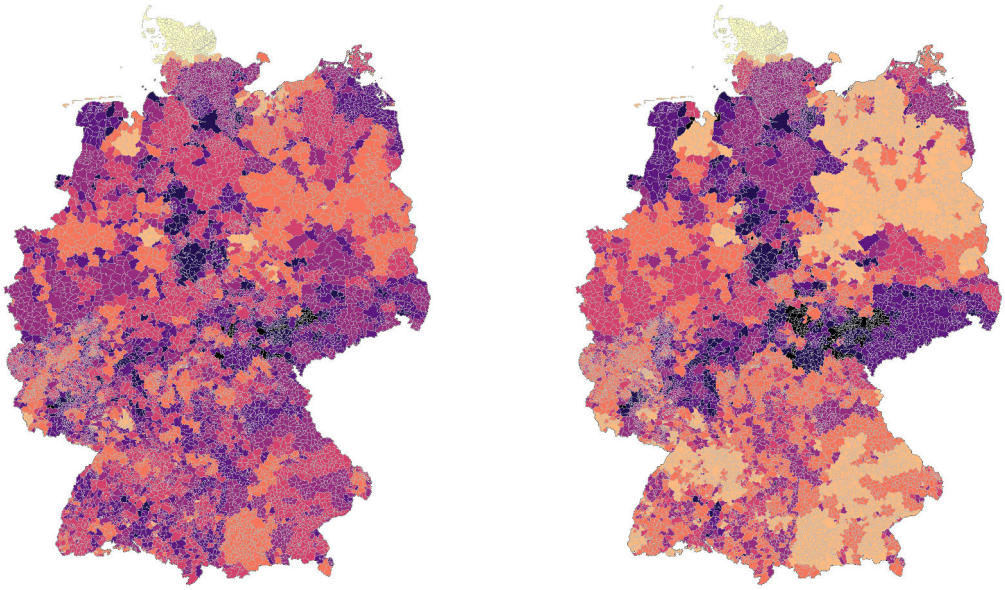
Figure 3 shows the values of the historical political instability index for all municipalities in Germany.

Both versions of the index show a similar pattern, but the weighting pronounces the differences. The area of today's Thuringia is the area of the highest political instability. This is compatible with common historical knowledge, since this region is also known for its long-lasting political fragmentation. Regions that look back at longer-standing historical states like Prussia, Bavaria but also the duchy of Württemberg in the Southwest stand out as more politically stable. The average of states a municipality belonged to between 1250 and 1925 is 4.5.

Our instrumental variable "Ruler Deaths without Heir" is constructed similar to the $WHPI$ index, but it only respects instances when a municipality changed its state because the ruler of the territory died of natural causes and without a male heir resulting in the territory being allocated/sold to another noble family, or being merged with another one. Information on the cause of the disappearance of a state is taken from the historical literature, especially Köbler (1988), Sante (1964), and Keyser and Stoob (1939–1974). A total of 489 states ceased to exist between 1250 and 1789, we identified 15 different reasons for these disappearances, and in 146 cases the extinction of the ruling dynasty because of a lack of a legitimate male heir. The latter set of historical accidents serves for our instrument.

Control Variables. We employ a host of contemporary and historical control variables. These include a dummy variable equal to one for municipalities historically located in the Roman Empire, a dummy variable equal to one if a municipality was the location of at least on historical war-related battle between 1250 and 1789, a dummy variable reporting location of a municipality on a major medieval trade route, historical location on the boundary of the Holy Roman Empire, and an indicator variable for Neolithic settlement areas. These data originate from Huning and Wahl (2021b), Wahl (2017) and Fritsch et al. (2021) and are introduced there. We use fixed effect for the states of the Holy Roman Empire in 1150 from Huning

and Wahl (2021b).[19] We also include several standard geographic control variables. These are latitude and longitude of a municipality's centroid, the interaction of latitude and longitude, as well as elevation and terrain ruggedness.



(a) HPI **(b)** WHPI

Note: This figure shows the values of our historical political instability index (panel a) and its inversely time weighted version (panel b) for each municipality. The darker a municipality is shaded the higher is its historical political instability.

Figure 3: Historical Political Instability among German Municipalities

Contemporary municipality characteristics averaged over the year 2002 to 2014 are taken from Asatryan, Havlik, and Streif (2017). Here, we consider population, income per capita, the share of industry buildings, and the migration balance per capita.[20] We coded a dummy for independent municipalities ("kreisfrei"), an at-

[19]Figure A.4. in the Online Appendix shows which municipality belongs to which of the states of the HRE in 1150 and, for comparison, also shows the borders of the contemporary German federal states. Note also that the Holy Roman Empire in 1150 did not extent into the northeastern parts of today's Germany. Consequently, in the regression including 1150 states dummies, parts of Brandenburg and Mecklenburg-Vorpommern are excluded. Here, we only consider the parts of Germany which belonged to the Holy Roman Empire since the 12th century.

[20]When we use these data, the number of observations decline because Asatryan, Havlik, and

tribute given to cities usually larger than 100,000 inhabitants which comes with more political autonomy. We take these data from the federal statistical office. Information on "gemeindefreie Gebiete", areas that are uninhabited, stems from Asatryan, Havlik, and Streif (2017). From Reuter's EIKON database we take information on the number of venture capitalist funds which are locally bound. These include quasi-public, private, or mixed institutions that have a given and binding geographic area they are allowed to invest it |(this will be a relevant factor to control for). We augment these data with the location of German universities in 2019 from the Federal statistical office.[21] Finally, we include the scaled version of Facebook's social connectedness index (SCI) as proxy for the social ties a NUTS-3 region has to others as of August 2020.[22]

A descriptive overview of all variables and data sets used in the empirical analysis can be found in the Online Data Appendix, Tables A.2 and A.3.

3 Empirical Analysis and Results

In this section we present the procedure and results from our empirical analysis. We start with showing that there is a considerable home bias among venture capitalists. We continue by testing the relationship between regional identity and the home bias, using our municipality-level data on Germany. Using the same data, we then test for correlation between historical political instability and regional identity. Finally, we provide causal evidence, we use our two-step 2SLS instrumental variables strategy,to exploit the exogenously determined share of historical political instability.

Streif (2017) do not have data for the federal state of Schleswig-Holstein, and most of their data is also missing for Hamburg, Berlin and for some other municipalities and years.

[21] This includes all certified universities, so also technical universities and universities of applied sciences.

[22] The publicly available version of the SCI can be downloaded for free here: `https://data.humdata.org/dataset/social-connectedness-index` (Last accessed on 24th July, 2022).

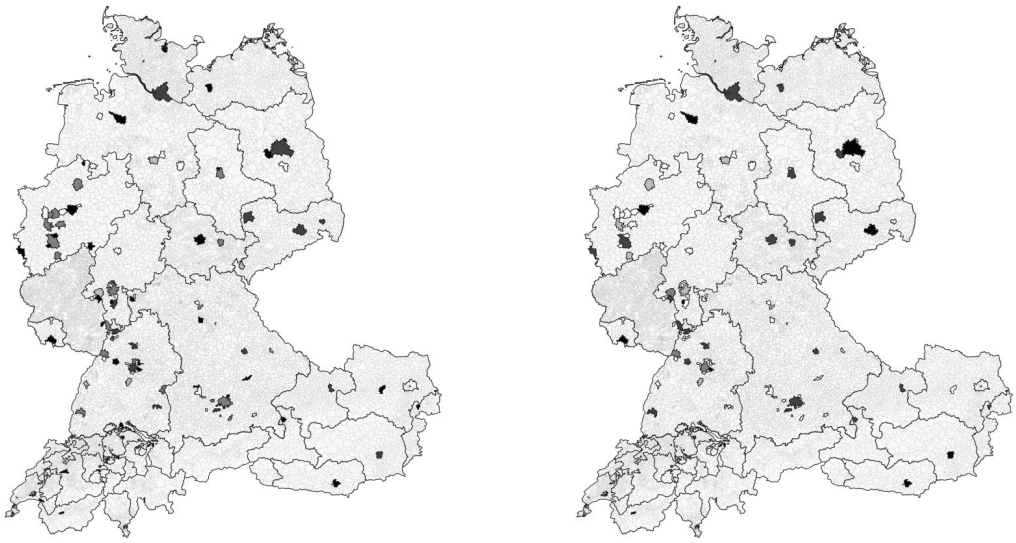
3.1 Documenting the Home Bias in Venture Capital Investments

Descriptive results. Table 2 displays the shares of all venture capitalist investments in our data in Austria, Germany and Switzerland, categorized by the distance between the headquarter of the investor and the invested company. This table suggest that around 25% of the starts-ups' headquarters were within a 100km radius of their respective venture capitalist. If we restrict the sample to investments in these three German-speaking countries, this share goes up to 40%. In already about one out of four investments, investors and investment are headquartered in the same federal state, and 15 % in the same city. These descriptive figures provide a first impression of the size of an investor's home bias. A comparison of our three countries shows that Switzerland seems to be relatively immune to home bias, whereas it is strongest in Austria.

Figure 4 provides a map on the regional pattern of the investments. The lines represent the municipality borders. Municipalities in which we found a venture capitalist are rendered in black. A darker shading in Figure4a indicates a higher share of investments in start-ups less than 100km from the headquarter. Figure4b shows the share of investments in start-ups in the same city, respectively. A comparison of the two figures shows a similar spatial structure, and suggests similar bias, however there is some variation within the maps. Non-surprisingly, investments in the same city are more likely in big cities (like Munich or Berlin) while the share of investments within 100km of the venture capitalist is more frequent in rural locations. Reassuring for our theory however is that the share of investments in close proximity as well as the share of same city transactions is higher in Northern Germany (which was historically relatively more politically stable), compared to its Southern half.

Table 2: Geographic Proximity and the Investments of Venture Capitalists

	Austria	Germany	Switzerland	All
Share distance <100km (all investments)	0.4	0.277	0.2	0.266
Share distance <100km (investments within GER, AUT, or CH)	0.5	0.37	0.44	0.4
Share foreign investments	0.36	0.34	0.72	0.42
Share same state	0.32	0.28	0.08	0.24
Share same city	0.3	0.16	0.05	0.14



(a) Distance investor to start-up < than 100km **(b)** Investors from the same city

Note: This figures shows the borders of all municipalities in the Austria, Germany, and Switzerland. The bold black lines are the borders of the municipalities with venture capitalists. A darker shading indicates a higher share of investments in start-ups less than 100km from the headquarter of the firm (sub-figure a) or the share of investments in start-ups in the same city (sub-figure (b)).

Figure 4: Visualizing Venture Capitalists' Home Bias

Regression results. To more thoroughly test the significance of a home bias, we

estimate regressions. We here rely on the matrix of all possible investments, constructed by pairing all venture capitalists with all start-ups in our dataset, a total of around 2.5 mio pairs. We then code a dummy variable that is equal to one if there is such investment, else zero. This dummy is then used as the explained variable of our probit regressions. Here, we predict the actual investment decisions with various sets of factors which could be relevant for the investment decisions:

$$\begin{aligned} &\Pr(Invest_{i,s}|HomeBias_{i,s}, \mathbf{X}_s, \mathbf{C}_{i,s}, SCI_{i,s}) \\ &= \Phi(\alpha + \beta HomeBias_{i,s} + \gamma' \mathbf{X}_s + \delta' \mathbf{C}_{i,s} + \theta SCI_{i,s} + \epsilon_{i,s}) \end{aligned} \tag{5}$$

With $Invest_{i,s}$ representing a dummy variable equal to one if a venture capitalist i has invested in a start-up s and $HomeBias_{i,s}$ is one of our three proxy variables for a home biased investment, which are distance to the respective start-up in km, a dummy variable equal to one if the distance to the start-up is less than 100km, and lastly, a dummy variable equal to one if a start-up is in the same municipality as the investor. We cluster all standard errors on the investor-level, given that they are the decision-making entity and their decisions may be correlated.

$\mathbf{X}_s$ represents a set of characteristics of the location of the start-up that could contribute to the investment decisions. Since larger, richer, and more attractive cities receive more investments, this is the natural logarithm (ln) of the population, the migration balance per capita, the share of industry buildings, the income per capita quantile, as well as dummy variables for the presence of a university.[23] Some of these controls proxy for the level of economic and industrial development of the start-ups' locations. Others reflect the fact that universities (especially technical universities) are well known for assisting their students and alumni to found start-ups.[24] This variable therefore measures also informal personal connections between start-ups and venture capitalists induced by a university.

[23]Throughout the paper and to keep the number of observations constant, we add one to all counts before taking the natural logarithm.

[24]This involves, for example, the provision of office space, incubators, as well as organizational support via networking associations.

$\mathbf{C}_{i,s}$ is a set of variables that captures the existence of common characteristics shared by the location of the start-up's and investor's headquarter. This is prudent since investors may be more inclined to invest in start-ups from similar places, for example places that both have each a university. As such, we create a dummy variables equal to one if universities, universities of applied science or technical universities, exist in both places. We also include a dummy variable that indicates whether the two locations are located in the same quantile of the income per capita distribution among German municipalities. If, for example, investors from more economically backward cities prefer to cooperate with individuals from similarly backward cities, this could be a shared similarity that affects their investment decisions, but this is not necessarily the shared regional identity we intend to measure.

$SCI_{i,s}$ is the Facebook social connectedness index. It measures how connected people from different regions are on this social network. This helps us to gain more conservative estimates of the home bias. Kuchler et al. (2020) shows that the intensity of social ties is a significant predictor of investments.

Table 3 reports the results.[25] Because several relevant control variables are only available for Germany, the regressions from column two onwards consider only investments in which both headquarters are located here. The results from all regressions are highly statistically and economically significant and show the expected signs. For example, venture capitalists are 40 and 64% more likely to invest into a start-up if it is not further than 100km away from the location of the venture capitalist. The probability to invest into a start-up if it is located in the same municipality is between 27 and 62% higher. We conclude from these regressions that a sizable home bias exists in our data. On a side note, the results for the social connectedness index replicate the finding of Kuchler et al. (2020), as well as confirm the relevance of universities (given the magnitude of the effect especially technical universities).[26]

[25] In the third regressions, we exclude the variables for the start-up locations.

[26] A combination of these university dummies yields similar results.

Table 3: Venture Capitalists' Home Bias in Investment Decisions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable					Investment=1				
Distance to Start-Up	-0.00139***	-0.00115***	-0.00109***						
	(0.0001)	(0.0002)	(0.0002)						
Distance to Start-Up $<$ 100km				0.638***	0.446***	0.409***			
				(0.0456)	(0.0567)	(0.0614)			
Start-Up in Same Municipality							0.622***	0.389***	0.270***
							(0.0603)	(0.0921)	(0.100)
ln(Population of Start-Up Location)		-0.00459	-0.00476		-0.00274	-0.0110		-0.0142	-0.0143
		(0.0154)	(0.00761)		(0.0157)	(0.00743)		(0.0151)	(0.00971)
Migration Balance p.c. of Start-Up Location		0.0409	0.0472		0.0631	0.0610		0.0724*	0.0798
		(0.0436)	(0.0542)		(0.0411)	(0.0512)		(0.0427)	(0.0522)
Share Industry Buildings of Start-Up Location		0.793	0.581		0.475	0.818*		0.853	0.835*
		(0.574)	(0.513)		(0.600)	(0.492)		(0.559)	(0.504)
University of Applied Science at Start-Up Location		-0.0212			-0.0249			0.00330	
		(0.0334)			(0.0354)			(0.0337)	
University at Start-Up Location		0.0331			0.0360			0.00399	
		(0.0345)			(0.0362)			(0.0362)	
Technical University at Start-Up Location		0.0161			-0.0160			-0.0344	
		(0.0403)			(0.0398)			(0.0458)	
Technical University of Applied Science at Start-Up Location		-0.0124			0.0181			-0.00476	
		(0.0240)			(0.0249)			(0.0235)	
Income p.c. Quantile of Start-Up Location		0.00140			-0.00823			0.0106	
		(0.0139)			(0.0144)			(0.0138)	
Facebook Social Connectedness Index		2.53e-07***	2.45e-07***		2.38e-07***	2.29e-07***		2.80e-07***	2.83e-07***
		(8.33e-08)	(8.16e-08)		(7.99e-08)	(7.82e-08)		(9.38e-08)	(9.49e-08)
University at Investor and Start-Up Location			-0.0200			-0.0199			-0.0464*
			(0.0224)			(0.0230)			(0.0256)
University of Applied Science at Start-Up and Investor Location			0.0595**			0.0476*			0.0436*
			(0.0242)			(0.0254)			(0.0251)
Technical University at Investor and Start-Up Location			0.0889**			0.115***			0.122**
			(0.0436)			(0.0426)			(0.0475)
Investor and Start-Up Location in Same Income Group			0.0119			0.0408			0.0948**
			(0.0446)			(0.0478)			(0.0429)
Observations	2,442,880	902,484	902,961	2,442,880	902,484	902,961	2,442,880	902,484	902,961

Notes. Standard errors in parentheses are clustered on investor level. Coefficient is statistically different from zero at the ***1 %, **5 %, and *10 % level. Reported are average marginal effects. The unit of observation are German municipalities in 2010 . All regressions include a constant not reported.

3.2 Regional Identity and Home Bias—Evidence from German Municipalities

We continue our empirical analysis by investigating the relationship between regional identity and the home bias. Given data constraints, we focus on Germany. We first present and discuss the baseline OLS results, and then test whether regional identity is caused by local differences in historical political instability. Here, we rely on our exogenous variation in historical instability that stems from ruler death without a male heir.

Estimation Approach. In a first step of our municipality-level analysis, we show cross-sectional relationship between regional identity and venture capitalists' home bias. We estimate variants of the following regression equation with OLS and heteroskedasdicity-robust standard errors:

$$\begin{aligned} ln(HB)_{i,s} =& \alpha + \beta ln(RegionalIdentity)_{i,s} + \gamma' \mathbf{G}_{i,s} + \delta' \mathbf{H}_{i,s} + \\ &+ \theta' \mathbf{X}_{i,s} + \eta RI_{i,s} + \pi_s + \epsilon_{i,s} \end{aligned} \tag{6}$$

$ln(HB)_{i,s}$ is our preferred measure of the home bias. It is the natural logarithm of the share of investments by a venture capitalist headquartered in municipality i in a state s that existed in 1150 and lies within a 100km radius around the headquarters. We prefer log-log specifications because most measures are left-skewed, there are some minor concerns with outliers, and the interpretation of the coefficients is more straightforward. [27]. $ln(RegionalIdentity)_{i,s}$ is the natural logarithm of the share of vehicles with reintroduced UZs on their license plates per municipality.

$\mathbf{G}_{i,s}$ is a set of geographic control variables. This includes a municipality's latitude, longitude, the interaction of both, elevation, and terrain ruggedness. The coordinates of each municipality controls for general geographic patterns in psychological and cultural attitudes. Elevation and Terrain ruggedness account for

[27] However, we present level-level regressions too, in order to ensure that our results are not sensitive to the use of of the level instead of the log of the variables

the fact that mountainous areas are characterized by a peculiar landscape and different lifestyle. These may lead to peculiar traditions and rituals that may cause shared characteristics which are orthogonal to regional identity caused by political stability.

$\mathbf{H}_{i,s}$ is a set of historical control variables that consists of a dummy variable equal to one for municipalities that once were part of the Roman Empire, one equal to one if there is evidence for medieval trade roads, a dummy variable equal to one for municipalities in which a relevant battle took place between 1250 and 1789, a political fragmentation measure of the average number of states the area of a municipality belonged to for each year between 1250 and 1789, a municipality's Black Death mortality rate, a dummy variable equal to one for municipalities which were located on the border of the Holy Roman Empire, and a variable that reports the area of a recorded Neolithic settlement (in km^2). These variables capture the impact of several different potentially relevant historical factors, which may be orthogonal to our story.[28]

[28]For example, Fritsch et al. (2021) show how a Roman presence in the past is correlated with today's entrepreneurship, innovation, and certain personality traits conducive for entrepreneurship. Similarly, being located on a major historical trade route might have contributed to a commercial tradition, less risk aversion and in general, more openness towards strangers and change. Proximity to the locations of major historical warfare as well as a high Black Death mortality similarly capture other aspects of instability of the political and social environment in a region determining, for example, how traditional people in those regions are. They also lead to significant migration movements which might have resulted in a population with more diverse backgrounds and therefore also more diverse attitudes. Political fragmentation can be responsible for the scale of regional identities. It could also have affected the formation of identities in a significant way as, for example, nation building policy is difficult for a small state lacking the necessary capacity. On the other hand, a high political fragmentation might have also contributed to strengthen regional identity as the presence of a lot of other states in close proximity could have increased the need to separate oneself form others. In the spirit of Bazzi, Fiszbein, and Gebresilasse (2020) location on the border of the Holy Roman Empire could have given rise to the emergence and persistence of a particular "frontier culture", which is, among other things, connected to higher levels of individualism and less attachment to other people, groups or regions (see also Iyigun 2008). The inclusion of the Neolithic settlement area is motivated by the hypothesis that areas with long settlement history had a head-start. From Huning and Wahl (2021a) we also know that early settlements are connected to the emergence and persistence of the inheritance practice of equal partition, which in turn is significantly linked to a higher degree of cooperation and social capital among the population.

$\mathbf{X}_{i,s}$ controls for contemporary determinants of home bias. This includes two dummy variables that indicate whether the managers of the venture capitalist have personal connections to the location of the start-up, for example if they were born there, went to university there, or worked or lived there. Another variable reports the share of investments by all venture capitalists in a municipality made by public or private investors that are legally bound only into local start-ups. If this type of investors represents a large portion of the overall investment activities, it would be self-evident to find more investments into start-ups in close proximity. We also include a dummy variable equal to one if a municipality has a technical university. We report the estimated coefficients of these variables are also explicitly reported in the regression tables to allow us a comparison with the effect of regional identity. This set of controls also includes a dummy equal to one for the largest six German cities (Berlin, Hamburg, Munich, Cologne, Frankfurt am Main and Stuttgart), and for uninhabited municipalities. We include a "large city dummy" to rule out that our results are driven by outliers, a few peculiar large places, the most vibrant economic areas of Germany. This should rule out that both the investors as well as the start-ups are located in these cities because they are prosperous areas and attractive places to live in.

$RI_{i,s}$ is a dummy variable equal to one if a municipality lies in the historical boundaries of an abolished county whose UZ was reintroduced by any modern county.[29] This dummy variable act as a fixed effect for these municipalities and accounts for all time-invariant unobserved factors common to all of them. These could, for example, be related to deep-rooted, historical factors, influencing the decision to reintroduce the UZ.

pi_s is a set of dummies variables that indicate to which state of the Holy Roman Empire in 1150 a present-day municipality belongs. These act as region fixed effects and have two main advantages over using current higher-order administra-

[29]Some of the abolished counties were split and are now part of two or more modern counties. It is not always the case that all these modern counties have decided to reintroduced the UZ of the abolished county.

tive units like NUTS-2 regions or federal states. First, they are determined far back in time and before we begin to measure political instability levels with our *HPI* index. It is therefore less likely that the border of these states are endogenous to events that still matter for contemporary socio-economic outcomes. Second, the borders of these states, e.g. of the Duchies of Franconia, Swabia or Bavaria are still approximately reflecting relevant present-day differences like in spoken dialect or cultural traditions. People often refer to these territories when asked about with which group they identify with.[30] As such they account for deep-rooted cultural and linguistic differences that may be closely related to regional identity.

Baseline Results. Table 4 has the results. In column (1) we show the results of a regression including the UZ was reintroduced dummy, uninhabited municipalities, and large cities. In the following columns, we iteratively add more controls. Column (5) is the full specification. Apart from different sets of control variables, we also consider the dependent variable and the share of vehicles with reintroduced UZ license plates in levels instead of the natural logarithm (column 6). In column (7), we also show results based on different standard errors. These take spatial autocorrelation into account and follow Conley (1999). The presence of spatial autocorrelation in the data could lead to unrealistically small standard errors (see Kelly 2020, who studies this problem in the context of historical persistence studies), and hence can create the false impression of a significant effect. The methods of Conley (1999) is the standard way to address this concern and adjust the standard errors in the presence of spatial autocorrelation. It is reassuring that these standard errors after Conley are virtually identical to the other results. The results show robust and highly statistically as well as economically significant effects of the considered determinants of home-biased investments. Personal connections between managers and the place that is invested in, the presence of a technical university, or a high share of venture capitalists that are legally bound to invest only in local companies, are all relevant for the investment decisions.

[30]For example people in Franconia (an area including Nuremberg), with is today part of four different German federal states, still identify as Franconian instead of Bavarian, Hessian, or Württembergian, and speak Franconian instead of Bavarian or Swabian dialects.

Table 4: Regional Identity and Venture Capitalists Home Bias

Dependent Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	ln(% Investment within 100km)			% Investments within 100km	ln(% Investment within 100km)		
ln(% Vehicles with Reintroduced UZs)	-0.0103***	-0.00891***	-0.0110***		-0.0139***	-0.0139***	-0.00549**
	(0.00233)	(0.0026)	(0.0027)		(0.0032)	[0.0036]	(0.0022)
% Vehicles with Reintroduced UZs				-0.00801***			
				(0.0022)			
Technical University							0.817***
							(0.273)
Venture Capitalist's Manager Studied at Start-Up Location							2.631***
							(0.862)
Other Connection of Venture Capitalist's Manager							3.187***
							(0.975)
% Locally Active Investors							4.617***
							(0.773)
UZ Reintroduced	✓	✓	✓	✓	✓	✓	✓
Uninhabited Dummy & Large Cities Dummy	✓	✓	✓	✓	✓	✓	✓
Geographic Controls	–	✓	✓	✓	✓	✓	✓
Historical Controls	–	–	✓	✓	✓	✓	✓
1150 State Dummies	–	–	–	–	✓	✓	✓
Observations	11,264	11,263	11,263	11,263	10,242	10,242	10,242
R^2	0.058	0.062	0.087	0.043	0.092	0.092	0.377

Notes. Standard errors in parentheses are heteroskedasdicity-robust. In column (6), Conley standard errors accounting for the presence of spatial autocorrelation are shown in brackets (cutoff point 15km). Coefficient is statistically different from zero at the ***1 %, **5 %, and *10 % level. The unit of observation are German municipalities in 2010. All regressions include a constant not reported. Geographic controls include a municipality's latitude, longitude, latitude-longitude interaction, elevation, and terrain ruggedness. The UZ Reintroduced dummy is one if a municipality lies in the historical boundaries of an abolished county whose UZ was reintroduced by any modern county. Historical controls comprise of dummy variables equal to one for municipalities located in the historically Roman part of Germany, on medieval trade roads, a dummy variable equal to one for municipalities that had a battle taking place in their area between 1250 and 1789, a political fragmentation measure giving the average number of states, the territory of a municipality belonged to between 1250 and 1789, a municipality's Black Death mortality rate, a dummy variable equal to one for municipalities which historically were located on the border of the Holy Roman Empire, and a variable reporting the area of each municipality that is located in Neolithic settlement area (in km^2).

We also find a significant effect of the share of vehicles with a reintroduced UZ on their license plates. As such, regional identity is able to explain a share of venture capitalists' home bias. Surprisingly, the sign of the coefficient implies a negative relationship between regional identity and the home bias (which runs against our theory). The estimated elasticities imply that an increase of the share of vehicles with reintroduced UZs by 1% decreases the share of investments within 100km by roughly 0.01% in columns (1) to (6). This is not a very large effect, but sizable given that the average share of home bias investments in the overall sample is only 0.367. The level-level specification in column (4) indicates that a one standard deviation increase in the share of vehicles with reintroduced UZs (which is by 1.52 log points) decreases the share of home bias investments by around 0.012%.

Discussion of the Results. The question now is whether this counter-intuitive result can be taken seriously, or whether it is solely driven by a significant downwards bias of OLS. This could come from unobserved factors that are positively correlated with regional identity but negatively with the home bias (such as a cultural characteristic related to remoteness, or instability of the environment in general). This factor would then impact the willingness to cooperate negatively. For example, people from remote regions would be less trusting with strangers, or be less open to new ideas. But if regions with high regional identity had inhabitants with attitudes not conducive for entrepreneurship, start-ups would likely not locate in this area. This could explain our regression results, since these sensible caveats would show create a negative correlation, but driven by the unavailability of investments rather that a low level of regional identity. As such, the OLS regressions are not credible. Therefore, we move on with our instrumental variable strategy that overcomes these issues. The reason why the instrumental variable is able to extract variation unrelated to this type of bias is its specific nature. Here it is important to note that our inclusion restriction is that our instrument must not be correlated with venture capitalists' home bias other than via its effect of regional identity. We argue that this is the case for rulers who died without leaving a male heir, a variable that is connected to historical political instability but

not directly to the decisions of venture capitalists. As such, our instrument can distinguish traditionalism, remoteness, openness towards new ideas from the regional identity we are after. It is however important to note, for further research, that the elements that drive a negative sign in the naive OLS regression seem to be relevant, and definitely worth to be investigated in further research.

3.3 Historical Political Instability and Contemporary Regional Identity

Estimation Approach. Before we move on to the results of our IV strategy, we show how historical instability explains regional identity (as measured by the vehicles with reintroduced UZs). We estimate variations of the following equation:

$$\begin{aligned} ln(RegionalIdentity)_{i,s} =& \alpha + \beta ln(HPI)_{i,s} + \gamma' \mathbf{G}_{i,s} \\ &+ \delta' \mathbf{H}_{i,s} + \theta' \mathbf{X}_{i,s} + \eta RI_{i,s} + \pi_s + \epsilon_{i,s} \end{aligned} \tag{7}$$

Here, $lnRegionalIdentity_{i,s}$ is the natural logarithm of the share of vehicles with reintroduced UZs in municipality i, the state in 1150 s. $HPI_{i,s}$ is the natural logarithm of our (weighted) historical political instability index as explained in section 2. $\mathbf{G}_{i,s}$ and $\mathbf{H}_{i,s}$ are the same sets of geographic and historical controls as before. $\mathbf{X}_{i,s}$ are the dummies for big cities and uninhabited areas. $DI_{i,s}$ is Reintroduced UZ Available Dummy, π_s are 1150 state fixed effects, and $\epsilon_{i,s}$ is the error term.

Results. Table 5 shows the results. In column (5), we show that the results hold in a non-logarithmic specification. In column (6), we use the weighted version of the HPI. This discounts changes between the historical states a municipality belonged to over time. The results remain highly statistically significant. In column (7), we test for sensitivity to the choice of the end date of our HPI index. We run the regressions using a version of our index which ends in 1871, the year of the German unification when the previously independent states (at least de jure) became federal states and lost control over important fields of politics.

Table 5: Regional Identity and Historical Political Instability

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	ln(% Vehicles with Reintroduced UZs)				% Vehicles with Reintroduced UZs	ln(% Vehicles with Reintroduced UZs)		
ln(Historical Political Instability)	-0.129***	-0.107***	-0.232***	-0.404***				-0.404***
	(0.0254)	(0.0261)	(0.0303)	(0.0500)				[0.100]
Historical Political Instability					-1.240***			
					(0.137)			
ln(Weighted Historical Political Instability)						-16.90***		
						(1.908)		
ln(Historical Political Instability Pre 1871)							-0.158***	
							(0.0332)	
UZ Reintroduced	✓	✓	✓	✓	✓	✓	✓	✓
Uninhabited Dummy & Large Cities Dummy	✓	✓	✓	✓	✓	✓	✓	✓
Geographic Controls	–	✓	✓	✓	✓	✓	✓	✓
Historical Controls	–	–	✓	✓	✓	✓	✓	✓
1150 State Dummies	–	–	–	✓	✓	–	–	✓
Observations	11,263	11,262	11,262	10,242	10,242	11,262	11,262	10,242
R^2	0.369	0.502	0.508	0.461	0.351	0.509	0.507	0.461

Notes. Standard errors in parentheses are heteroskedasdicity robust. In column (9), Conley standard errors accounting for the presence of spatial autocorrelation are shown in brackets (cutoff point 15km). Coefficient is statistically different from zero at the ***1 %, **5 %, and *10 % level. The unit of observation are German municipalities in 2010. All regressions include a constant not reported. Geographic controls include a municipality's latitude, longitude, latitude and longitude interaction, elevation, and terrain ruggedness. The UZ Reintroduced dummy is one if a municipality lies in the historical boundaries of an abolished county whose UZ was reintroduced by any modern county Historical controls comprise of dummy variables equal to one for municipalities located in the historically Roman part of Germany, on medieval trade roads, a dummy variable equal to one for municipalities that had a war-related battle taking place in their area between 1250 and 1789, a political fragmentation measure giving the average number of states, the territory of a municipality belonged to between 1250 and 1789, a municipality's black death mortality rate, a dummy variable equal to one for municipalities which historically were located on the border of the Holy Roman Empire, and a variable reporting the area of each municipality that is located in Neolithic settlement area (in km^2).

Reassuringly, the coefficient with this version of the index are within the same range of estimates as the coefficients of our standard index. In column (8) we use Conley-standard errors. The size of the standard error increases, but the coefficient of the HPI remains significant on 1% level. Reassuringly, the coefficient of the HPI is negative and significant in all the regressions, suggesting a robust relationship between both variables. This underpins our theoretical reasoning and supports a causal chain from historical political instability to regional identity. The most conservative results imply that an increase of the HPI by 1% decreases the share of vehicles with reintroduced UZs by around 10%. According to the estimate in column (5), a one standard deviation increase in historical political instability (1.4 state changes) decreases the share of vehicles with reintroduced UZs in a municipality by around 1.7 percentage points $(1.4 * -1.24)$. Given an average share of vehicles with a reintroduced UZ of 2.7% in the whole sample, this is sizable.

3.4 IV Results

To separate the effect of regional identity from other mechanisms that may drive the OLS results, we move on to our instrumental strategy.

The Instrumental Variable. Our instrument is connected to historical political instability. Inspired by Acharya and Lee (2019), it rests on the idea that only a portion of territorial changes are exogenous. The most central aspect of the survival of a European dynasty was the creation of a legitimate (usually male) heir before the death of the current ruler. Failure to do so would jeopardize all other efforts to stabilize one's reign. This could happen if a heir was born, but died in childhood, a fact of life that was ubiquitous in the Middle Ages (compared to the more seldom but recorded events of heirs dying in a battle or falling off a horse). The death of a ruler without a male heir could lead to the death of many others, if a dispute over the territory could not be solved peacefully. This could often be avoided if the territory could be legitimately transferred to another noble family (which was

often related to the first) who then integrated the territory into their realms.[31] This variable is a reliable instrument for historical political instability, since the death of a ruler without an heir was a random event. It is reasonable to assume that it did not affect regional identity other than via its effect on political instability. It is also a variable that is determined long ago, and especially before the Industrial Revolution transformed societies and economies. Catering to a large literature on plausible instruments, it is also a specific variable, and captures well-defined historical events. To support this statement, we conduct a placebo exercise and use our instrumental variable, "Ruler Deaths without Heir" to explain various economic and political outcomes, related to entrepreneurship, industrialization levels, and the location of investors. "Ruler Deaths Without Heir" is a version of the HPI in which we only consider territorial changes of municipalities that resulted from a ruler dying without an heir before 1800. We consider a variety of outcomes, such as the natural logarithm of the average share of votes for the liberal party (FDP) in the federal elections of 2002, 2005 and 2009, the natural logarithm of a municipality's business tax revenue per capita, the population, income per capita, and unemployment rate. All variables are averaged over the period from 2002 to 2014 and originate from the data set of Asatryan, Havlik, and Streif (2017).[32] The included control variables are the same as in the regressions in Table 5.

[31] One example of such a change in state is the County of Ziegenhain in the north of today's Hesse. The last count of Ziegenhain, John II., called "the strong" died in 1450 without a male heir. As result, there was a limited military conflict between different potential legal successors, among them the Count of Hesse, who finally succeeded and integrated the county in his territory in 1495. The death of the ruler without legitimate heir sometimes resulted in violence and conflict, but not always. In the case of the county of Niederslam, which is located in today's Belgium, count Henry VII. died in 1416 without a heir and just bequeathed the state to his nephew John V. of Reifferscheid his closest living relative.

[32] A descriptive overview of the variables can be found in Table A.2 in the Online Appendix.

Table 6: Ruler Deaths Without Heir and Alternative Socio-Economic Outcomes

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	% ln(Votes Liberal Party)	ln(Business Tax Revenue p.c.)	ln(Population)	ln(Income p.c.)	ln(Unemployment Rate)
Weighted Ruler Deaths Without Heir	-0.151	-2.153	7.616	-3.214	-0.169
	(0.140)	(6.513)	(7.708)	(2.141)	(0.104)
UZ Reintroduced	✓	✓	✓	✓	✓
Uninhabited & Large Cities Dummy	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓
Historical Controls	✓	✓	✓	✓	✓
1150 State Dummies	✓	✓	✓	✓	✓
Observations	9,756	9,576	9,790	9,706	9,761
R^2	0.349	0.179	0.426	0.383	0.531

Notes. Heteroskedasdicity robust standard errors in parentheses. Coefficient is statistically different from zero at the ***1 %, **5 %, and *10 % level. The unit of observation are German municipalities in 2010. All regressions include a constant not reported. Geographic controls include a municipality's latitude, longitude, latitude-longitude interaction, elevation, and terrain ruggedness. The UZ Reintroduced dummy is one if a municipality lies in the historical boundaries of an abolished county whose UZ was reintroduced by any modern county Historical controls comprise of dummy variables equal to one for municipalities located in the historically Roman part of Germany, on medieval trade roads, a dummy variable equal to one for municipalities that had a war-related battle taking place in their area between 1250 and 1789, a political fragmentation measure giving the average number of states, the territory of a municipality belonged to between 1250 and 1789, a municipality's black death mortality rate, a dummy variable equal to one for municipalities which historically were located on the border of the Holy Roman Empire, and a variable reporting the area of each municipality that is located in Neolithic settlement area (in km^2).

Table 6 shows the results. The "Ruler Deaths without Heir" variable is not related to any of these variables in any common statistical sense. This supports the validity of the variable as instrument.

IV Approach. To quantify the causal effect of regional identity on the home bias, we estimate variations of the following instrumental variable regressions using 2SLS:

$$\begin{aligned} ln(RegionalIdentity)_{i,s} =& \alpha_1 + \beta_1 Rulerdeath_{i,s} + \gamma_1' \mathbf{G}_{i,s} + \delta_1' \mathbf{H}_{i,s} + \\ & \theta_1' \mathbf{X}_{i,s} + \eta_1 RI_{i,s} + \zeta_s + \eta i, s \end{aligned} \tag{8a}$$

$$\begin{aligned} ln(HB)_{i,s} =& \alpha_2 + \beta_2 ln(\widehat{RegionalIdentity})_{i,s} + \gamma_2' \mathbf{G}_{i,s} + \delta_2' \mathbf{H}_{i,s} + \\ & \theta_2' \mathbf{X}_{i,s} + \eta_2 RI_{i,s} + \pi_s + \epsilon_{i,s} \end{aligned} \tag{8b}$$

Here, $Rulerdeath_{i,s}$ is the WHPI index as defined in the data section, but only considering territorial changes due to the death of a ruler without male heir. $ln(RegionalIdentity)_{i,s}$, $ln(HB)_{i,s}$,$\mathbf{G}_{i,s}$, $\mathbf{H}_{i,s}$, $\mathbf{X}_{i,s}$, and $RI_{i,s}$ are defined identically to equation 6. With ζ_s and π_s we refer to 1150 states fixed effects. The error terms are $\eta_{i,s}$ and $\epsilon_{i,f}$.

Results. Table 7 reports the results of the 2SLS regressions. Any specification

spans over three columns: The first column shows the reduced form, the second the first stage, and the third the second stage. Columns (1) to (3) report the results of our baseline IV regressions. Here we include all control variables and report heteroskedasdicity-robust standard errors. We see that the reduced form shows a significant relationship between the logarithm of the share of investments within a 100km radius of the venture capitalists' headquarter. The F-statistic of the excluded instrument in the first stage is 17.29, above common thresholds, which suggests that ruler death without a heir is a relevant and strong instrument. The second stage results reveal a significant and positive effect of the share of vehicles with reintroduced UZs (our measure of regional identity) on the share of investments with home bias. The estimated elasticity of 0.175 is both statistically as well as economically highly significant. Unlike in our OLS specification, the sign of the coefficient—positive—supports our theory. The elasticity implies that a 1% increase in vehicles from reintroduced UZs increases the amount of biased investments by around 0.175 %. In columns (4) to (6), we add the contemporary predictors of home bias (like in Table 4). The logarithm of the share of vehicles with reintroduced UZs remains significant. The coefficient is 0.106 and therefore sizable. The other determinants of the home bias remain significant. In column (3), we report Conley-standard errors. The coefficient remains significant on 10% level. Our results imply a significant and positive effect of regional identity on venture capitalists' home bias. The instrumental variable regressions, our preferred specifications, overcome the downward bias of the OLS results.

In Table 8, we present robustness checks for our IV results.

Level-level specification. We use the level of the share of vehicles with reintroduced UZs and investments within 100km of the headquarters of the venture capitalists. The result are reported in Column (1) of Table 8.

Table 7: Regional Identity, Historical Political Instability and Venture Capitalits Home Bias—IV Regressions

Dependent Variable	(1) ln(% Investments within 100km)	(2) ln(% Vehicles with Reintroduced UZs)	(3) ln(% Investments within 100km)	(4) ln(% Investments within 100km)	(5) ln(% Vehicles with Reintroduced UZs)	(6) ln(% Investments within 100km)
	Reduced Form	1st stage	2nd stage	Reduced Form	1st stage	2nd stage
ln(Vehicles with Reintroduced UZs)			0.175***			0.106**
			(0.0661)			(0.0465)
			[0.103]*			(0.0465)
Weighted Ruler Deaths Without Heir	-5.471***	-31.20***		-3.373***	-31.81***	
	(1.536)	(7.504)		(1.237)	(7.498)	
Technical University				0.820***	-0.248	0.846***
				(0.273)	(0.197)	(0.276)
Venture Capitalist's Manager Studied at Start-Up Location				2.631***	-0.665*	2.701***
				(0.862)	(0.364)	(0.865)
Other Connection of Venture Capitalist's Manager				3.188***	-1.000***	3.294***
				(0.975)	(0.344)	(0.984)
% Locally Active Investors				4.625***	-1.511**	4.785***
				(0.774)	(0.601)	(0.817)
UZ Reintroduced	✓	✓	✓	✓	✓	✓
Uninhabited & Large Cities Dummy	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓
Historical Controls	✓	✓	✓	✓	✓	✓
1150 State Dummies	✓	✓	✓	✓	✓	✓
F-value of excluded IV		17.29			18.00	
Observations	10,242	10,242	10,242	10,242	10,242	10,242
R^2	0.090	0.458	-0.270	0.377	0.460	0.252

Notes. Heteroskedasdicity robust standard errors in parentheses. Coefficient is statistically different from zero at the ***1 %, **5 %, and *10 % level. In column (3), Conley standard errors accounting for the presence of spatial autocorrelation are shown in brackets (cutoff point 15km). The unit of observation are German municipalities in 2010. All regressions include a constant not reported. Geographic controls include a municipality's latitude, longitude, latitude-longitude interaction, elevation, and terrain ruggedness. The UZ Reintroduced dummy is one if a municipality lies in the historical boundaries of an abolished county whose UZ was reintroduced by any modern county. Historical controls comprise of dummy variables equal to one for municipalities located in the historically Roman part of Germany, on medieval trade roads, a dummy variable equal to one for municipalities that had a war-related battle taking place in their area between 1250 and 1789, a political fragmentation measure giving the average number of states, the territory of a municipality belonged to between 1250 and 1789, a municipality's black death mortality rate, a dummy variable equal to one for municipalities which historically were located on the border of the Holy Roman Empire, and a variable reporting the area of each municipality that is located in Neolithic settlement area (in km^2).

The coefficient remains positive and statistically significant.[33]

Additional Control Variables. In columns (2) and (3), we assess the effect of further control variables. First, in column (2) we split counties into ordinary counties and independent cities ("kreisfreie Städte"). The latter have never reintroduced any UZs, predominantly because their geographic borders never included UZs other than the city's. We include a dummy variable equal to one for these counties into the regression. The coefficient remains statistically significant and above 0.01 in size. In column (3), we control for the share of the population that is older than 65 (around the usual age of retirement). The data comes from Asatryan, Havlik, and Streif (2017)). Since the venture capitalist scene is demographically younger than the average, the share of over 65 is informative. An older population may also be an indicator of a less dynamic regions (in terms of economics, but also socially), which can both affect regional identity and financial behavior. We also include a a dummy whether the municipality is at the border to an abolished county whose UZ was reintroduced. This is motivated by a close inspection of the UZ data, which shows that the share of vehicles with reintroduced UZs is lowest in municipalities which are further away from the center of the abolished county this reintroduced UZ abbreviates. We are interested whether our results hold when we isolate these municipality, because we expect that the ability of a reintroduced UZ to represent a region is strongest in the areas closest to the political center of the abolished county it represents. Secondly, also economic development, population densities, infrastructure etc. is likely to be different in areas which are at the boundary to other counties, hence away from the historical seat of the county government. All these robustness checks are passed; the coefficient of our main explanatory variable remains virtually unchanged to the baseline.

[33]The F-statistic of the excluded IV falls below 10, however common tests for under-identification and weak-instrument robust inference pass. As such, the instrument is strong. The Kleinbergen-Paap rk LM statistic, for example, rejects the null of under-identification on 1% level. Tests of joint significance of the endogenous regressor in the main equation (Anderson-Rubin Wald test and Stock-Wright LM S statistic) reject the null hypothesis of a zero effect on 1% significance level as well.

Table 8: IV Regressions—Robustness Checks

Dependent Variable	(1) % Investments within 100km	(2) ln(% Investments	(3) within 100km)	(4) % Investments within 50km	(5) % Investments within 30km	(6) % Investments within 20km	(7) ln(% Investments in Same 1970 County)
		2nd Stage Estimates					
Robustness Check		Additional Controls			Alternative Definition of Home Bias		
ln(% Vehicles with Reintroduced UZs)		0.129**	0.155**	0.156***	0.140***	0.129**	0.0767**
		(0.0550)	(0.0654)	(0.0595)	(0.0536)	(0.0514)	(0.0370)
% Vehicles with Reintroduced UZs	0.268**						
	(0.134)						
Independent City Dummy	–	✓	–	–	–	–	–
% of Population over 65	–	–	✓	–	–	–	–
Border Municipality	–	–	✓	–	–	–	–
UZ Reintroduced	✓	✓	✓	✓	✓	✓	✓
Uninhabited & Large Cities Dummy	✓	✓	✓	✓	✓	✓	✓
Geographic Controls	✓	✓	✓	✓	✓	✓	✓
Historical Controls	✓	✓	✓	✓	✓	✓	✓
1150 State Dummies	✓	✓	✓	✓	✓	✓	✓
F-value of Excluded IV	7.84	18.20	15.79	17.29	17.29	17.29	17.29
Observations	10,242	10,242	10,242	10,242	10,242	10,242	10,242

Notes. Heteroskedasdicity robust standard errors in parentheses. Coefficient is statistically different from zero at the ***1 %, **5 %, and *10 % level. The unit of observation are German municipalities in 2010. All regressions include a constant not reported. The geographic controls include a municipality's latitude, longitude, latitude-longitude interaction, elevation, and terrain ruggedness. The UZ Reintroduced dummy is one if a municipality lies in the historical boundaries of an abolished county whose UZ was reintroduced by any modern county. Historical controls comprise of dummy variables equal to one for municipalities located in the historically Roman part of Germany, on medieval trade roads, a dummy variable equal to one for municipalities that had a war-related battle taking place in their area between 1250 and 1789, a political fragmentation measure giving the average number of states, the territory of a municipality belonged to between 1250 and 1789, a municipality's black death mortality rate, a dummy variable equal to one for municipalities which historically were located on the border of the Holy Roman Empire, and a dummy variable indicating whether a municipality is located in Neolithic settlement area.

Alternative Definitions of a "Home Bias Investment". We follow the literature with our 100km threshold, however one may suspect that our results would be different if we used other thresholds. To ensure that our results are not sensitive about the exact distance threshold, we repeat our baseline 2SLS regression with a 50, 30 and 20km radius around the headquarters. We also consider a variable that defines the home bias as the share of a venture capitalist's total investments into start-ups that, in 1970, would have had their headquarter in the same county. Columns (4) to (7) of Table 8 show the results. Non-surprisingly, the narrower definition of the home bias causes a reduction in the coefficients, but they remain stable, positive, and significant across all our alternative measures for the home bias. To conclude, our results are not driven by a particular definition of home bias.

Sensitivity to Violations of the Exclusion Restriction. To further test whether our instrument complies with the exclusion restriction, we follow the methodology outlined in Conley, Hansen, and Rossi (2012), and use their union of confidence interval (uci) and the local to zero (ltz) approach. Results from the uci approach suggest that our IV results are credible if direct effect of the instrument on the home bias variable is smaller than -2.7. This is around half of the total reduced form effect of the instrumental variable on the home bias measure (see Table 7, column (1)). The lzt approach results in significant and positive coefficients for all estimated second stage specifications. As such, both tests support the robustness our results. [34]

4 Conclusion

This paper documents a significant home bias among venture capitalists in the German-speaking countries, especially Germany itself. It investigates the role regional identity for this bias, and identifies this form of (assumed) shared charac-

[34]The local to zero approach assumes that the effect of the instrument on the home bias is normally distributed around the mean zero. We tested various plausible values of the variance of this direct effect of the instrument (between 0.1 and 1).

teristics as an important factor. Using a large dataset of historical variables, we can show that differences in the degree to which individuals ascribe to their regions have historical roots that go back as far as the Middle Ages. We advance and empirically establish a positive, statistically robust effect of historical political instability levels on the formation and persistence of regional identities.

The paper improves our knowledge on yet understudied deep-roots of current financial behavior and it demonstrates that the context of business transactions is complex, relevant, and fascinating. The fact that a branch as seemingly cosmopolitan as the start-up and venture capitalist scene is affected by long forgotten historical events is a friendly reminder that we still know quite little about the determinants of behavioral and intangible aspects of our everyday life.

This study is the first systematic quantitative study on the link between the historical origins and economic consequences of regional identity. We show how past experiences of political unstable environments translate into differences in regional identities which then explain financial behavior. Shared experience, and a common regional identity, is crucial for individuals, and relevant for their decisions. These experiences shape their expectations about who they are similar to, who they can trust, and who will be a worthy keepsake for their investment.

This study suggests that other—yet unexplored—factors that influence individuals' decision-making via their identification with groups are economically and financially important. These could include norms, attitudes, and other intangible aspects of everyday life. Meanwhile our results highlight the role of a long gone past and hence immutable aspects of the environment, our findings on the effect of technical universities and their ability to shape investments highlights the room that institutions and policy have if they thrive to change behavior in their interest.

This study is one of many to suggest that yet unexplored aspects of culture shape professional interactions. The recent emergence of theoretical frameworks that integrate ideas from Cultural Evolution into economic modeling to explain the long-

run dynamics of culture and its effect on economic outcomes can be instruemental to further deepen our understanding of why some areas lack behind in terms of attracting venture capital or investors in general. Our paper does not resolve the debate about whether the home bias among investors is rational. Whether investors should rely on a regional identity they share with their counterpart in a start-up is not straightforward. We can also not settle if we measure real of perceived similarity between these individuals, and whether the trust that a common identity instills in the individuals involved in these transactions is justified. For these questions, we would need more studies. It would be worthwhile to investigate the long-run benefit of relying on regional identity as a cooperation enhancer. It is also interesting to estimate the success of deals struck by a common regional identity.

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Appendix (For online publication only)

A.1 Overview of the Reintroduced UZs of Abolished Counties

Table A.1 list all the reintroduced abolished county UZs (license plates) , the date they were available again, the contemporary county that reintroduced them and the federal state in which the county is located. The information depicted in the table comes from a list of all officially recognized UZs as of 12.09.2018 from the Federal Motor Transport Authority (Kraftfahrt-Bundesamt 2018), and a list of reintroducedUZs of abolished counties in the wikipedia entry about the German license plate liberalization ("Kennzeichenliberalisierung") `https://de.wikipedia.org/wiki/Kennzeichenliberalisierung` (accessed latest on 15th July, 2022). As already stated in the main text, 170 counties reintroduced 355 old UZs. To calculate the share of abolished county UZs in each municipality, we merge this list with the dataset of all registered UZs in each municipality that we bought from the KBA by both the UZ and the county name. In doing so, we ignore the UZ of abolished counties which are registered outside of the counties that decided to reintroduce them, because it is unclear what signal these UZs send. Then we calculate the sum of all UZs and of reintroduced UZs of abolished counties in each municipality, divide both figures by each other and collapse the data on municipality level.

Table A.1: The Reintroduction of Altkreis license plates in German counties as of 1st January 2019

Abolished County UZ	Date Reintroduced	County of Reintroduction	Federal State
ÖHR	10.02.2015	Hohenlohekreis	Baden-Württemberg
LEO	25.02.2013	Landkreis Böblingen	Baden-Württemberg
NT	10.11.2014	Landkreis Esslingen	Baden-Württemberg
HCH	19.02.2018	Landkreis Freudenstadt	Baden-Württemberg
HOR	02.12.2013	Landkreis Freudenstadt	Baden-Württemberg
WOL	19.02.2018	Landkreis Freudenstadt	Baden-Württemberg
VAI	14.07.2014	Landkreis Ludwigsburg	Baden-Württemberg
BH	09.12.2013	Landkreis Rastatt	Baden-Württemberg
BK	01.09.2018	Landkreis Schwäbisch Hall	Baden-Württemberg
CR	28.03.2014	Landkreis Schwäbisch Hall	Baden-Württemberg
SÄK	15.03.2021	Landkreis Waldshut	Baden-Württemberg
MGH	07.01.2014	Main-Tauber-Kreis	Baden-Württemberg
BCH	25.02.2013	Neckar-Odenwald-Kreis	Baden-Württemberg
BH	30.03.2015	Ortenaukreis	Baden-Württemberg
KEL	31.03.2014	Ortenaukreis	Baden-Württemberg
LR	31.03.2014	Ortenaukreis	Baden-Württemberg
WOL	31.03.2014	Ortenaukreis	Baden-Württemberg
GD	25.02.2013	Ostalbkreis	Baden-Württemberg
BK	02.12.2013	Rems-Murr-Kreis	Baden-Württemberg
HCH	25.02.2013	Zollernalbkreis	Baden-Württemberg
NEC	01.12.2014	Coburg	Bavaria

Table A.1 – *Continued*

FDB	11.07.2013	Landkreis Aichach-Friedberg	Bavaria
LF	01.10.2016	Landkreis Altötting	Bavaria
BUL	12.07.2013	Landkreis Amberg-Sulzbach	Bavaria
ESB	12.07.2013	Landkreis Amberg-Sulzbach	Bavaria
NAB	12.07.2013	Landkreis Amberg-Sulzbach	Bavaria
SUL	12.07.2013	Landkreis Amberg-Sulzbach	Bavaria
DKB	10.07.2013	Landkreis Ansbach	Bavaria
FEU	10.07.2013	Landkreis Ansbach	Bavaria
ROT	10.07.2013	Landkreis Ansbach	Bavaria
ALZ	11.07.2013	Landkreis Aschaffenburg	Bavaria
SMÜ	01.03.2017	Landkreis Augsburg	Bavaria
WER	01.03.2017	Landkreis Augsburg	Bavaria
BRK	10.07.2013	Landkreis Bad Kissingen	Bavaria
HAB	10.07.2013	Landkreis Bad Kissingen	Bavaria
WOR	10.07.2013	Landkreis Bad Tölz-Wolfratshausen	Bavaria
EBS	10.07.2013	Landkreis Bayreuth	Bavaria
ESB	10.07.2013	Landkreis Bayreuth	Bavaria
KEM	10.07.2013	Landkreis Bayreuth	Bavaria
MÜB	10.07.2013	Landkreis Bayreuth	Bavaria
PEG	10.07.2013	Landkreis Bayreuth	Bavaria
BGD	15.09.2016	Landkreis Berchtesgadener Land	Bavaria
LF	15.09.2016	Landkreis Berchtesgadener Land	Bavaria
REI	15.09.2016	Landkreis Berchtesgadener Land	Bavaria
KÖZ	10.07.2013	Landkreis Cham	Bavaria

Table A.1 – *Continued*

ROD	10.07.2013	Landkreis Cham	Bavaria
WÜM	10.07.2013	Landkreis Cham	Bavaria
NEC	10.07.2013	Landkreis Coburg	Bavaria
WER	10.07.2013	Landkreis Dillingen a.d.Donau	Bavaria
LAN	01.03.2017	Landkreis Dingolfing-Landau	Bavaria
NÖ	10.07.2013	Landkreis Donau-Ries	Bavaria
HÖS	02.02.2015	Landkreis Erlangen-Höchstadt	Bavaria
EBS	10.07.2013	Landkreis Forchheim	Bavaria
PEG	10.07.2013	Landkreis Forchheim	Bavaria
GRA	10.07.2013	Landkreis Freyung-Grafenau	Bavaria
WOS	10.07.2013	Landkreis Freyung-Grafenau	Bavaria
KRU	13.07.2013	Landkreis Günzburg	Bavaria
EBN	01.04.2014	Landkreis Haßberge	Bavaria
GEO	01.04.2014	Landkreis Haßberge	Bavaria
HOH	01.04.2014	Landkreis Haßberge	Bavaria
MÜB	04.08.2014	Landkreis Hof	Bavaria
NAI	04.08.2014	Landkreis Hof	Bavaria
REH	04.08.2014	Landkreis Hof	Bavaria
SAN	04.08.2014	Landkreis Hof	Bavaria
MAI	10.07.2013	Landkreis Kelheim	Bavaria
PAR	10.07.2013	Landkreis Kelheim	Bavaria
RID	10.07.2013	Landkreis Kelheim	Bavaria
ROL	10.07.2013	Landkreis Kelheim	Bavaria
SAN	10.07.2013	Landkreis Kronach	Bavaria

Table A.1 – *Continued*

EBS	10.07.2013	Landkreis Kulmbach	Bavaria
SAN	10.07.2013	Landkreis Kulmbach	Bavaria
MAI	25.07.2014	Landkreis Landshut	Bavaria
MAL	25.07.2014	Landkreis Landshut	Bavaria
ROL	25.07.2014	Landkreis Landshut	Bavaria
VIB	25.07.2014	Landkreis Landshut	Bavaria
STE	16.07.2013	Landkreis Lichtenfels	Bavaria
OBB	15.01.2018	Landkreis Miltenberg	Bavaria
AIB	10.07.2013	Landkreis München	Bavaria
WOR	10.07.2013	Landkreis München	Bavaria
SOB	10.07.2013	Landkreis Neuburg-Schrobenhausen	Bavaria
PAR	10.07.2013	Landkreis Neumarkt i.d.OPf.	Bavaria
SEF	10.07.2013	Landkreis Neustadt a.d.Aisch-Bad Windsheim	Bavaria
UFF	10.07.2013	Landkreis Neustadt a.d.Aisch-Bad Windsheim	Bavaria
ESB	10.07.2013	Landkreis Neustadt a.d.Waldnaab	Bavaria
VOH	10.07.2013	Landkreis Neustadt a.d.Waldnaab	Bavaria
ILL	10.07.2013	Landkreis Neu-Ulm	Bavaria
ESB	15.07.2013	Landkreis Nürnberger Land	Bavaria
HEB	15.07.2013	Landkreis Nürnberger Land	Bavaria
N	15.07.2013	Landkreis Nürnberger Land	Bavaria
PEG	15.07.2013	Landkreis Nürnberger Land	Bavaria
FÜS	10.07.2013	Landkreis Ostallgäu	Bavaria
MOD	10.07.2013	Landkreis Ostallgäu	Bavaria
VIT	01.03.2018	Landkreis Regen	Bavaria

Table A.1 – *Continued*

KÖN	10.07.2013	Landkreis Rhön-Grabfeld	Bavaria
MET	10.07.2013	Landkreis Rhön-Grabfeld	Bavaria
AIB	10.07.2013	Landkreis Rosenheim	Bavaria
WS	10.07.2013	Landkreis Rosenheim	Bavaria
HIP	11.07.2013	Landkreis Roth	Bavaria
EG	10.07.2013	Landkreis Rottal-Inn	Bavaria
GRI	10.07.2013	Landkreis Rottal-Inn	Bavaria
VIB	10.07.2013	Landkreis Rottal-Inn	Bavaria
BUL	10.07.2013	Landkreis Schwandorf	Bavaria
NAB	10.07.2013	Landkreis Schwandorf	Bavaria
NEN	10.07.2013	Landkreis Schwandorf	Bavaria
OVI	10.07.2013	Landkreis Schwandorf	Bavaria
ROD	10.07.2013	Landkreis Schwandorf	Bavaria
GEO	10.07.2013	Landkreis Schweinfurt	Bavaria
WOR	10.07.2013	Landkreis Starnberg	Bavaria
BOG	02.07.2018	Landkreis Straubing-Bogen	Bavaria
MAL	02.07.2018	Landkreis Straubing-Bogen	Bavaria
KEM	10.07.2013	Landkreis Tirschenreuth	Bavaria
LF	14.10.2016	Landkreis Traunstein	Bavaria
SOG	16.09.2013	Landkreis Weilheim-Schongau	Bavaria
GUN	10.07.2013	Landkreis Weißenburg-Gunzenhausen	Bavaria
MAK	10.07.2013	Landkreis Wunsiedel i.Fichtelgebirge	Bavaria
REH	10.07.2013	Landkreis Wunsiedel i.Fichtelgebirge	Bavaria
SEL	10.07.2013	Landkreis Wunsiedel i.Fichtelgebirge	Bavaria

Table A.1 – *Continued*

OCH	10.07.2013	Landkreis Würzburg	Bavaria
BER	19.03.2013	Landkreis Barnim	Brandenburg
EW	19.03.2013	Landkreis Barnim	Brandenburg
KW	02.07.2015	Landkreis Dahme-Spreewald	Brandenburg
LC	02.07.2015	Landkreis Dahme-Spreewald	Brandenburg
LN	02.07.2015	Landkreis Dahme-Spreewald	Brandenburg
FI	02.04.2013	Landkreis Elbe-Elster	Brandenburg
LIB	29.05.2013	Landkreis Elbe-Elster	Brandenburg
NAU	04.01.2016	Landkreis Havelland	Brandenburg
RN	04.01.2016	Landkreis Havelland	Brandenburg
FRW	18.03.2013	Landkreis Märkisch-Oderland	Brandenburg
SEE	18.03.2013	Landkreis Märkisch-Oderland	Brandenburg
SRB	18.03.2013	Landkreis Märkisch-Oderland	Brandenburg
CA	15.03.2013	Landkreis Oberspreewald-Lausitz	Brandenburg
SFB	15.03.2013	Landkreis Oberspreewald-Lausitz	Brandenburg
BSK	01.09.2017	Landkreis Oder-Spree	Brandenburg
EH	01.09.2017	Landkreis Oder-Spree	Brandenburg
FW	01.09.2017	Landkreis Oder-Spree	Brandenburg
KY	18.03.2013	Landkreis Ostprignitz-Ruppin	Brandenburg
NP	18.03.2013	Landkreis Ostprignitz-Ruppin	Brandenburg
WK	18.03.2013	Landkreis Ostprignitz-Ruppin	Brandenburg
FOR	19.03.2013	Landkreis Spree-Neiße	Brandenburg
GUB	19.03.2013	Landkreis Spree-Neiße	Brandenburg
SPB	19.03.2013	Landkreis Spree-Neiße	Brandenburg

Table A.1 – *Continued*

ANG	03.04.2014	Landkreis Uckermark	Brandenburg
PZ	03.04.2014	Landkreis Uckermark	Brandenburg
SDT	03.04.2014	Landkreis Uckermark	Brandenburg
TP	03.04.2014	Landkreis Uckermark	Brandenburg
USI	02.01.2013	Hochtaunuskreis	Hesse
DIL	02.05.2014	Lahn-Dill-Kreis	Hesse
DI	02.01.2013	Landkreis Darmstadt-Dieburg	Hesse
ROF	01.08.2013	Landkreis Hersfeld-Rotenburg	Hesse
HOG	02.01.2013	Landkreis Kassel	Hesse
WOH	02.01.2013	Landkreis Kassel	Hesse
WEL	02.01.2013	Landkreis Limburg-Weilburg	Hesse
BID	02.01.2013	Landkreis Marburg-Biedenkopf	Hesse
FKB	04.11.2013	Landkreis Waldeck-Frankenberg	Hesse
WA	04.11.2013	Landkreis Waldeck-Frankenberg	Hesse
HU	15.06.2016	Main-Kinzig-Kreis	Hesse
GN	02.01.2013	Main-Kinzig-Kreis	Hesse
SLÜ	02.01.2013	Main-Kinzig-Kreis	Hesse
SWA	15.08.2013	Rheingau-Taunus-Kreis	Hesse
FZ	16.03.2015	Schwalm-Eder-Kreis	Hesse
MEG	16.03.2015	Schwalm-Eder-Kreis	Hesse
ZIG	16.03.2015	Schwalm-Eder-Kreis	Hesse
WIZ	16.09.2013	Werra-Meißner-Kreis	Hesse
BÜD	02.01.2013	Wetteraukreis	Hesse
HGN	01.08.2013	Landkreis Ludwigslust-Parchim	Mecklenburg-West Pomerania

Table A.1 – *Continued*

LBZ	01.08.2013	Landkreis Ludwigslust-Parchim	Mecklenburg-West Pomerania
LWL	01.08.2013	Landkreis Ludwigslust-Parchim	Mecklenburg-West Pomerania
PCH	01.08.2013	Landkreis Ludwigslust-Parchim	Mecklenburg-West Pomerania
STB	01.08.2013	Landkreis Ludwigslust-Parchim	Mecklenburg-West Pomerania
AT	18.03.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
DM	22.07.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
MC	18.03.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
MST	22.07.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
MÜR	22.07.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
NZ	18.03.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
RM	18.03.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
WRN	18.03.2013	Landkreis Mecklenburgische Seenplatte	Mecklenburg-West Pomerania
GDB	02.04.2013	Landkreis Nordwestmecklenburg	Mecklenburg-West Pomerania
GVM	02.04.2013	Landkreis Nordwestmecklenburg	Mecklenburg-West Pomerania
WIS	02.04.2013	Landkreis Nordwestmecklenburg	Mecklenburg-West Pomerania
BÜZ	18.03.2013	Landkreis Rostock	Mecklenburg-West Pomerania
DBR	18.03.2013	Landkreis Rostock	Mecklenburg-West Pomerania
GÜ	18.03.2013	Landkreis Rostock	Mecklenburg-West Pomerania
ROS	18.03.2013	Landkreis Rostock	Mecklenburg-West Pomerania
TET	18.03.2013	Landkreis Rostock	Mecklenburg-West Pomerania
ANK	14.03.2013	Landkreis Vorpommern-Greifswald	Mecklenburg-West Pomerania
GW	14.03.2013	Landkreis Vorpommern-Greifswald	Mecklenburg-West Pomerania
PW	14.03.2013	Landkreis Vorpommern-Greifswald	Mecklenburg-West Pomerania
SBG	10.07.2013	Landkreis Vorpommern-Greifswald	Mecklenburg-West Pomerania

Table A.1 – *Continued*

UEM	14.03.2013	Landkreis Vorpommern-Greifswald	Mecklenburg-West Pomerania
WLG	14.03.2013	Landkreis Vorpommern-Greifswald	Mecklenburg-West Pomerania
GMN	15.03.2013	Landkreis Vorpommern-Rügen	Mecklenburg-West Pomerania
NVP	15.03.2013	Landkreis Vorpommern-Rügen	Mecklenburg-West Pomerania
RDG	15.03.2013	Landkreis Vorpommern-Rügen	Mecklenburg-West Pomerania
RÜG	15.03.2013	Landkreis Vorpommern-Rügen	Mecklenburg-West Pomerania
NOR	15.11.2012	Landkreis Aurich	Lower Saxony
SY	23.04.2018	Landkreis Diepholz	Lower Saxony
BRL	15.11.2012	Landkreis Goslar	Lower Saxony
CLZ	15.11.2012	Landkreis Goslar	Lower Saxony
DUD	15.11.2012	Landkreis Göttingen	Lower Saxony
HMÜ	15.11.2012	Landkreis Göttingen	Lower Saxony
OHA	01.11.2016	Landkreis Göttingen	Lower Saxony
ALF	15.11.2012	Landkreis Hildesheim	Lower Saxony
EIN	15.11.2012	Landkreis Northeim	Lower Saxony
GAN	15.11.2012	Landkreis Northeim	Lower Saxony
BSB	11.06.2018	Landkreis Osnabrück	Lower Saxony
MEL	11.06.2018	Landkreis Osnabrück	Lower Saxony
WTL	11.06.2018	Landkreis Osnabrück	Lower Saxony
BRV	15.11.2012	Landkreis Rotenburg (Wümme)	Lower Saxony
RI	15.11.2012	Landkreis Schaumburg	Lower Saxony
WAT	14.11.2012	Bochum	North Rhine-Westphalia
WIT	14.11.2012	Ennepe-Ruhr-Kreis	North Rhine-Westphalia
WAN	12.12.2012	Herne	North Rhine-Westphalia

Table A.1 – *Continued*

AH	01.02.2013	Kreis Borken	North Rhine-Westphalia
BOH	01.02.2013	Kreis Borken	North Rhine-Westphalia
LH	16.05.2014	Kreis Coesfeld	North Rhine-Westphalia
JÜL	17.11.2012	Kreis Düren	North Rhine-Westphalia
MON	15.07.2015	Kreis Düren	North Rhine-Westphalia
SLE	15.07.2015	Kreis Düren	North Rhine-Westphalia
SLE	20.02.2013	Kreis Euskirchen	North Rhine-Westphalia
ERK	02.09.2013	Kreis Heinsberg	North Rhine-Westphalia
GK	02.09.2013	Kreis Heinsberg	North Rhine-Westphalia
GEL	10.06.2014	Kreis Kleve	North Rhine-Westphalia
BÜR	24.11.2014	Kreis Paderborn	North Rhine-Westphalia
CAS	13.11.2012	Kreis Recklinghausen	North Rhine-Westphalia
GLA	13.11.2012	Kreis Recklinghausen	North Rhine-Westphalia
BLB	13.11.2012	Kreis Siegen-Wittgenstein	North Rhine-Westphalia
LP	03.12.2012	Kreis Soest	North Rhine-Westphalia
BF	03.07.2013	Kreis Steinfurt	North Rhine-Westphalia
TE	03.07.2013	Kreis Steinfurt	North Rhine-Westphalia
LH	01.09.2015	Kreis Unna	North Rhine-Westphalia
LÜN	24.11.2012	Kreis Unna	North Rhine-Westphalia
KK	02.03.2015	Kreis Viersen	North Rhine-Westphalia
BE	22.04.2014	Kreis Warendorf	North Rhine-Westphalia
DIN	03.12.2012	Kreis Wesel	North Rhine-Westphalia
MO	03.12.2012	Kreis Wesel	North Rhine-Westphalia
OP	03.08.2015	Leverkusen	North Rhine-Westphalia

Table A.1 – *Continued*

GV	19.08.2015	Rhein-Kreis Neuss	North Rhine-Westphalia
MON	02.07.2013	Städteregion Aachen	North Rhine-Westphalia
ROK	15.07.2013	Donnersbergkreis	Rhineland-Palatinate
PRÜ	14.11.2012	Eifelkreis Bitburg-Prüm	Rhineland-Palatinate
BKS	26.11.2012	Landkreis Bernkastel-Wittlich	Rhineland-Palatinate
ZEL	15.11.2012	Landkreis Cochem-Zell	Rhineland-Palatinate
BIN	15.11.2012	Landkreis Mainz-Bingen	Rhineland-Palatinate
MY	06.05.2013	Landkreis Mayen-Koblenz	Rhineland-Palatinate
ZW	02.02.2015	Landkreis Südwestpfalz	Rhineland-Palatinate
SAB	19.11.2012	Landkreis Trier-Saarburg	Rhineland-Palatinate
GOA	15.11.2012	Rhein-Hunsrück-Kreis	Rhineland-Palatinate
DIZ	08.07.2013	Rhein-Lahn-Kreis	Rhineland-Palatinate
GOH	08.07.2013	Rhein-Lahn-Kreis	Rhineland-Palatinate
ANA	09.11.2012	Erzgebirgskreis	Saxony
ASZ	09.11.2012	Erzgebirgskreis	Saxony
AU	09.11.2012	Erzgebirgskreis	Saxony
MAB	09.11.2012	Erzgebirgskreis	Saxony
MEK	09.11.2012	Erzgebirgskreis	Saxony
STL	09.11.2012	Erzgebirgskreis	Saxony
SZB	09.11.2012	Erzgebirgskreis	Saxony
ZP	09.11.2012	Erzgebirgskreis	Saxony
BIW	09.11.2012	Landkreis Bautzen	Saxony
HY	09.11.2012	Landkreis Bautzen	Saxony
KM	09.11.2012	Landkreis Bautzen	Saxony

Table A.1 – *Continued*

LÖB	09.11.2012	Landkreis Görlitz	Saxony
NOL	09.11.2012	Landkreis Görlitz	Saxony
NY	09.11.2012	Landkreis Görlitz	Saxony
WSW	09.11.2012	Landkreis Görlitz	Saxony
ZI	09.11.2012	Landkreis Görlitz	Saxony
BNA	09.11.2012	Landkreis Leipzig	Saxony
GHA	09.11.2012	Landkreis Leipzig	Saxony
GRM	09.11.2012	Landkreis Leipzig	Saxony
MTL	09.11.2012	Landkreis Leipzig	Saxony
WUR	09.11.2012	Landkreis Leipzig	Saxony
GRH	09.11.2012	Landkreis Meißen	Saxony
RG	09.11.2012	Landkreis Meißen	Saxony
RIE	09.11.2012	Landkreis Meißen	Saxony
BED	09.11.2012	Landkreis MittelSaxony	Saxony
DL	09.11.2012	Landkreis MittelSaxony	Saxony
FLÖ	09.11.2012	Landkreis MittelSaxony	Saxony
HC	09.11.2012	Landkreis MittelSaxony	Saxony
MW	09.11.2012	Landkreis MittelSaxony	Saxony
RL	09.11.2012	Landkreis MittelSaxony	Saxony
DZ	09.11.2012	Landkreis NordSaxony	Saxony
EB	09.11.2012	Landkreis NordSaxony	Saxony
OZ	09.11.2012	Landkreis NordSaxony	Saxony
TG	09.11.2012	Landkreis NordSaxony	Saxony
TO	09.11.2012	Landkreis NordSaxony	Saxony

Table A.1 – *Continued*

DW	12.11.2012	Landkreis Sächsische Schweiz-Osterzgebirge	Saxony
FTL	12.11.2012	Landkreis Sächsische Schweiz-Osterzgebirge	Saxony
SEB	12.11.2012	Landkreis Sächsische Schweiz-Osterzgebirge	Saxony
GC	09.11.2012	Landkreis Zwickau	Saxony
HOT	09.11.2012	Landkreis Zwickau	Saxony
WDA	09.11.2012	Landkreis Zwickau	Saxony
AE	09.11.2012	Vogtlandkreis	Saxony
OVL	09.11.2012	Vogtlandkreis	Saxony
PL	09.11.2012	Vogtlandkreis	Saxony
RC	09.11.2012	Vogtlandkreis	Saxony
GA	27.11.2012	Altmarkkreis Salzwedel	Saxony-Anhalt
KLZ	27.11.2012	Altmarkkreis Salzwedel	Saxony-Anhalt
HHM	27.11.2012	Burgenlandkreis	Saxony-Anhalt
NEB	27.11.2012	Burgenlandkreis	Saxony-Anhalt
NMB	27.11.2012	Burgenlandkreis	Saxony-Anhalt
WSF	27.11.2012	Burgenlandkreis	Saxony-Anhalt
ZZ	27.11.2012	Burgenlandkreis	Saxony-Anhalt
RSL	27.11.2012	Dessau-Roßlau	Saxony-Anhalt
AZE	27.11.2012	Landkreis Anhalt-Bitterfeld	Saxony-Anhalt
BTF	27.11.2012	Landkreis Anhalt-Bitterfeld	Saxony-Anhalt
KÖT	27.11.2012	Landkreis Anhalt-Bitterfeld	Saxony-Anhalt
ZE	27.11.2012	Landkreis Anhalt-Bitterfeld	Saxony-Anhalt
BÖ	27.11.2012	Landkreis Börde	Saxony-Anhalt
HDL	27.11.2012	Landkreis Börde	Saxony-Anhalt

Table A.1 – *Continued*

OC	27.11.2012	Landkreis Börde	Saxony-Anhalt
OK	27.11.2012	Landkreis Börde	Saxony-Anhalt
WMS	27.11.2012	Landkreis Börde	Saxony-Anhalt
WZL	27.11.2012	Landkreis Börde	Saxony-Anhalt
HBS	27.11.2012	Landkreis Harz	Saxony-Anhalt
QLB	27.11.2012	Landkreis Harz	Saxony-Anhalt
WR	27.11.2012	Landkreis Harz	Saxony-Anhalt
BRG	27.11.2012	Landkreis Jerichower Land	Saxony-Anhalt
GNT	27.11.2012	Landkreis Jerichower Land	Saxony-Anhalt
EIL	27.11.2012	Landkreis Mansfeld-Südharz	Saxony-Anhalt
HET	27.11.2012	Landkreis Mansfeld-Südharz	Saxony-Anhalt
ML	27.11.2012	Landkreis Mansfeld-Südharz	Saxony-Anhalt
SGH	27.11.2012	Landkreis Mansfeld-Südharz	Saxony-Anhalt
HV	27.11.2012	Landkreis Stendal	Saxony-Anhalt
OBG	27.11.2012	Landkreis Stendal	Saxony-Anhalt
GHC	27.11.2012	Landkreis Wittenberg	Saxony-Anhalt
JE	27.11.2012	Landkreis Wittenberg	Saxony-Anhalt
MER	27.11.2012	Saalekreis	Saxony-Anhalt
MQ	27.11.2012	Saalekreis	Saxony-Anhalt
QFT	27.11.2012	Saalekreis	Saxony-Anhalt
ASL	27.11.2012	Salzlandkreis	Saxony-Anhalt
BBG	27.11.2012	Salzlandkreis	Saxony-Anhalt
SBK	27.11.2012	Salzlandkreis	Saxony-Anhalt
SFT	27.11.2012	Salzlandkreis	Saxony-Anhalt

Table A.1 – *Continued*

MED	20.04.2015	Kreis Dithmarschen	Schleswig-Holstein
ECK	15.11.2012	Kreis Rendsburg-Eckernförde	Schleswig-Holstein
ARN	29.11.2012	Ilm-Kreis	Thuringia
IL	29.11.2012	Ilm-Kreis	Thuringia
ART	29.11.2012	Kyffhäuserkreis	Thuringia
SDH	29.11.2012	Kyffhäuserkreis	Thuringia
SLN	29.11.2012	Landkreis Altenburger Land	Thuringia
HIG	29.11.2012	Landkreis Eichsfeld	Thuringia
WBS	29.11.2012	Landkreis Eichsfeld	Thuringia
ZR	29.11.2012	Landkreis Greiz	Thuringia
RU	29.11.2012	Landkreis Saalfeld-Rudolstadt	Thuringia
MGN	29.11.2012	Landkreis Schmalkalden-Meiningen	Thuringia
NH	29.11.2012	Landkreis Sonneberg	Thuringia
APD	29.11.2012	Landkreis Weimarer Land	Thuringia
EIS	29.11.2012	Saale-Holzland-Kreis	Thuringia
SRO	29.11.2012	Saale-Holzland-Kreis	Thuringia
LBS	29.11.2012	Saale-Orla-Kreis	Thuringia
PN	29.11.2012	Saale-Orla-Kreis	Thuringia
SCZ	29.11.2012	Saale-Orla-Kreis	Thuringia
LSZ	29.11.2012	Unstrut-Hainich-Kreis	Thuringia
MHL	29.11.2012	Unstrut-Hainich-Kreis	Thuringia
SLZ	29.11.2012	Wartburgkreis	Thuringia

A.2 Maps Used for the Calculation of the HPI

A.2.1 Maps of the Territories of the HRE by Wolff (1877)

The area of a state ("reichsunmittelbares Territorium") is calculated based on shapefiles created from maps of the non-Italian parts of the Holy Roman Empire printed in Wolff (1877). One of those maps, "Deutschland beim Tode Karl des IV. im Jahre 1378" ("Germany at the death of Charles IV. in the year 1378") is shown below in Figure 5. Note that this map incorrectly includes the state of the Teutonic Order, so when digitizing the map we excluded this area.[35] To cross-validate the map of we consulted several other historical atlases, including those of Darby and Fullard (1978), Stier et al. (1956), and Andree (1886), or Baldamus, Schwabe, and Koch (1914).

[35]The maps are available here: `http://gei-digital.gei.de/viewer/javax.faces.resource/pdf-icon32.png.xhtml?ln=images/` (accessed on January 22, 2016).

Note: This figure shows the original map of the HRE as printed in Wolff (1877). For our empirical analysis we digitized this map using GIS software.

Figure 5: Germany at the Death of Charles IV. in the Year 1378 according to Wolff (1877)

A.2.2 Frequency and Type of Territories in the HRE

Overall, we identified 730 independent states, including 81 city states, 89 ecclesiastical territories (bishoprics, archbishoprics and monastic states), and 560 secular territorial states. The latter group consists of two kingdoms, Bohemia and Prussia, 48 duchies, 80 principalities[36], 16 republics (all of them in today's Switzerland), 217 counties[37] and 180 "Herrschaften" (territories ruled by "Freiherren"

[36]Apart from principalities, we also classify the following states into this category: Nine "Landgrafschaften" (landgraviates), 17 "Markgrafschaften" (margraviates) and two Princely counties (the Princely county of Burgundy and the Princely County of Tyrol). The reason for this is that the rulers of those states (the margrave, the landgrave etc.) were considered to have the same rank as princes (although their names refer to their origins as counties).

[37]The 217 counties subsume the following territories with "county" in the name: Four "Pfalzgrafschaften" (county palatinates). In general, the rulers of those territories (the palatinates) were

(barons)). Furthermore, there were seven Imperial territories (directly controlled by the Emperor), among them were six "Landvogteien" (Grand Bailiffs) and one territory, the Staufian lands, controlled by the Staufian Emperors during the 11th to 13th century. There are also four territories that were occupied by the Swedes after the Thirty Years' War. Finally, there are nine electorates (among them three archbishoprics already counted above), which are considered to be the most powerful states of the HRE and are treated as an own category.[38]

A.2.3 Historical Background to the Sampling Years

1. 1250 was the year of the death of Frederick II., the last Emperor of the Staufer dynasty. The Staufer dynasty had ruled the Empire as kings and emperors for more than 110 years. The whole dynasty (and with them central power) collapsed soon after, in 1254, when his sole male heir Konrad IV., who was King of Germany but never Emperor, died. Following the collapse of the Staufer dynasty, a 20 year period called the "Great Interregnum" began, in which there was no elected Emperor, but four elected kings. The kings were not universally accepted by the powerful princes, and so did not rule the Empire. In this period, known as an age of insecurity, violence, and anarchy, many of the numerous city state (free and imperial cities) emerged and political frag-

considered to be of a higher rank than ordinary counts (in the case of a "Pfalzgraf" (Palatinate)). One of these county palatinates, the "Pfalzgrafschaft bei Rhein" (County Palatinate of the Rhine) had the status of an electorate from the middle of the 13th century (and was thereafter called "Kurfürstentum Pfalz" (Electorate of the Palatinate)). Thus, it still was called a county palatinate but actually was one of the most influential and powerful states within the Empire. Then, there are also six burgraviates and 207 ordinary "counties". It is important to note that counties were fairly heterogeneous regarding their size, and political importance. The county of Württemberg, for example, for a long time the largest county of the Empire (before it became a duchy in 1495), was larger than some of the principalities or duchies of the time and also had higher tax revenues than some of those higher-ranked territories. Hence, one should not assume counties to be less important or smaller than duchies or principalities.

[38]The official title of those states differed. Some of them were called "Kurfürstentümer" (electoral principalities) some are margraviates or county palatinates and the Habsburg monarchy called itself "Archduchy of Austria".

mentation increased further.[39]

2. 1378 was the year Emperor Charles IV died. This year marks the peak of the political fragmentation of the Empire—a situation that was made permanent by the Golden Bull of 1356. Furthermore, while considered by some as one of the greatest and most influential medieval German Emperors, he failed to preserve the powerful position of his dynasty, the Luxembourgians, as he pledged away a lot of the territories under his control, in order to pay his large debts. This further weakened central authority and helped to increase the political fragmentation of the Empire.

3. 1477 was the year in which Charles the Bold, Duke of Burgundy died. With his death, the Duchy of Burgundy, one of the largest states in Europe, which could be considered an independent, middle-sized power (although de jure part of the HRE), collapsed and was split after violent hostilities. Some parts of the Duchy fell to France and the remainder was integrated into the HRE as smaller political entities (like the Duchy of Brabant). Furthermore, through marriage, the Habsburgs gained control over the remaining parts of Burgundy. Thus, the death of Charles the Bold was the decisive event in the ascent of the House of Habsburg to world power. A period with slowly declining political fragmentation began.

4. 1556, the year after the peace of Augsburg settled the confessional division of Germany for the next decades and ended the first wave of religious wars in the Holy Roman Empire. However, it also was the year when Charles V, probably the most powerful European monarch after the fall of Rome, abdicated from the throne due to his setback against the protestant princes and his lack of loyal vassals within the Empire. His reign marked the peak and

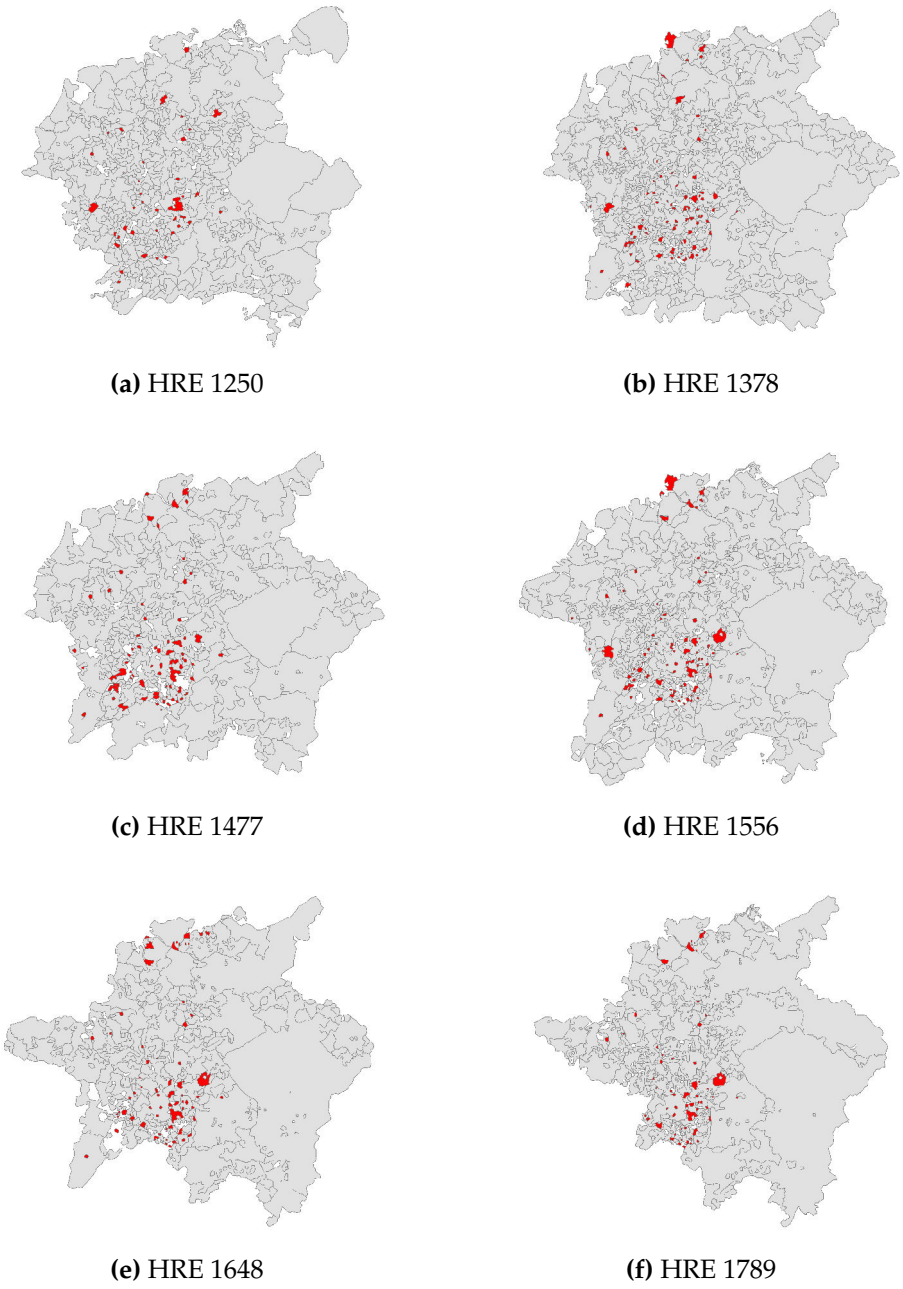
[39] Political fragmentation in the 13th century was already much higher than during the 12th century. This was due to the fact that, as a consequence of the struggle between Henry the Lion, Duke of Saxony and Emperor Frederick I., the old and quite large stem duchies ("Stammesherzogtümer") were dissolved and partitioned into smaller (and even further divisible) territories. This should have weakened the position of dukes and princes towards the Emperor and hence strengthen central power, but in the long-run, had the opposite effect.

turning point of the power of the House of Habsburg as his resignation from the throne and its defeat by the princes of the Empire commenced the slow decline of the Habsburg's power.

5. 1648, the year the Thirty Years War ended, with the Peace Treaties of Westphalia. This lead to notable territorial changes, as some large and powerful states like Brandenburg and Hesse integrated smaller territories into their states. Furthermore, several imperial cities disappeared, becoming part of France or of Switzerland (whose independence was officially acknowledged). Finally, it settled the confessional question within the Empire.

6. 1789, the year when the French Revolution began and triggered a series of events and wars, resulting in the demise of the HRE and the most significant reshaping of the landscape of states in Central Europe since the dissolution of the stem duchies in the 12^{th} century.

A.2.4 States in the Holy Roman Empire 1250–1789



(a) HRE 1250 **(b)** HRE 1378

(c) HRE 1477 **(d)** HRE 1556

(e) HRE 1648 **(f)** HRE 1789

Figure 6: The Holy Roman Empire and its territorial states (gray) and city states (red) at our sampling years

A.2.5 Coding Challenges and Discussion of Difficult Cases

Typical difficulties in the coding of the data originate from errors as to name, type of state or omission of an existing state. Such problems mostly arose in the case of small states on which information is limited even today (typically some "Herrschaften", states ruled by a baron or an imperial knight), when there were several territories with the same name (e.g. "Limburg") or for a few of Imperial cities in the Alsac-Lorrain region which Wolff forgot.[40] However, we were able to resolve almost all of these issues, sometimes by consulting additional sources such as books by local historians.

Another difficulty was determining the start and end point of a states' independence. The latte was problematic, when, for example, a states was split up between the sons of a ruler and three family lines ruled over three different parts of the former territory. Here, Wolff not always correctly recorded the division of the state, which we resolved. Sometimes, after a ruling dynasty died out due to a lack of a male heir (or after a war about its heritage) a territory was partitioned between several other rulers. In this case, we decided whether to assign the territory to the state that had the majority of rights or whether it remained an independent state (when there was no clearly dominant party).

This was the case, for example, for the county of Sponheimwhich consisted at the beginning of the 14^{th} century, of two separated territories, the "Vordere" and "Hintere" Grafschaft of Sponhein. When the dynasty ruling the "Vordere Grafschaft" (the front county) died out, one fifth of the County went to the Electoral Palatinate and four fifth to the Count controlling the "Hintere Grafschaft" (the back county). After 1437, the Margrave of Baden and the Count of Veldenz in-

[40] Another case was that of the Imperial city of Friedberg and the burgraviate of Friedberg, located around a castle next to the city. The latter was a very small county around the castle of Friedberg that was involved in various conflicts with the nearby Imperial city. Wolff does not include both territories before the 1789 map, where he drew a territory called Friedberg and marked it as an Imperial city. We split this territory between the Imperial city and the burgraviate from 1250 to 1378. In 1477 the Imperial city lost its independence (it was under the control of the burgraviate then for most of the time) and thus, we assigned the whole territory to the burgraviate in the later maps—the burgraviate existed until 1806.

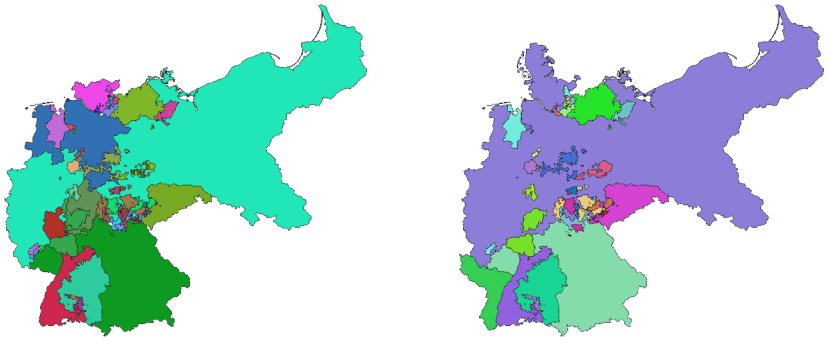
herited both parts of the County. Both rulers decided not to split the County but to rule it together as a condominium. Another change occurred in 1559, when the Princedom of Pfalz-Simmern (who had inherited the part of the County of Veldenz) bought the Electoral Palatinate's shares in the "Vordere Grafschaft". Simultaneously, it decided to give away the half of the "Hintere Grafschaft" to the Duchy of Pfalz-Zweibrücken. This resulted in the following situation: the "Vordere Grafschaft" belonged three fifths to Pfalz-Simmern (since 1559 Electoral Palatinate) and two fiftha to Baden. The "Hintere Grafschaft" belonged half to Baden and half to Zweibrücken. Finally, in 1707, the Margraviate of Baden-Baden and Electoral Palatinate split up the "Vordere Grafschaft" and in 1776, the "Hintere Grafschaft" was split in half by the Margrave of Baden and the duke of Pfalz-Zweibrücken. After 1815 the territory was integrated into Prussia and disappeared. In 1477 and 1555, i.e. during the condominium, we decided to consider the whole territory as county of Sponheim. Wolff, in his 1556 map has assigned the four separate territories of the county to either Pfalz-Simmern or Baden-Baden, Pfalz-Zweibrücken and the Electoral Palatinate. One cannot be sure whether he has assigned it to Pfalz-Simmern or Baden-Baden as both have the same color. In addition, this does not reflect the actual situation in 1556 (according to our sources), rather this is the situation in 1559 (when one assumes that he has assigned the "Vordere Grafschaft" to Baden and not to Pfalz-Simmern). For 1648 and 1789 we follow Wolff, who no longer included the county of Sponheim but assigned its territory to Pfalz-Zweibrücken, Electoral Palatinate and Baden-Baden (or Baden, respectively).

A lack of clarity about when a territory ceased to be an independent state typically arose also because Wolff (and other historians) followed a tradition of drawing important states (like e.g., the duchy of Berg) as independent ("reichsunmittelbare") states even when they were de facto ruled by other nobles, as was the case for the united duchy of Kleve-Jülich-Berg which was split up again after armed hostilities over the different parts, with one part (the duchy of Kleve and the counties of Mark and Ravensberg) falling in the hands of the margrave of Brandenburg

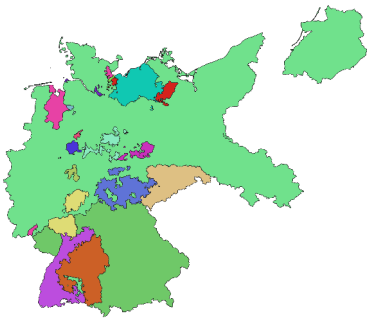
and another part (the duchies of Berg and Jülich) coming under the control of the duchy of Pfalz-Neuburg. In these cases we diverge from the map and make these territories part of Brandenburg or Pfalz-Neuburg, respectively.

Finally, city states are often among those territories for which it was not absolutely clear what degree of independence they had, regardless of their de jure status. It is well known that some cities had gained certain independence from their rulers, while never being officially considered as imperial cities. By the same measure, there were imperial cities that were never truly independent of their former ruler although they were granted "Reichsunmittelbarkeit" by the Emperor. We consulted standard sources on the history of German cities such as Köbler (1988) or Keyser and Stoob (1939–1974) and other studies on imperial cities, including Cantoni (2012) and followed their judgment about whether a city was de facto, and not just de jure, an imperial city. This is also an issue for several territories that were ruled by the Emperor or another high-ranked noble (like an elector) but where never part of their core territory. Two of these territories were the magraviates of Ober- and Niederlausitz (Upper and Lower Lusatia). Hence, some historians argue that the power of those rulers over the territory was limited if non-existent. Therefore, we decided to treat the Lausitz territories as independent states.

A.2.6 Maps on the German Territories and States after 1800



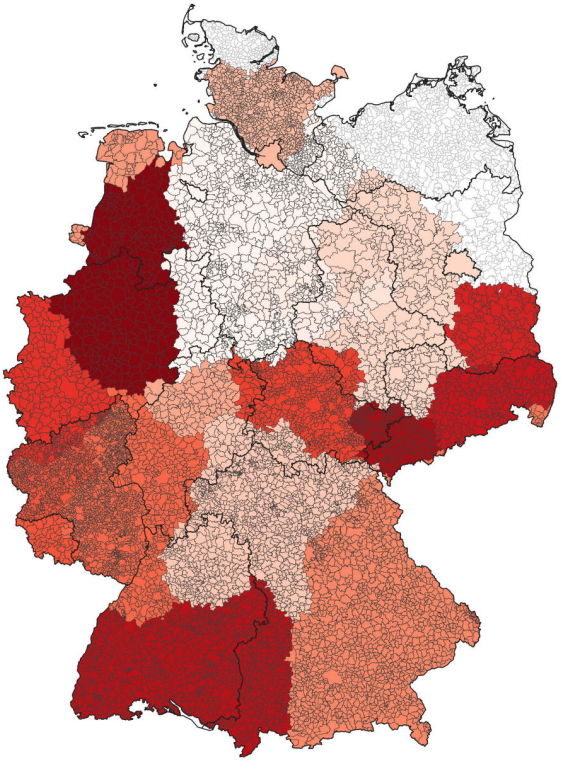
(a) The German Confederation in 1820 **(b)** States of the German Empire 1871



(c) States of the German Empire in 1925

Figure 7: States of the German Confederation, the German Empire, the FRG and the GDR

A.2.7 Map of 1150 States of the HRE and Municipalities



Note: This figure shows the borders of contemporary German municipalities and federal states (the bold black lines). The different red colors in which the municipalities are faded indicate to which state of the HRE in 1150 a municipality belongs. The white color municipalities are those outside of the HRE in 1150 borders and are thus not part of the sample in the regression using 1150 states dummies. The borders of the states of the HRE in 1150 are drawn according to a map printed in Wolff (1877)

Figure 8: Assignment of German Municipalities to the States of the HRE in 1150 and Federal States

A.3 Descriptive Overview of the Data Sets

Table A.2: Descriptive Overview of the "Matrix Data Set"

Variable	Obs	Mean	Std. dev.	Min	Max
Distance to Start-Up	2,442,880	400.343	228.700	0.000	3148.671
Distance to Start-Up < 100km	2,442,880	0.097	0.296	0.000	1.000
Facebook Social Connectedness Index	1,348,479	35644.060	128153.500	1818.000	24100000.000
Income p.c. Quantile of Start-Up Location	1,381,060	3.014	1.169	1.000	5.000
Investment=1	2,442,880	0.002	0.049	0.000	1.000
Investor and Start-Up Location in Same Income Group	2,442,880	0.303	0.460	0.000	1.000
ln(Population of Start-Up Location)	1,381,754	11.864	1.831	6.136	14.118
Migration Balance p.c. of Start-Up Location	1,313,742	0.136	0.181	-0.343	1.350
Share Industry Buildings of Start-Up Location	1,381,754	0.035	0.022	0.000	0.161
Start-Up in Same Municipality	2,442,880	0.043	0.202	0.000	1.000
Technical University at Investor and Start-Up Location	2,442,880	0.339	0.473	0.000	1.000
Technical University at Start-Up Location	1,964,714	0.464	0.499	0.000	1.000
Technical University of Applied Science at Start-Up Location	1,964,714	0.383	0.486	0.000	1.000
University at Investor and Start-Up Location	2,442,880	0.392	0.488	0.000	1.000
University at Start-Up Location	1,964,714	0.681	0.466	0.000	1.000
University of Applied Science at Start-Up and Investor Location	2,442,880	0.400	0.490	0.000	1.000
University of Applied Science at Start-Up Location	1,964,714	0.694	0.461	0.000	1.000

Table A.3: Descriptive Overview of the Municipality Level Data Set

Variable	Obs	Mean	Std. dev.	Min	Max
% Altkreis License Plates	11,264	11.157	20.992	0.000	98.977
% Investments within 100km	11,264	0.367	5.270	0	100
% Investments within 30km	11,264	0.002	0.040	0.000	1.000
% Investments within 50km	11,264	0.003	0.043	0.000	1.000
% Investments within 20km	11,264	0.002	0.038	0.000	1.000
% Locally Active Funds	11,264	0.001	0.019	0.000	1.000
% Population over 65	10,998	0 .196	0.037	0 .000	0.45
Altkreis Border	11,264	0.153	0.360	0 .000	1.000
Black Death Mortality	11,264	33.130	4.188	7.677	56.020
Boundary of HRE	11,264	0.068	0.253	0.000	1.000
Elevation	11,263	280.300	215.400	0.015	1435.000
Gemeindefrei	11,264	0.0482	0.214	0.000	1.000
Historical Battles	11,264	0.006	0.075	0.000	1.000
Historical Political Fragmentation	11,264	1.417	0.569	0.000	5.667
Historical Political Instability	11,263	4.491	1.365	0.000	8.000
Kreisfrei	11,264	0 .009	0.097	0.000	1.000
Latitude	11,264	5635.959	215.752	5246.913	6097.555
Latitude×Longitude	11,264	3190614	840499.5	1607068	5226483
ln(% Altkreis License Plates)	11,264	1.258	1.520	0.000	4.605
ln(Business Taxes p.c.)	9,978	-2.013	1.090	-6.851	5.079
ln(Income p.c.)	10,115	0.699	0.403	-1.269	2.994
ln(% Investments in Same Altkreis)	11,264	0.0113	0.195	0.000	4.615
ln(% Investments within 100km)	11,264	.025	0.312	0.000	4.615
ln(% Investments within 20km)	11,264	0.017	0.251	0.000	4.615
ln(% Investments within 30km)	11,264	0.019	0.261	0.000	4.615
ln(% Investments within 50km)	11,264	0.021	0.276	0.000	4.615
ln(Historical Political Instability)	11,263	1.659	0.338	0.000	2.197
ln(Historical Political Instability Pre 1871)	11,263	1.593	0.334	0.000	1.946
ln(Population)	10,202	7.594	1.528	2.079	14.118
ln(Votes FDP)	10,168	0.095	0.028	0.000	0.383
ln(Unemployment Rate)	10,173	0.0444	0.0247	0.0000	0.1923
ln(Weighted Historical Political Instability)	11,263	0.015	0.005	0.000	0.033
Location on Historical Trade Route	11,264	0.320	1.681	0.000	40.320
Longitude	11,264	565.241	144.079	284.1033	917.626
Neolithic Settlement Area	11,264	0.374	3.390	0.000	123.000
Other Personal Connection of VC Manager	11,264	0.001	0.024	0.000	1.000
Roman	11,264	0.568	2.232	0.000	44.810
Ruler Deaths Without Heir (Weighted)	11,263	0.001	0.002	0.000	0.009
Technical University	11,264	0.001	0.037	0.000	1.000
Terrain Ruggedness	11,263	4.324	3.858	0.000	36.060
UZ Reintroduced	11,264	0.678	0.467	0.000	1.000
VC Manager Studied at Start-Up Location	11,264	0.001	0.024	0.000	1.000

A.4 Control Variables

Black Death Mortality. The variable provides an estimate for the Black Death mortality rate of each municipality. It is based on the city-level mortality rates calculated by Christakos et al. (2005). Data for all municipalities is obtained by interpolatiing the values for all of them from the existing city-level mortality rates using the inverse distance weighted (IDW) interpolation tool in QGIS.

Boundary of the HRE. Dummy variable equal to one if a municipality was located at the border of the Holy Roman Empire in at least one of the periods for which we have maps (1250, 1378, 1477, 1556, 1648, 1789). Variable is calculated using digitized versions of the maps of the HRE printed in Wolff (1877).

Elevation. Maximum elevation of each state in meters. Data is based on the Digital Elevation Model (DEM) of the U.S. Geological Survey's Center for Earth Resources Observation and Science (EROS), namely the GTOPO30 dataset, which can be downloaded here `https://lta.cr.usgs.gov/GTOPO30` (last accessed May, 30th 2016). The GTOPO30 has a spatial resolution of 30 arc seconds.

Historical Battles. Dummy variable equal to one if at least one historical battle has taken place in the area of the municipality in the period between two of our maps (e.g. between 800 and 1250 between 1250 and 1378, between 1378 and 1477 etc.). The considered period is from 1250 to 1789. Information of the date and location of the battles is taken from Bradbury (2004), Clodfelter (1992) and Darby and Fullard (1978).

Historical Political Fragmentation. Average number of historical states intersecting the municipality. Variable is calculated using digitized versions of the maps of the HRE printed in Wolff (1877).

Location on Historical Trade Road.Dummy variable equal to one if a municipality intersect a historical trade route. Data on the course of historical trade routes are ob-

tained by digitizing a map on "Medieval Commerce" from Shepherd (1923). The map can be downloaded as pdf from here: `https://www.lib.utexas.edu/maps/historical/shepherd/europe_mediaeval_commerce.jpg` (last accessed July, 10th 2017).

Neolithic Settlement Area. We have computed the area within each state that was already settled in pre-historic times (in km^2). This information stems from Schlüter (1952).

Roman. Dummy variable equal to one if a grid cell is located in the historical Roman Empire as of 200 AD, when it had reached its largest extent. Assignment of grid cells to the Roman Empire is based on a shapefile of the Roman border from the "Digital Atlas of Roman and Medieval Civilizations" (McCormick et al. 2013). The shapefile is based on the map of Roman roads in the Barrington Atlas of the Greek and Roman World Talbert (2000). It can be accessed here: `https://harvard-cga.maps.arcgis.com/apps/View/index.html?appid=b38db47e08ca40f3a409c455ebb688` (last accessed March, 3rd 2021)

Terrain Ruggedness. Following Riley, DeGloria, and Elliot (1999) average ruggedness of a states' territory is calculated as the negative value of the derivative of the ruggedness index of a digital elevation model. The calculations are based on the elevation raster of Nunn and Puga (2012) (see above). Terrain ruggedness was calculated using QGIS.

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