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SAVING BANKS AND THE INDUSHRIAL REVOLUTION IN PRUSSIA SUPPORTING REGIONAL DEVELOPMENT WITH PUBLIC FINANCIAL INSTITUTIONS

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Abstract

We show that smaller, regional public financial intermediaries significantly contributed to industrial development, using a new data set of the foundation year and location of Prussian savings banks. This extends the banking-growth nexus beyond its traditional focus on the large universal banks, to savings banks. The saving banks had an impact through the financing of public infrastructure, such as railways, and new private factories. Saving banks were public financial intermediaries, so our results strongly suggest that state intervention can be very successful, particularly in regions in the early stages of industrial development when capital requirements are manageable, and access to international capital markets is limited.

JEL Codes: G21, N23, N74, N93, R11

Keywords: Savings Banks, Prussia, Industrialisation, Public Infrastructure, Regional and Urban Development

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1) Introduction

Does the financial sector promote growth or does it just accompany growth? This question has been studied intensively from a theoretical and an empirical perspective. Starting with the seminal paper of King and Levine (1993), a number of papers have argued in favour of a causal relationship. Levine and Zervos (1998), for instance, show that stock market liquidity and banking development both positively predict growth, capital accumulation and productivity improvements. Rajan and Zingales (1998) further show that industrial sectors that were relatively more in need of external finance developed disproportionally faster in countries with more developed financial markets. In this context, Germany and its bank-based financial system is one of the most intensively studied cases.[2] Most famous is the work by Gerschenkron (1962), who claimed that moderately backward economies – like Germany in the 19th century – can speed up their growth by establishing modern financial institutions such as the large universal joint stock banks.[3]

We contribute to this literature by showing that savings banks also played a pivotal role in Germany's 19th century economic success. Looking at more than 900 Prussian cities, we find a strong positive relationship between the existence of these small public financial intermediaries and regional development in the early period of industrial development (1837 to 1875). This is consistent with Guiso et al. (2004), who have shown that differences in the local financial development are important determinants of economic success in modern Italy.

A change in regulations prompted a wave of establishment of savings banks: this rule change enables us to account for endogeneity issues that would otherwise arise due to the likelihood that towns and counties with high growth rates also attracted savings banks. In July 1854, the minister for trade and commerce issued a decree demanding the foundation of at least one savings bank per county, to give all workers the opportunity to save and to raise capital to

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[2] While Lehmann-Hasemeyer and Streb (2016) recently challenged the view that Germany was a typical bank based system by showing that it had a well-functioning stock market for new technology by the end of the 19th century, it seems common knowledge that joint stock banks played a crucial role in Germany's industrialisation. See also Lehmann (2014) for the importance of large universal banks at the Berlin stock exchange and Lehmann-Hasemeyer and Burhop (2014) and Burhop and Lehmann-Hasemeyer (2016) for the general development of all stock exchanges. A recent paper by Heblich and Trew (2015) also shows evidence for the bank–growth nexus in British industrialisation. Furthermore, Pascali (2016) shows that regional differences in banking development are highly persistent across Italian regions since the Renaissance, and that there is also a long-run positive effect of local banks on urban economic development.

[3] This idea has been formalised for instance by Da Rin and Hellmann (2002). In their model, banks can propel an economy from a self-perpetuating low equilibrium to a sustainable high equilibrium. Banks can thus become the driving force in the big push towards industrialisation. On the other hand, endogenous models claim that the development of the banking sectors is a result of economic success and less its cause (see for instance Greenwood and Jovanovic (1990) and Pagano (1993)).

support regional development (v. Knebel-Doveritz 1907, 6pp). Following this decree, many savings banks were established and we observe a much wider geographical distribution than before. In 1849 there were savings banks in about half of the counties: this had risen to nearly 95 percent by 1864. Furthermore, while in earlier periods we observe a significant pre-growth trend before the foundation of a savings bank in a city, there is no such trend after 1854. The banks that were founded in this wave can therefore be treated as exogenous.

Apart from some rare papers by Guinnane (2002, 1997, 1998), Burhop (2006) and Proettel (2013), scholarly discussions about the banking-growth nexus in Germany have not given significant attention to bank types other than universal banks. Guinnane (2002) outlines that although joint stock banks offered a wider range of services than did U.S. or British banks, and that it is therefore easy to believe that these banks were particularly able to foster growth and support firms at an early stage, there are important gaps in this literature. In this context, he mentions the savings banks in particular as neglected financial institutions that deserve more attention. In an empirical investigation based on aggregate time series for the whole of Germany, Burhop (2006) finds a positive relationship between the savings banks' financial depth and Germany's real capital stock for the period 1883 to 1913.[4]

German industrialisation was not only based on large, multinational firms and coal resources: good public infrastructure, a competitive schooling system and small and medium-sized firms were the foundation of German industry. Savings banks as communal financial institutions provided large funds for public infrastructure projects like railways or buildings, and were also crucial in financing small and medium-sized local industries. We provide robust and conclusive evidence that small regional financial intermediaries were equally as important for the transition to modern economic growth as large universal banks and stock markets. Furthermore, since saving banks were public financial intermediaries, our results strongly suggest that state intervention can be very successful, particularly in areas and regions at the beginning of an industrial take-off, when capital requirements are manageable and access to international capital markets is limited.

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[4] Burhop (2006) also confirms empirically that joint stock credit banks positively influenced capital formation for the country's modern sector.

2) A brief history of savings banks

The first German savings banks were founded in the northern parts of the country, in Hamburg (1778), Oldenburg (1786), Kiel (1796), and Altona (1801) (Wysocki, 1980, 24). The foundation date for every single savings bank in Prussia up to 1875 can be found in the Prussian statistical yearbook *"Zeitschrift des Königlich Preußischen Statistischen Bureaus 1876"* (Königlich Preußisches Statistics Bureau 1876).[5] The first Prussian savings bank was established in Berlin in 1818 (Ashauer, 1998), and by 1913, there were 1765 savings banks in Prussia and 3,133 in the whole German Empire (Deutsche Bundesbank, 1976, 63 f).

Savings banks held 24.8 per cent of the total assets of all German financial institutions in 1913, – the largest group of banks, followed closely by incorporated credit banks, comprising 24.2 per cent, and mortgage banks at 22.8 per cent. Wysocki (1980, 119) estimates that in the period 1851 to 1910, the savings banks rank at the top of all bank types in terms of net investments. Nevertheless, one might argue that the overall capital of one savings bank was too low to have an impact on a region. However, if we limit our scrutiny to the savings banks established after 1854 it becomes clear that this was not the case. In 1875 the average savings bank had investments of about 40 000 Marks, an average of 184 Marks per head (median 68 Marks per head) across all cities, and approximately 440 Marks per head for the smallest decile of cities (see Königlich Preußisches Statistisches Bureau 1876).

Savings banks were closely aligned with the local government. The 1808 Prussian directions for municipal self-administration *(Preussischen Städteverordnung)* gave municipalities autonomy in financial administration, including whether to found a savings bank. According to Schulz (2005, 22) savings banks generally existed as dependent departments of the local government up to the 1930s. The strong relationship between savings banks and communities was also manifested in their guarantor liabilities. The regional authority, which could be either the community, the town or the county, was liable for the obligations of the savings banks. Furthermore, the local authority had to ensure the economic stability of the savings banks (Schulz 2005, 22-23). The principal legislation covering the organisation, business practices and public control of Prussian savings banks was passed in 1838. The law required local authorities to prove that they could guarantee the deposits before permission would be granted to open a savings bank (§3, Prussian Regulation of 1838 (v. Knebel-Doveritz 1907, 6pp).[6]

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[5] Please note that there might be a slight selection bias, because we only observe savings banks that still existed in 1875. However, given the large number of new banks founded in this period, this bias seems negligible.

[6] However, similar regulations can also be found in the statutes of the earlier savings banks (Schulz 2005, 23).

Savings banks and local authorities were often also connected via personal relationships. For example, the executive board of the savings bank in Altenburg in 1886 was made up of members of the local government, and bank employees were recruited and paid by the city council (Schulz 2005, Hiller 1996, 33).

Savings banks had a strong regional character, the so-called "*Regionalprinzip*" (Mura 1998, 27; Ashauer 1991, 177). Although this was not codified in every region, in most cases it was not possible to open an account if one did not live in that region. More importantly, investments were also supposed to be regional. This was to ensure that only those who would be liable if the bank failed benefitted from successful investments (Schulz, 2005, 24). However, sometimes the benefits spilled into neighbouring regions, as we will outline below.

Local authorities had several clear reasons for founding savings banks (see Schulz 2005, 27-28): the main purpose was to give poorer people the opportunity to save and thereby gain autonomy and independence.[7] This social target is common to most of the early savings banks (Wysocki 2005,18; Trende 1957).[8] Savings banks therefore created opportunities to take personal precautionary measures by accumulating private savings (see also Lehmann-Hasemeyer and Streb 2016b), and this reduced the burden on local funds for poor relief.

Furthermore, because of the local authorities' close relationship to "their" savings banks they had easy access to capital. Figure 1 provides an overview of the financial assets of the Prussian savings banks in our observation period. Unlike government bonds, loans to public authorities were mostly obligations (*Schuldscheine)* which could not be sold (Proettel 2013, 11). These loans financed streets, schools, hospitals, energy infrastructure and railroads (Ashauer 1998,

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[7] The stated purpose of the abovementioned first savings banks in Hamburg was, for instance, "*Die Ersparungsklasse dieser Versorgungsanstalt ist zum Nutzen geringer fleissiger Personen beiderlei Geschlechts, als Dienstboten, Tagelöhner, Handwerker, Seeleute errichtet, um Ihnen Gelegenheit zu geben, auch bei Klenigkeiten etwas zurückzulegen und ihren saer erworbenen Not- und Bautpfennig sicher zu einigen Zinsen belegen zu können, wobei man hoffet, dass sie diese ihnen verschaffte Bequemlichkeit sich zur Aufmunterung gereichen lasse mögen, um durch Fleiss und Sparsamkeit dem Staat nützlich zu sein.*" (§94, Mura 1997, 26).

[8] Some banks defined their customers very precisely, while others claimed more generally to serve the poorer members of the population. The Bank in Trier, which was located in the Prussian province of the Rhineland, for instance, defined their target group as day labourers, servants, soldiers up to a certain rank and public servants who earned a yearly salary of less than 12 Thalers (Ashauer 1998, 55). Others such as the savings banks in Lübeck, Kiel or Göttingen never restricted their target customers (Wysocki 2005 pp.18, Mura 1995, 21). Often we find a stated preference for workers, daily labourers and servants but with a provision for other customers to open saving accounts (Wysocki 2005, 19). Furthermore, not all banks followed their statutes or guidelines to the letter. Overall, Wysocki (2005, 77-79) estimates that the original target group, i.e. the poorer members of the population, held about 40-50 per cent of the overall savings in our observation period. Although 40 per cent is lower than originally intended, it still constitutes a respectable amount. In 1900 for instance, 40 per cent of all savings in Prussia was about 2.298 Billion Marks (see Ashauer 1998, 64; Höpker 1924, 80). Furthermore, the administrative staff of the savings banks themselves believed that the poorer customers from the working class were important for their business.

76; Mura, 1998, 109-110; Schulz 2006, 29)[9][10]; in 1859, for instance, the savings bank in Saarbrücken granted a loan to install a water pump, build a running well and lay down water pipes. Proettel (2013, 12) describes the savings bank in Kirchheim unter Teck in the South of Germany granting about 70 loans worth 1.8 million Marks to public authorities in the period 1907 to 1913. Of this, 522,850 Marks were for building schools and apartments for teachers, 436,165 Marks for streets, and 108,300 Marks for water pipes. About 10,000 Marks were used to build a gas plant, which was mainly used by industrial firms. Another loan built a new railroad in 1908, connecting Kirchheim unter Teck to three smaller towns. The main supporters of this project were the businessmen and industrialists, similar to an earlier case in the 1860s. Proettel (2013, 13) assumes that this was not an exception, and provides another example from 1907 when a public official from Göppingen, a nearby town, sought a loan from the Kirchheim savings bank because the Göppingen savings bank was already financing a railway for about 80,000 Marks and could not provide another loan. We need to take into account that Proettel's (2013) cases are located in Württemberg and focus on a later period, and might not be representative for Prussia. Nevertheless, these loans to public authorities made up 8-9 per cent of the total investments of Prussian savings banks, which amounted to 190 million Marks in the period 1856 to 1875.

It is difficult to estimate the extent to which savings banks were directly involved in financing infrastructure, since in the official statistics all shares held by the savings banks are summarized as "securities" (Ashauer, 1991, 144). However, a decree issued in September 1844 provides some insight about the typical securities of savings banks. This decree states that loans can only be granted if the securities that were offered as collateral were those in which the savings banks invested. These were German covered bonds ("*Pfandbrief*"), national government bonds, guaranteed railway shares and obligations from the community (cited after Trente 1957, 118).

Furthermore, for some cases we have more detailed information on these investments. The savings bank in Aachen, for instance, started to buy shares in railways that had government guarantees and railway obligations in 1842. By 1852, national railway shares and obligations constituted almost 50 per cent of its securities (Thomes 2010. 62, 66-67). Schulte-Rentrop (1937, 85-86) provides more detailed information on the investment policy of saving banks in Westphalia. For example, in 1887 the savings bank in Warendorf held fixed interest railways obligations of 49,500 Marks, which was about 14 per cent of its equity. The remainder consisted

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[9] See also Proettel (2013, 7)

[10] In a recent paper, Atack et al (2014) have also shown that the expansion of banking and railroads in the United States during the industrial revolution were intimately linked and that their relationship evolved over time.

of different types of government bonds and smaller investments in gas equities. Based on his findings, Schulte-Rentrop (1937, 85-86) concludes that in the early 19th century, savings banks already contributed a great deal to the German transport network of streets, railways, trams and waterways via government bonds, but also via direct investments. Both savings banks, Aachen and Warendorf, were located in Prussia and are included in our sample.

Savings banks also provided private loans to industrialists. As Proettel (2013) has emphasised, the majority of firms, even by the end of the 19th century, were small and middle sized. By 1882, only 3.5 per cent of employees worked in firms with more than 1000 employees, while more than 50 per cent worked in firms with less than five employees (Burhop 2011, 140). Large universal banks, however, mainly focussed on large industrial firms – mainly from the coal and steel sector (see also Tilly 1986, 150). Table 1 shows that in mining and salines, 92.4 per cent of the people were working in firms with more than 50 employees, although the average firm size was about 3 employees. However, it remains unclear how the large number of small and medium sized firms were financed, and we assume that saving banks mattered a great deal to close this gap. There are numerous examples of savings banks providing credit to smaller and medium-sized firms (see for instance Guinnane 2002, 88). Compared to the mortgages, however, these seem rather low and thus earlier historical research has rated them as irrelevant to industry financing (Ashauer, 1991, 144; Mura, 1998, pp 109; Schulz 2006, 29). However, even though these personal loans might have been relatively small, they can still have a significant impact since small firms and craftsmen did not have large capital requirements. In the years 1858 to 1861 the savings bank in Saarbrücken granted 108 personal loans, with an overall value of about 12,000 Thalers. Nearly half the recipients were craftsmen, i.e. locksmiths, smiths, carpenters and masons. Although nothing is known about the purpose of the loans, it is most likely that they were used to buy land, seeds, machines and raw materials and were therefore important for the local businesses (Thomes 1985, 83-85). Given the fact that the daily wage of a construction worker was about 1/2 Thalers in 1850 (see Strauss 1963, 148), these loans were not insignificant.

In terms of the mortgages, Proettel (2013) makes a convincing case that the savings bank in *Kirchheim unter Teck* often granted mortgages to workers, machinists, gas plant employees, artisans and other industrialists, and that these were used for industrial investments and to finance commercial buildings. In 1908, for instance the textile mill "*W.F. Berger We*" received a loan of 30,000 Marks to build a new spinning room. Although we lack evidence from a Prussian savings bank, it is most likely that Proettel's (2013) findings can be generalised to

Prussian savings banks. At least, they clearly show that there is a misunderstanding and therefore underestimation of the mortgage loans when it comes to financing industrialisation. It is almost certain that they were not solely used to finance private housing.

Altogether, savings banks were not important just in terms of numbers of saving banks, but also in market share compared to other financial intermediaries. Moreover, according to anecdotal evidence and previous historical research, they invested in infrastructure and provided capital for smaller and medium-sized firms in their region. According to Thomes (1985, 11), their main achievement was the mobilisation of smaller sums of capital and investing it back into the economy (see also Schulte-Rentrop 1937, 57). They are therefore most likely to have had a positive causal impact on regional development. The positive effect on the regions may further increase over time with the accumulation of capital.

3) Empirical Analysis

3.1 Data

City level population figures are taken from Hornung (2015). The data set covers all 978 cities that held city rights in 1849 in Prussia, within its 1849 borders. It also contains population figures for every third year between 1837 and 1871, resulting in 12 years with data and 11,736 city-year pairs.

Data on the existence and number of savings banks is from the Zeitschrift des Königlich Preußischen Statistischen Bureaus for the year 1876 (Königlich Preußisches Statistisches Bureau 1876). This volume contains founding dates for all savings banks, from 1871 to 1875 (after which only a few new savings banks were founded). About half the cities (459) in this data set founded at least one savings bank by 1875.

To control for general geographic development patterns and to identify the distance between the savings banks, we georeferenced the location of a city and the location of the savings banks in cities other than these 978 cities, based on location information from online geocoding tools gpsvisualizer.com and geonames.org. We also identified the geographic position using GIS tools and a shapefile of Prussian counties provided by the ifo Prussia Economic History database (iPEHD) (Becker et al. 2014).

Information on railways access is taken from Hornung (2015); data on the share of mining workers in a county in 1882 is taken from the iPEHD. Data on the number of factories,

employees and steam engines (steam engines and steam boilers) in a city for the years 1855 and 1858 is taken from the official statistical publication "Tabellen und amtliche Nachrichten über den Preußischen Staat" (Königlich Preußisches Statistisches Bureau 1858,1860). As further control variables we use the city population in 1816 (at the beginning of our observation period), the share of Protestants in a city in 1816, and variables capturing the soil texture (share of a county's area that has clay, loamy or sandy soils in 1866). All of these are taken from Hornung's (2015) city-level panel data set. Table 2 provides a descriptive overview of the panel data set (Panel A) and the cross sectional data set (Panel B).

3.2 Empirical Approach and Baseline Results

To test empirically whether there is a significant relationship between the introduction of savings banks and urban and regional economic development in Prussia, we rely on a balanced panel of cities.[11] We use population growth as proxy for economic development and regress it on a set of variables representing the savings banks treatment. Population growth can serve as a proxy variable for economic development because we assume that economic development increased migration to urban centers, while fertility remained unchanged. Generalizing from urban population growth to economic growth has shown to be an acceptable approximation in cases where no data on income is available (Acemoglu, Johnson, and Robinson 2002). To control for time-invariant unobserved heterogeneity and temporal shocks affecting all cities equally, we include city and year fixed effects. We also include interactions of the location of a city (longitude and latitude) and year dummies to account for changing general geographical patterns of regional development within Prussia. Thus, we estimate the following baseline regression equation using the fixed effects (FE) method:

$$\frac{(Pop_{i,t+1} - Pop_{i,t})}{Pop_{i,t}} = \alpha + \beta \ln(Pop)_{it} + \gamma SB_{it} + \sum_{\tau \in \Gamma} \rho'_\tau SBast_{i\tau}\pi_\tau + \sum_{\tau \in \Gamma} \theta'_\tau Lat_{i\tau} * \pi_\tau +$$

$$\sum_{\tau \in \Gamma} \mu'_\tau Lon_{i\tau}\pi_\tau + \delta_i + \pi_t + \epsilon_{it} \qquad (1)$$

With $\frac{(Pop_{i,t+1} - Pop_{i,t})}{Pop_{i,t}}$ being the growth of population in county or district i between period $t + 1$ and t. SB_{it} represents two different treatment variables that we use to capture the effect of savings banks on regional development. Since only 38 of 978 cities had more than one savings

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[11] A similar analysis based on county level was not possible. To get a sufficient number of observations we would need to aggregate the data based on the county borders of 1849. This leaves us with 335 counties and population figures for the years 1849, 1861, 1864, 1867, 1871 and 1875. By 1861, however, 91% per cent of these counties already had at least one savings bank. Thus the variation in the data is insufficient for this type of analysis.

bank during the observation period, we simply use a dummy variable "Savings banks" that is equal to one if there was at least one savings bank in a city in a respective year and zero otherwise. Second, we employ a variable "Time since First Savings Bank" that measures the years since the foundation of the first savings bank, for each year t and each city i in the data set. Hence, this variable allows us to analyse whether it takes time for the effect of a newly founded savings bank to emerge. We further include a dummy variable "savings bank at some stage" (SBats) that is equal to one if the city founded a savings bank in the observation period and zero if we do not observe the foundation of a savings bank until 1875. We then interact this dummy with year dummies to control whether cities that founded a savings bank in the observation period followed a systematically different development pattern than the other cities ($\sum_{\tau \in \Gamma} \rho'_\tau SBast_{i\tau}\pi_\tau$). $\sum_{\tau \in \Gamma} \theta'_\tau Lat_{i\tau} * \pi_\tau$ and $\sum_{\tau \in \Gamma} \mu'_\tau Lon_{i\tau}\pi_\tau$ are interactions of latitudinal and longitudinal coordinates and year dummies (as explained above). δ_i are city fixed effects and π_t are year fixed effects. Finally, we include the natural logarithm of a city's population in period t ($\ln(Pop)_{it}$) to account for the well-known fact that larger cities grow systematically more slowly than smaller ones. Standard errors are clustered at city level.

The results are presented in Table 3. As expected, we find clearly that smaller cities grew more quickly than larger ones. However, the most important observation is that the effect of savings banks is both statistically and economically significant for both treatment variables. With the introduction of a savings bank, the growth rate increased by about 2 percent. We also find that the effect becomes larger the longer the saving banks existed in the city. Furthermore, the dummy "savings bank" becomes non-significant if we include the variable that captures the time since the first savings bank. Thus it seems that the effect is a gradual change from the date of the foundation rather than an abrupt change. The variable that shows the trend for the 459 cities that founded at least one savings bank in our observation period is not significant. Already in this simple baseline specification, there is no evidence that a selection bias drives the results.[12]

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[12] We also tested whether the impact of treatment duration is non-linear by including the squared number of years since the first savings bank and found it not to be significant. Results are not reported but are available from the authors upon request.

3.3 The decree of 1854 as a "natural experiment"

Even when applying a FE estimation and controlling for diverging trends of cities that never founded a savings bank, endogeneity concerns due to the reverse causality issue remain. It is most likely that the timing of the foundation is endogenous. Cities that experienced a period with high growth rates might also have attracted savings banks. In particular, the first savings banks that were privately founded were most likely to be located in cities with the prospect of sufficient demand (see also Proettel 2017).

However, savings banks were founded in waves, triggered by changes in regulations. The first large wave of foundations started after the general regulation of Prussian savings banks in 1838 (see Figure 2). This was a general legal framework covering organisation, business practices and public control. Within this framework, however, was a wide scope for municipalities. While in 1837 we observe just 136 savings banks, this number had nearly trebled (to 376) by 1849. However, although there was certainly an intention to open savings banks in more rural and less developed areas, it is unclear whether this already happened in this period. Nonetheless, in the 1850s the state authorities continued to point to the economic importance and necessity of savings banks. In July 1854 the minister for trade and commerce, together with the minister of internal affairs, issued a decree that demanded the foundation of at least one savings bank per county in the years to come. This was intended to give all workers the opportunity to save, and thereby raise capital to support regional development (v. Knebel-Doveritz 1907, 6pp). Most importantly, this decree encouraged communities, especially poorer communities, to found savings banks. For instance, the interior minister promised financial support for communities that struggled to bear the costs and risks of founding a savings bank (see also Thomes 1885, 15-20).[13] This decree triggered a second wave of foundations. In the period between 1854 and 1865 another 345 savings banks were founded and by 1864, we observe 794 savings banks in Prussia. In our sample of cities, we observe 176 cities that founded the first savings bank in this

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[13] The original wording was as follows: "*Dabei sind dieselben (Ländräte) namentlich darauf aufmerksam zu machen, dass die Gelder der Sparkassen sicher und nutzbringend bei den Provinzial-hülf-kassen untergebracht werden können, so wie dass den Sparern aus dem Stande der kleinen Leute nicht bloss die Sparkassen-Zinsen, sondern auch die von den Hülfs-kassen zu vertheilenden Prämien zu Gute kommen. Ist eine Sparkasse geründet, so erhält sie sich, da sie bei irgend umsichtiger Verwaltung nicht füglich Verlust haben kann, von selbst und an den übrigens an sich geringfügigen Mitteln zur Gründung derselben wird es den Kreisständen fehlen. Sollte dies dennoch nicht der Fall sein, so bin ich, der mitunterzeichnende Minister des Inneren bereit, mit mässigen Summen hinzuzutreten, Ich bemerke aber jetzt schon, dass sie nur ausnahmsweise wird geschehen können, theils weil der zu diesem Behulfe zu Gebote stehende Fonds an sich nicht bedeutend ist, theils weil besondere Umstände, welche dann näher zu motivieren sein werden, vorahnden sein müssten, wenn der Kreis nicht im Stande sein sollte, sie nicht erheblichen Einrichtungs-Kassen aufzubringen.*"

period. After this boom, the number of foundations per year decreased again. In the years between 1864 and 1875, about 19 new savings banks were founded per year.

The 1854 decree clearly enhanced the equal distribution of savings banks by requiring the foundation of at least one savings bank per county, and by encouraging poorer local authorities by offering financial support. Thus, while it is possible that the first savings banks were founded in areas that were already prospering, we expect that the degree of industrialisation did not matter for the founding boom after 1854. A closer look at the geographical distribution of the savings banks in different periods reveals that the savings banks that were founded in the period between 1854 and 1865 seem to be exogenous. While the first savings banks were mainly founded in already industrialised areas, such as the Rhineland and Silesia, the distribution became much wider and more equal after the first legal framework was introduced in 1838. Furthermore, there is a clear difference in the distribution of savings banks that were founded after 1854. The distribution became much wider and the willingness to create good coverage of savings banks throughout Prussia becomes obvious. If we consider the counties within the 1849 borders, more than 90 percent had at least one savings bank by 1865, while in 1854 only about 56 percent had at least one savings bank (see Figure 3).

In order to test whether our observation is correct and the foundation of savings banks during the boom years of 1854-1865 was independent of previous economic success, we estimate the following equation using the probit method:

$$P(Savings\ Bank)_{i,t} = \alpha + \beta * Popgrowth_{i,t-l} + \gamma * X_i + \varepsilon$$

Where $P(Savings\ Bank)_{i,t}$ is the probability that the saving bank is founded in period t. In order to be able to determine an event, we only consider cities that founded a savings bank at some stage in the period before 1875. We estimate two separate cross-sectional regressions where t is 1838-1854 and 1855-1865 respectively. The average economic success of the period before a savings bank was founded is proxied by $Popgrowth_{i,t-l}$ with $l = 3,6$. Thus, this covers either the growth rate in the three years (one period) before the foundation, or the average city growth within six years (two periods) before the foundation of a respective savings bank. X_i covers further city specific variables such as soil texture variables, longitude and latitude and the share of Protestants in 1816.[14]

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[14] An overview of the cross sectional data set used for estimating equation (2) is given in Table 2, Panel C.

The results are presented in Table 4. In the first specification, we include all cities that got a savings bank before 1875, assuming that all these cities could also have founded the savings bank in a different year. In the second specification, we only cover cities that founded a savings bank in the period after 1854. We find a pre-growth trend for the savings banks that were founded before 1854, if we consider the growth up to six years before the savings banks were founded. For the savings banks that were founded after 1854, we find no such trend. Overall, this simple exercise confirms our expectations and observations from the anecdotal evidence. The savings banks that were founded in the boom years 1855 to 1865 can be treated as exogenous and are not the result of positive or negative selection.

In a next step, we estimate equation (1) again for different sub-samples. These results are presented in Table 5. Columns 1, 4 and 7 show the baseline specification to enable comparison. Columns 2, 5 and 8 show the results only for savings banks founded after 1838, when the first general legal framework for Prussian saving banks was introduced. Finally, columns 3, 6 and 9 depict the estimated coefficients when focusing on savings banks founded in 1854-1865 only, that is, for that sub-sample of savings bank foundations that can be considered to be exogenous. All regressions include city and year fixed effects and interactions of latitude and longitude with year dummies. Standard errors are clustered at the city level. The most important observation is that the effect of savings banks is both statistically and economically significant for both treatment variables and sub-samples. Indeed, the estimated coefficients remain virtually identical across all samples and, if anything, tend to slightly increase for the sample of exogenous savings bank foundations.

As a first robustness check, we test whether the estimated effects are due to a mining industry boom, especially in the Ruhr and Upper Silesia coal industries. If savings banks were founded (and founded earlier) in regions with an economic upswing caused by the growth of the mining industry, this could bias our results. In Table 6 we thus re-estimate equation (1) for all three treatment variables and two different sub-samples. All samples exclude cities in which savings banks were already founded before 1855 or after 1865. The first sample further excludes the 5% of cities with the highest share of mining workers and the second sample excludes those in the 4th quantile of the mining worker share distribution. Results show that the coefficients of the savings bank variables actually increase in magnitude. Hence, if anything, ignoring coal biases our estimates downwards. Again, this supports our hypothesis that the foundation of saving banks had an especially positive impact on less-developed regions.

Next, we attempt to learn more about the cities that benefitted most. Thus we spilt the sample into three according to the average size of the city. The first third contains the 326 smallest cities, with the smallest city having just 271 inhabitants, and an average city size of 1380 inhabitants. Most cities (82% in this subsample and 94% overall) had more than 1000 inhabitants. The smallest city with a savings bank was Wirsitz with about 930 inhabitants. The second third contains the middle size cities in the sample. Here, the average city had about 2700 inhabitants. The last sample contains the larger cities. Cities in this sample had an average of 11 320 inhabitants.

If we run the same regressions for the three subsamples, it becomes clear that the effect is not caused by the large cities, but rather by the middle size ones. If we only consider the sample of the foundation wave after 1854, the effects seem to be driven by the smallest cities. Again, our findings provide conclusive evidence that savings banks were particularly useful in less developed and more rural areas.

We also question whether we should consider the foundation of a savings bank in a city nearby as a treatment. This is particularly important if both cities were in the same county, and a savings bank was intended to be accessible to people in neighbouring cities. Such a bank could also have financed public investments and regional business in any city in the county. Furthermore, cities also often benefitted from savings banks across counties. As in the case of *Kirchheim an der Teck* and *Göppingen*, described above, neighbouring savings banks often cooperated to finance large investments that they could not have financed on their own. Therefore, we can expect that when neighbouring savings banks are included in regressions, the effect of a savings bank in a city should increase. To study the effect of banks in the neighbourhood of a city we constructed two variables, namely the number of savings banks in each year within 10km and within 20km of a city. We then re-run the regressions where the savings bank dummy is the variable of interest, this time including one of the two neighbour variables. Results are reported in Table 7. They suggest that, as expected, including the establishment of savings banks in neighbouring cities slightly increases the effect of savings banks for city growth. The effect of savings banks in the neighbourhood seems to be larger than the effect of a savings bank in a city. This is, however, driven by the fact that a notable number of cities had two or more neighbouring savings banks, so that the effect of two, three or four savings banks in the neighbourhood is larger than that of a single savings bank in a city. Furthermore, we see that the coefficients for the 20km distance band are – while still statistically significant – notably

smaller. This suggests that the effect of neighbouring savings banks decreases with distance, which is intuitive as transaction costs increase with distance.[15]

3.4 Event Study Results

In this section we estimate an event study specification. This further allows us to identify whether there exists a pre-treatment trend that accounts for our results. Furthermore, it enables us to uncover how the effect of savings banks evolved over time and how long it took for them to significantly affect urban development. In the event study we treat the introduction of the first savings bank in a city as the event (happening in period t) and then define variables for four periods before the event and five periods after the event.[16] Thus, we compare cities at different points in time but at the same stage in terms of the introduction of a savings bank. We include city population, city and year fixed effects and estimate the event study specification for three different samples. First, we include the whole sample, then we restrict the analysis to the sample of savings banks founded between 1854 and 1865. Results are shown in Table 9. For the overall sample (column 1) we see that cities with a savings bank showed significantly higher population growth in the period (that is three years) before the foundation of the first savings bank, and, additionally, the coefficient increases relatively little after the opening of the first savings bank. However, for the banks founded between 1854 and 1865 we do not see such a significant pre-treatment trend. This sub-sample of cities does not show significantly higher city growth before the foundation of the first savings bank and the coefficient more than doubles in the year the first savings bank opens. Note also that the estimated coefficients imply a much larger effect than those estimated before – when not accounting for pre-treatment trends and temporal heterogeneity in the effects of savings banks. To be precise, the results suggest that in the period when the savings bank was founded (i.e. within the first three years of its opening) cities grew on average about 10 per cent larger than cities without a savings bank. The coefficients and 95% confidence interval for this last sub-sample are also depicted in Figure 4 to give a visual impression of the temporal evolution of the effects. With respect to the temporal evolution, the event study suggests that savings banks had a significant effect immediately in the period when they were founded (i.e. within the first three years after their opening) but that

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[15] We also tried a 50km distance band and found that for this neighbour variable the estimate coefficients remain statistically significant but are even smaller. Thus, we have a consistent and economically meaningful pattern of positive spatial spillovers from neighbour treatments declining with distance.

[16] The event window is the result of balancing the advantage of having as many pre and post-treatment periods as possible and a large sample size as e.g. a larger pre-event window would lead us to have to discard a lot of cities with savings banks founded very early.

the effect becomes larger and larger over time (which fits the positive and linear effect of the "time since first savings bank" variable in the baseline regressions).

Finally, similar to the baseline estimations, it is likely that it is not the foundation of a savings bank in a city, but in the neighbourhood of a city, that is the relevant event to study. Thus, we conduct a modified event study on the whole sample of observations, in which an event is defined as the opening of a savings bank in the city or within the 10km of the outskirts of the city, depending on which of the two events happened first. Results are shown in Table 9, regressions 3 and 4. In the case of the 10km distance band, results are qualitatively identical to those of the standard event study with non-significant coefficients before the event and significant and increasing coefficients afterwards, for the sample of exogenously founded banks.

3.5 Channels - Financing of Public Infrastructure and Regional Firms

As discussed in section 2, there is qualitative historical evidence suggesting that savings banks financed smaller local firms and business activities, and were also involved in large public infrastructure projects, such as railways and school buildings. To test whether the anecdotal evidence can be generalised and does not simply reflect rare exceptions, we investigate whether cities with a savings bank were more often connected to a railroad and whether they had a larger number of factories and public buildings per capita. Overall, 459 cities in our sample founded at least one savings bank in the time between 1818 and 1875, and 336 cities received railway access. In only 45 cities (about 13 per cent of the cities with railway access) do we observe that railway access preceded the first savings bank. In another 91 cities (about 27 per cent of the towns with railway access), we observe railway access but not the foundation of a savings bank in our observation period. In most cases, railway access came after the foundation of the first savings bank (185 cities and about 55 per cent of the cities with railway access). In only fifteen cities were both institutions founded in the same year or within a two-year period.

In the years after the 1854 decree, 176 cities in our sample founded at least one savings bank. Of these, only 22 were founded in a city that already had a rail access. In six cities the railway access came within two years of the foundation of the savings bank, and 43 cities got railway access after the first savings bank was founded. This took on average about eight years. These observations further complement the anecdotal evidence that savings banks contributed in a meaningful way to railway financing.

In Table 10, we test the role of savings banks for the provision of public infrastructure using a simple econometric exercise. Using Hornung's (2015) approach, we identified cities that had access to Prussian railways but were not located in the straight line corridor (SLC) between the large cities. Initially, railways were owned, financed and operated by private companies, but the Prussian government granted licenses for the respective lines. Hence, the railway companies only built the most profitable railway lines that connected larger cities via straight lines.[17] If a city was not located between two nodes (large cities) of such a straight line and wanted to have access to a railroad, it had to raise the funds to build its own spur and station (Hornung 2015). Thus, access to funds from a savings bank could have determined whether a city achieved railway access or not. In the regressions in Table 10, two different dependent variables are used. First (in columns 1 and 2) we focus on cities with any kind of railway access. Second, we only consider cities located on the straight line corridor, that is, cities where the government ensured that a railway was built. Third, (in columns 5-8) we focus on cities that have railway access and are not on the straight line corridor, and cities that had railway access and were more than 15km away from the straight line corridor. Again, we address endogeneity concerns by running the regression only on the sub-sample of cities where savings banks were founded between 1854 and 1865. Furthermore, we exclude all cities in which the railway was built before the savings bank and the cities in which railways and savings banks were both founded within a two-year period. We do this to ensure that the coefficient is not influenced by the fact that savings banks were established along railroads (see also Atack et al. 2014). Results show that, indeed, cities with savings banks had a significantly higher probability of having railway access. The estimated coefficients suggest that cities that were at least 15km away from the SLC and had at least one savings bank were on average about nine per cent more likely to have railway access than similar cities without a savings bank. It is interesting to note that the effect is not significant when we only consider cities located on the straight line corridor, indicating that these railways were financed by sources other than savings banks.

Second, in Table 11 we test the impact of the foundation of savings banks on the number of steam engines per factory in 1855 and 1858 (columns 1 and 2) and on the number of steam engines per capita in those two years (columns 3 and 4). Those machines were necessary for production in almost every important industry, yet they were also costly and external funds from banks were needed to finance them. We include county fixed effects and latitudinal and

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[17] However, later the Prussian government started to build railways into previously unconnected, remote areas, e.g. in Eastern Prussia (like the "Ostbahn in 1848) and took over more and more of the privately operated railway lines (Hornung 2015).

longitudinal coordinates of cities in the regressions. For both variables, we find a statistically and economically significant and positive impact of savings banks. In cities with at least one savings bank, there were on average about 8 per cent more steam engines per factory than in cities without a savings bank. In sum, the results in Tables 10 and 11 strongly support our claim that savings banks financed regional business and public infrastructure in 19th-century Prussia, and made a significant contribution to national industrialisation.

4) Conclusion

The present study has shown that the establishment of savings banks in Prussia from 1816 to 1875 significantly contributed to urban and regional development. It appears that examples of savings banks funding communal public infrastructure projects like railways and buildings, and small and medium sized local industries, were not rare and can indeed be generalised. The evidence strongly suggests that savings banks played a pivotal role in Germany's 19th-century economic success. German industrialisation was not only based on larger, multinational firms and coal resources, but rather on good public infrastructure, a competitive schooling system and small and medium-sized firms as the backbone of German industry. The resulting, peculiar economic structure of an economy based on various, highly specialised, internationally active, yet regionally centred medium-sized firms has persisted to today, where these firms remain an integral part of the German economic model.

Furthermore, the bank-growth nexus was obviously not limited to the large banks. Indeed, given the preference of the large universal banks for financing large traditional firms, it is most likely that savings banks were even more important for Germany's industrial take-off in regions in which the majority of the firms were young, and small or medium sized. This study contributes to our understanding of why Germany industrialised, and reveals more about the relationship between banks and growth. We provide evidence that small regional financial intermediaries may be equally as important for the transition to modern economic growth as large banks and stock markets, at least at the beginning of an economic take-off when capital requirements are manageable. The history of saving banks can also be seen as a success story of early economic policy, since the saving banks were clearly communal public institutions.

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Tables and Figures

Figure 1: Financial assets of Prussian savings banks (per cent)
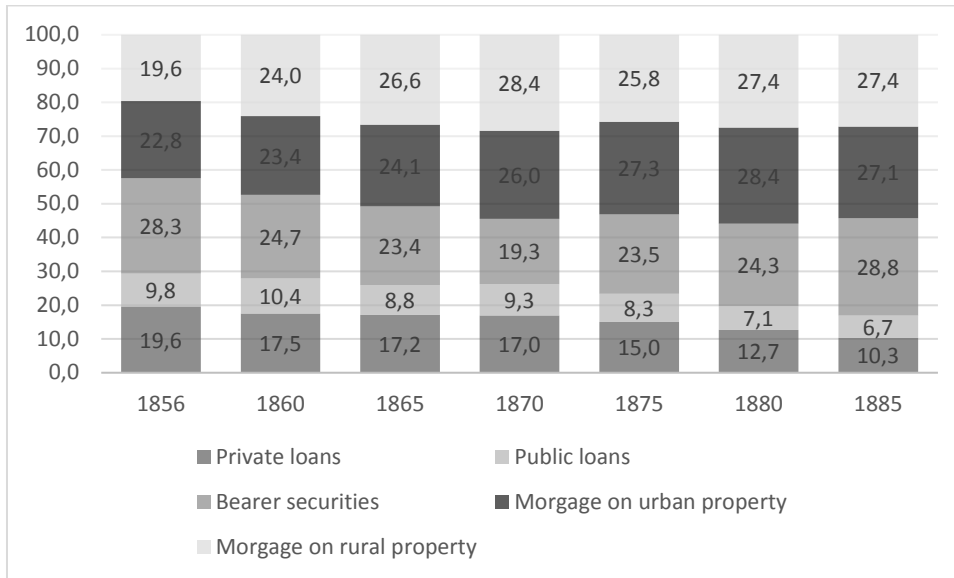
Source: Ashauer (1998, 77)

Figure 2: Newly founded savings banks
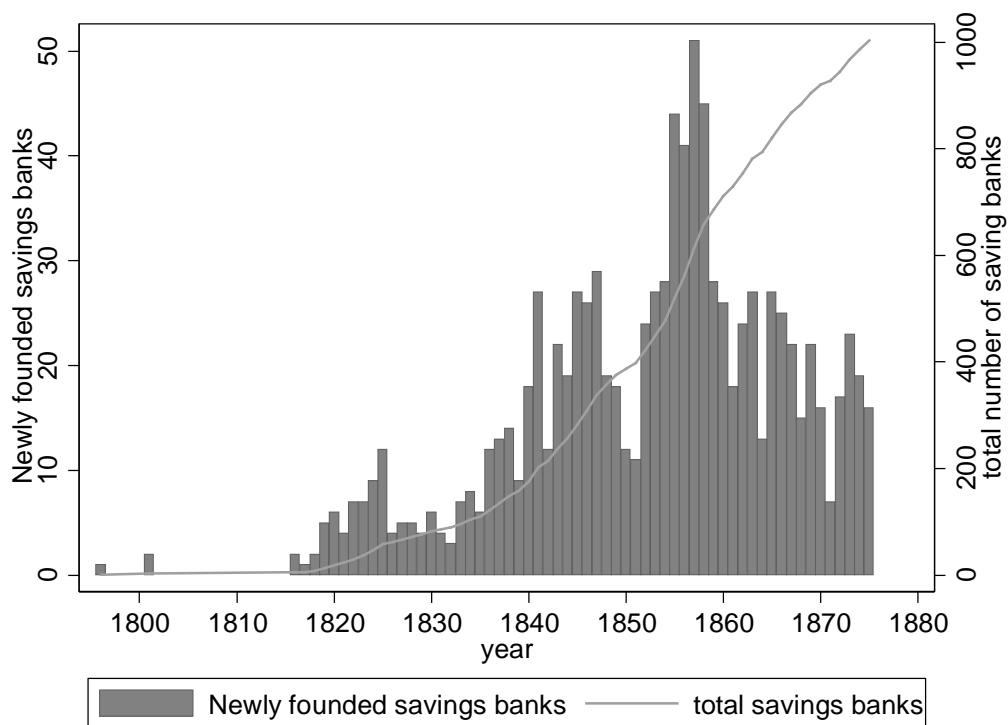
Figure 3: The diffusion of savings banks

Counties with at least one savings bank in 1849 (1849 borders)

Counties with at least one savings bank in 1864 (1849 borders)
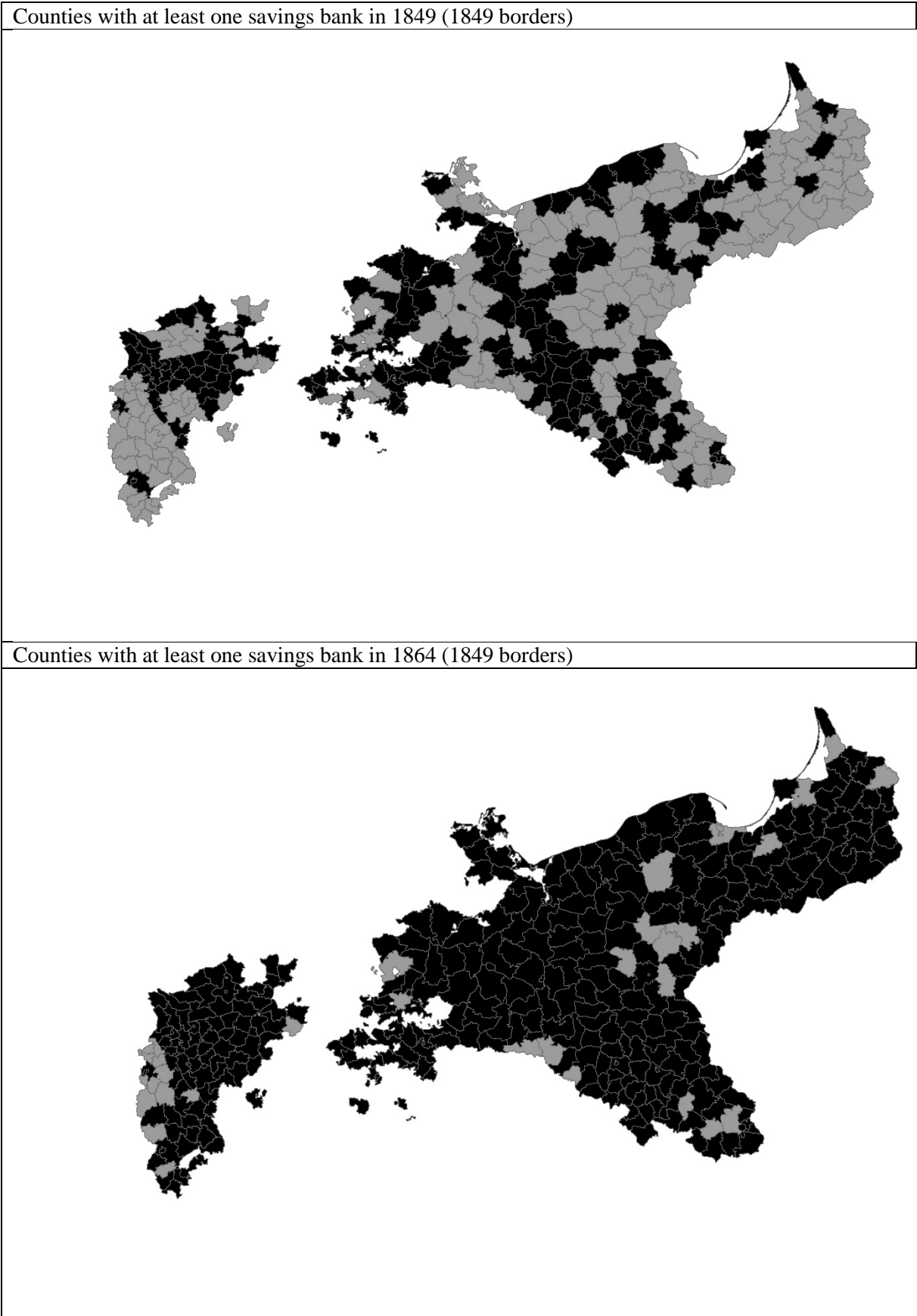
Figure 4: Event study-Savings bank foundation between 1854-1865, (Beta-coefficients and 95% confidence intervals of year dummies, corresponds to Table 10, regression (2))
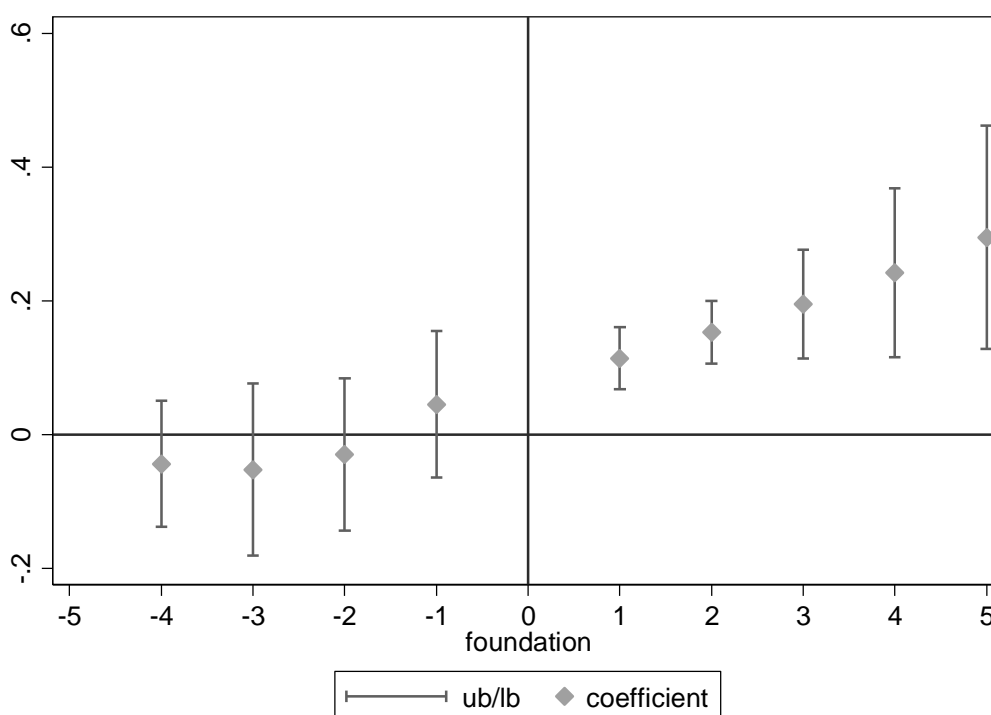
Table 1: Size of firms in Germany 1882

	EMPLOYEES PER FIRM	SHARE OF EMPLOYEES IN FIRMS WITH MORE THAN 50 EMPLOYEES IN PERCENT
MINING AND SALINES	81.3	92.4
STONES	6.6	33.1
METAL WORKING	2.8	18.7
APPARATUS	4.3	46.8
CHEMICALS	7.8	51
TEXTILES	2.6	38.2
FOODS	3	20
CLOTHING	1.5	3
AVERAGE	2.6	26.2

Source: Burhop (2011, 139), data from *Statistisches Jahrbuch für das Deutsche Reich*, 35. (2014).

Table 2: Descriptive Overview of the Data Sets

Variable	Obs	Mean	Std. Dev.	Min	Max
Panel A: City-Level Data Set					
City Growth	11,673	0.046	0.164	-0.743	7.808
Endogenous Rail Access (>15km SLC)	11,736	0.075	0.264	0.000	1.000
Endogenous Rail Access (not in SLC)	11,736	0.086	0.280	0.000	1.000
Latitude	11,736	52.123	1.165	49.235	55.697
ln(City Population in 1816)	11,688	7.975	0.850	5.525	13.625
Longitude	11,736	13.808	4.299	6.032	22.850
No. of Savings banks within 10km	11,736	0.270	0.834	0.000	9.000
No. of Savings banks within 20km	11,736	1.570	2.795	0.000	25.000
Rail Access	11,736	0.142	0.349	0.000	1.000
Savings Bank	11,736	0.278	0.448	0.000	1.000
Steam Engines per 1,000 Inhabitants	1,954	0.091	0.380	0.000	6.780
Steam Engines per Factory	1,956	0.112	0.339	0.000	2.773
Straight line corridor (SLC)	11,736	0.068	0.252	0.000	1.000
Panel B: Cross-Section Data Set Used in Table 4 & 5					
Average population growth in the 3 years before SB	978	0.027	0.257	-0.102	7.808
Average population growth in the 6 years before SB	978	0.013	0.040	-0.471	0.390
Clay Soils	978	0.347	0.349	0.000	1.000
Latitude	978	52.123	1.166	49.235	55.697
Loamy Soils	978	0.322	0.230	0.000	0.996
Longitude	978	13.808	4.301	6.032	22.850
Population Growth 1816-1837	938	0.419	1.812	-0.764	52.974
Population Growth 1816-1852	948	0.759	2.266	-0.705	67.553
Population Growth 1837-1852	967	0.245	0.311	-0.472	7.863
Population Growth 1855-1864	974	0.157	0.414	-0.700	8.487
Protestants p.c. in 1816	922	0.637	0.396	0.000	1.022

Table 3: Savings Banks and County Population Growth- Baseline estimates

Dependent Variable	City Growth		
	(1)	(2)	(3)
ln(City Population)	-0.211***	-0.220***	-0.220***
	(0.0439)	(0.0436)	(0.0438)
Savings Bank	0.0205***	0.0103	0.00266
	(0.00756)	(0.00846)	(0.0114)
Time Since First Savings Bank		0.00204***	0.00126*
		(0.000473)	(0.000682)
Cities which founded a saving bank until 1875 * year			0.000961
			(0.000667)
City Fixed Effects	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes
Latitude and Longitude	Yes	Yes	Yes
Observations	11,673	11,673	11,673
R-squared	0.073	0.076	0.076
Number of Clusters (Cities)	978	978	978

Standard errors clustered on county/city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and * 10 % level. All regressions include a constant not reported.

Table 4: Probability of Savings Banks Foundation in Different Periods

Dependent Variable	Probability that savings bank was founded in 1838-1854		Probability that savings bank was founded in 1855-1865	
	(1)	(2)	(3)	(4)
Sample	only cities that founded at least one saving bank before 1875, excluding cities that already had a saving bank in 1837		only cities that founded at least one saving bank before 1875, excluding cities that already had a saving bank in 1854	
Average population growth in the 6 years before SB	5.701**		-0.651	
	(2.563)		(1.917)	
Average population growth in the 3 years before SB		1.049		-0.765
		(1.031)		(0.818)
Protestants p.c. in 1816	0.492***	0.470***	-0.212	-0.189
	(0.187)	(0.182)	(0.272)	(0.273)
Longitude	-0.00605	-0.00266	-1.94e-05	0.000754
	(0.0182)	(0.0181)	(0.0272)	(0.0272)
Latitude	0.0206	0.0156	0.323***	0.324***
	(0.0749)	(0.0748)	(0.102)	(0.103)
Clay Soils	-0.301	-0.267	-0.617	-0.522
	(0.921)	(0.922)	(1.576)	(1.586)
Loamy Soils	-1.542	-1.430	-1.357	-1.284
	(1.003)	(1.002)	(1.686)	(1.691)
Sandy Soils	-0.403	-0.443	-1.196	-1.144
	(1.018)	(1.022)	(1.659)	(1.667)
Observations	385	385	212	212

Standard errors clustered on county/city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and * 10 % level. All regressions include a constant not reported. The table shows coefficients obtained from a probit regression.

Table 5: Savings Banks and City Growth

Dependent Variable	City Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Sample	All cities	Excluding town in which saving banks were founded before 1838	Excluding town in which saving banks were founded before 1854 or later than 1865	All cities	Excluding town in which saving banks were founded before 1838	Excluding town in which saving banks were founded before 1854 or later than 1865
ln(City Population)	-0.211***	-0.222***	-0.292***	-0.219***	-0.228***	-0.292***
	(0.0439)	(0.0449)	(0.0549)	(0.0437)	(0.0447)	(0.0551)
Savings Bank	0.0205***	0.0244***	0.0312***			
	(0.0076)	(0.0077)	(0.0105)			
Time Since First Savings Bank				0.00225***	0.00263***	0.00287***
				(0.0004)	(0.0005)	(0.0008)
City Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Latitude and Longitude	Yes	Yes	Yes	Yes	Yes	Yes
Observations	11,673	10,821	8,076	11,673	10,821	8,076
R-squared	0.073	0.073	0.087	0.075	0.075	0.086
Number of Clusters (Cities)	978	907	678	978	907	678

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and* 10 % level. All regressions include a constant not reported.

Table 6: Savings Banks and City Growth Excluding Mining Intensive Districts

Dependent Variable	City Growth							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Observations excluded	excluding the 5% most coal intensive cities (more than 4.5 percent of the working population in 1882)				excluding the 25% most coal intensive cities (more than 0.4 percent of the working population in 1882)			
Sample	All cities	Excluding town in which saving banks were founded before 1854 or later than 1865	All cities	Excluding town in which saving banks were founded before 1854 or later than 1865	All cities	Excluding town in which saving banks were founded before 1854 or later than 1865	All cities	Excluding town in which saving banks were founded before 1854 or later than 1865
ln(City Population)	-0.245***	-0.311***	-0.251***	-0.310***	-0.278***	-0.332***	-0.281***	-0.331***
	(0.0457)	(0.0574)	(0.0455)	(0.0576)	(0.0490)	(0.0606)	(0.0490)	(0.0608)
Savings Bank	0.0217***	0.0326***			0.0244**	0.0350**		
	(0.008)	(0.0112)			(0.0100)	(0.0136)		
Time Since First Savings Bank			0.00210***	0.00285***			0.00190***	0.00286***
			(0.0004)	(0.0009)			(0.0004)	(0.0009)
Observations	11,081	7,688	11,081	7,688	8,782	6,226	8,782	6,226
R-squared	0.078	0.088	0.080	0.088	0.086	0.095	0.087	0.094
Number of Clusters (Cities)	928	645	928	645	736	523	736	523

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and *10 % level. All regressions include a constant not reported.

Table 7: The Effect of Savings Banks in Small versus Large Cities

Dependent Variable	City Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Excluded cities						
				Saving banks were founded before 1854 or after 1865		
Sample of	smallest cities (average population below 1951)	middle sizes cities (average population between 1951 and 3655)	larger cities (average population above 3655)	smallest cities (average population below 1951)	middle sizes cities (average population between 1951 and 3655)	larger cities (average population above 3655)
ln(City Population)	-0.163***	-0.181***	-0.286***	-0.172***	-0.195***	-0.441***
	(0.0232)	(0.0316)	(0.0743)	(0.0265)	(0.0311)	(0.0882)
Savings Bank	0.0262	0.0232*	0.00337	0.0248**	0.0188	0.0205
	(0.0194)	(0.0131)	(0.0145)	(0.0118)	(0.0122)	(0.0318)
City Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Latitude and Longitude	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3,852	3,909	3,912	3,519	3,057	1,500
R-squared	0.091	0.090	0.094	0.147	0.118	0.117
Number of Clusters (City)	326	326	326	298	255	125

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and* 10 % level. All regressions include a constant not reported.

Table 8: Savings Banks and City Growth--Spillovers from Foundations in the Neighborhood

Dependent Variable	City Growth					
	(1)	(2)	(3)	(4)	(5)	(6)
Sample		All Cities		Savings Banks founded between 1854 and 1865		
ln(City Population)	-0.248***	-0.245***		-0.340***	-0.321***	
	(0.0514)	(0.0491)		(0.0698)	(0.0642)	
Savings Bank	0.0212***	0.0201***		0.0360***	0.0333***	
	(0.0075)	(0.0074)		(0.0110)	(0.0106)	
No. of Savings banks within 10km	0.0415***			0.0566***		
	(0.0114)			(0.0193)		
No. of Savings banks within 20km		0.0130***			0.0132**	
		(0.0031)			(0.0053)	
One Savings Bank within 10km			0.0122			0.0193*
			(0.00912)			(0.0114)
Two Savings Banks within 10km			0.0665**			0.0549**
			(0.0300)			(0.0240)
Three Savings Banks within 10km			0.217***			0.357**
			(0.0761)			(0.143)
Four Savings Banks within 10km			0.277***			0.268**
			(0.0716)			(0.117)
Five Savings Banks within 10km			0.326***			0.548**
			(0.120)			(0.223)
More than five Savings Banks within 10km			0.121*			0.190**
			(0.0659)			(0.0923)
Observations	11,673	11,673	11,673	8,076	8,076	8,076
R-squared	0.084	0.082		0.100	0.093	0.127
Number of Clusters (Cities)	978	978	978	678	678	678

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and* 10 % level. All regressions include a constant not reported.

Table 9: Event Study: Foundation of a Savings Bank and Neighbor Savings Bank

Dependent Variable	City Growth			
	(1)	(2)	(3)	(4)
Event	Foundation of First Savings Bank	Foundation of First Savings Bank or Neighbor Savings Bank		
Sample	All Cities	Excluding Savings Bank foundation before 1854 or after 1865	All Cities	Excluding Savings Bank foundation before 1854 or after 1865
Foundation-4	-0.00955	-0.0453	-0.00509	-0.0144
	(0.0209)	(0.0488)	(0.0171)	(0.0250)
Foundation-3	0.00576	-0.0545	0.00498	-0.00937
	(0.0194)	(0.0666)	(0.0154)	(0.0288)
Foundation-2	0.0173	-0.0324	0.00989	-0.00146
	(0.0145)	(0.0589)	(0.0132)	(0.0271)
Foundation-1	0.0612**	0.0421	0.0491**	0.0558
	(0.0273)	(0.0564)	(0.0233)	(0.0350)
Foundation	0.0893***	0.110***	0.0667***	0.0856***
	(0.0168)	(0.0248)	(0.0149)	(0.0147)
Foundation+1	0.0960***	0.147***	0.0700***	0.103***
	(0.0215)	(0.0225)	(0.0173)	(0.0181)
Foundation+2	0.105***	0.187***	0.0853***	0.126***
	(0.0232)	(0.0386)	(0.0210)	(0.0220)
Foundation+3	0.135***	0.233***	0.129***	0.176***
	(0.0312)	(0.0607)	(0.0303)	(0.0378)
Foundation+4	0.158***	0.285***	0.164***	0.196***
	(0.0378)	(0.0807)	(0.0338)	(0.0416)
Foundation+5	0.182***	0.325***	0.170***	0.207***
	(0.0468)	(0.102)	(0.0434)	(0.0478)
ln(City Population)	Yes	Yes	Yes	Yes
City Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Observations	3,696	1,743	4,726	2,745
R-squared	0.099	0.171	0.083	0.133
Number of Clusters (Cities)	398	176	510	285

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and* 10 % level. All regressions include a constant not reported.

Table 10: Savings Banks and the Financing of Railways

Dependent Variable	Rail access all		City on straight line corridor (SLC)		Endogenous Rail Access (not in SLC)		Endogenous Rail Access (>15km SLC)	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sample	Excluding towns in which saving banks were founded before 1854 or later than 1865							
Savings Bank	0.111***		0.0124		0.0899***		0.0959***	
	(0.0189)		(0.0113)		(0.0164)		(0.0155)	
Time Since First Savings Bank		0.0184***		0.00216		0.0154***		0.0178***
		(0.0028)		(0.0015)		(0.0027)		(0.0027)
City Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Latitude and Longitude	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,564	6,564	6,564	6,564	6,564	6,564	6,564	6,564
R-squared	0.111	0.191	0.015	0.018	0.096	0.166	0.103	0.196
Number of townkey1849	547	547	547	547	547	547	547	547

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and* 10 % level. All regressions include a constant not reported. We excluded all cities in which the railroad was established before the savings bank or within two years after the savings bank was founded to ensure that we capture the right direction of the effect.

Table 11: Savings Banks and the Financing of Regional Business 1855 and 1858

Dependent Variable	Steam Engines per Factory		Steam Engines per 1,000 Inhabitants	
	(1)	(2)	(3)	(4)
Sample	Excluding cities in which saving banks were founded before 1854 or later than 1858			
Savings Bank	0.0837**		0.0212	
	(0.0329)		(0.031)	
Time Since First Savings Bank		0.0646***		0.037**
		(0.0206)		(0.0187)
County Fixed Effects	Yes	Yes	Yes	Yes
Latitude and Longitude	Yes	Yes	Yes	Yes
Observations	1,356	1,356	1,354	1,354
R²	0.353	0.364	0.283	0.286

Standard errors clustered on city level in parentheses. Coefficient statistically different from zero at the *** 1%, ** 5% and* 10 % level.
All regressions include a constant not reported.

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