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Persistence of Entrepreneurship in Different Historical Contexts¹

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Abstract

Persistence of entrepreneurship over longer periods of time could indicate a culture of entrepreneurship among the local population that may be an important factor for regional development, but does persistence of economic activity require cultural transmission? We exploit the diverse historical developments in the territory that is Poland today to analyze the level and the sources of persistence from the 1920s until today. Persistence is mainly found in those regions that were part of Germany before World War II. This persistence is noticeable despite the exchange of most of the pre-war population, ruling out that persistence is driven by transmission of culture. In most regions that were already part of Poland before World War II, the relationship between historical and current levels of entrepreneurship is not significant. Persistence of entrepreneurship is related to the historical success of regions, which we capture by the pre-war level of and self-employment in manufacturing industries, particularly in those that can be regarded as knowledge intensive. Our main conclusion is that persistence of entrepreneurship requires a certain level of successful economic development that we capture by the degree of industrialization in the early 20th century, but it does not necessarily require persistence of the local population.

JEL-classification: L26, M13, O1, O18, R11

Keywords: Persistence, entrepreneurship, self-employment

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I. Introduction

A growing literature demonstrates persistence of economic activity in different settings (e.g., Davis and Weinstein, 2002; Bleakley and Lin, 2012; Dalgaard et al., 2018) that is often explained by “first nature” conditions (Henderson et al., 2018) and persistence of cultural traits (for an overview, see Giuliano and Nunn, 2019). One stream of this literature deals with the persistence of regional levels of entrepreneurial activities over longer periods of time (for an overview, see Fritsch & Wyrwich 2017; 2019). Two main mechanisms that may be responsible for this persistence of entrepreneurship are discussed: (1) ‘sticky’ regional determinants of entrepreneurship, and (2) localized externalities such as a positive entrepreneurial climate emerging from the role model and peer effects of past self-employment that may trigger social learning (Lyons & Berge 2012) and result in a regional culture of entrepreneurship (Andersson & Koster 2011; Fritsch & Wyrwich 2014; 2019).

The long-term persistence of entrepreneurship was confirmed in quite a number of different historical and institutional settings. Fotopoulos & Storey (2017) showed that historical entrepreneurship levels in the regions of England and Wales in the year 1921 considerably influenced the current levels. Glaeser et al. (2015) provide indirect indication for persistence of entrepreneurship in metropolitan areas of the US over a period of more than one hundred years. Fritsch and Wyrwich (2014; 2019) show that persistence of spatial differences in entrepreneurship can also be found in constellations characterized by disruptive changes of the economic, social, and political framework conditions, as was the case in Germany over the course of the 20th century. This pattern is particularly remarkable for East Germany, a region that experienced forty years of a socialist regime that adopted massive anti-entrepreneurial policies.

Another particularly fascinating example of long-term persistent entrepreneurship in a period of rather disruptive changes can be found in the area of Kaliningrad (Fritsch et al. 2019a). The Kaliningrad region was Ger-

man territory until the end of the Second World War (WW II), and then became part of Russia with a socialist planned economy where any form of private economic activity was illegal until the economic reforms in the early 1990s. After WW II the Russian authorities completely expelled the original German population of Kaliningrad and replaced them with people from other regions of the Soviet Union. These changes of the political and economic regime, as well as heavy destructions during the war, rule out that persistence of entrepreneurship is driven by sticky regional characteristics. Furthermore, the complete exchange of the original regional population after WW II excludes that persistence of regional entrepreneurship was due to a transfer of entrepreneurial values, attitudes, and abilities across generations, from parents to their offspring. Fritsch et al. (2019a) suggest that the reemergence of entrepreneurship in the Kaliningrad region after the dissolution of the Soviet Union may be explained by a collective memory of successful entrepreneurial activity in the past that led people to consider entrepreneurship as a viable economic activity (Olick, Vinitzky-Seroussi & Levy 2011). This memory emerged among the new population of the Kaliningrad area that came from other regions of the Soviet Union.

The empirical setting of this paper refers to entrepreneurial activity in Poland, a country whose regions experienced rather different types of disruptions of their economic, social, and political environment and an interesting case to study the persistence of entrepreneurship. During the Polish partitions between 1772 and 1918 Russia and Austria-Hungary ruled the central and the eastern part of the country while Germany administered the northern and the western part. The western part and many regions in the north remained German until the end of WW II in 1945. In the aftermath of the war, the German population in this area was expelled and replaced by people from other parts of Poland, including the former Polish territories that after WW II became Russian, the so-called *Kresy* territories. Beginning in 1945, the country experienced more than forty years of state-mandated socialism, followed by a rapid transition to a market-based economic system in the 1990s, and finally accession to the European Union in 2004. In a nutshell, Poland consists of areas where, like in Kaliningrad, an

exchange of the local population took place, and areas where the population base remained stable. Thus, we can analyze whether persistence of entrepreneurship requires the persistence of population and, hence, opportunities for the intergenerational transmission of values and traditions. We can also learn whether persistence is necessarily stronger in areas where such cultural transmission was possible.

We find persistence of entrepreneurship in that part of the country that remained Germany until 1945, but no significantly positive effect of historical entrepreneurship in most of the other regions. We conjecture that, as in the case of Kaliningrad where the original German population was replaced after the war (Fritsch et al. 2019a), the persistence of entrepreneurship in the former German part of Poland may be explained by the collective memory of successful entrepreneurship that was emerging among the new Polish population. In line with this thought, our analysis shows that the regional persistence of entrepreneurship can be almost completely explained by the historical success of regions. Our analysis captures this by examining the pre-war level of and self-employment in manufacturing activities, particularly in knowledge-intensive industries, both of which were extremely high in the former German areas. Hence, this historical specialization may have worked as an important conduit for the emergence and transmission of a collective memory about regional entrepreneurship. The pre-war German areas, where the population was replaced, stand in sharp contrast to historically less industrialized pre-war Polish areas, where entrepreneurship did not persist even though there was room for the intergenerational transmission of entrepreneurial values. Thus, our results show that persistence of entrepreneurship does not necessarily require persistence of population. If entrepreneurship was historically successful in a specific region, this reality might be a more important source of persistence of entrepreneurship than persistence of population.

The remainder of the paper is organized as follows. First, we outline how history might shape regional entrepreneurship over time (Section II). We then explain in detail why the case of Poland is of particular interest in

this respect (Section III). Data sources and variables are described in Section IV, and Section V presents the results of the empirical analysis. The final section (Section VI) discusses the empirical evidence with its limitations, and draws conclusions for policy, as well as for further research.

II. How history might shape regional entrepreneurship today

Studies for Germany (Fritsch & Wyrwich 2014; 2017; 2019), the region of Kaliningrad (Fritsch et al. 2019a), and for the UK Fotopoulos & Storey (2017) found pronounced persistence of the regional levels of entrepreneurship over time periods of about one hundred years. This persistence of entrepreneurship is particularly remarkable for territories that experienced several disruptive changes of economic, social, and political framework conditions, such as Germany and the region of Kaliningrad. Such disruptive shocks rule out an explanation of persistence based on more or less unchanged or 'sticky' regional conditions for entrepreneurial activity (Sternberg 2009) that may apply for shorter time periods with relatively stable framework conditions (see Fotopoulos 2014).

An alternative explanation of persistence that may apply for periods with drastically changing framework condition could be the presence of localized externalities, such as: entrepreneurial opportunities created by newcomers, a positive entrepreneurial climate and social learning (Lyons & Berge 2012) emerging from the role model and peer effects of self-employment,² or the presence of an entrepreneurial culture (Andersson & Koster 2011; Fritsch & Wyrwich 2014; 2019). Following North (1994), an entrepreneurial culture can be understood as an informal institution re-

² Role model and peer effects include, for example, the direct transmission of entrepreneurship across generations (Chlosta et al. 2012; Dohmen et al. 2012; Laspita et al. 2012; Lindquist et al. 2015), as well as the particularly pronounced transfer of entrepreneurial abilities and attitudes within smaller firms (Parker 2009).

flected in norms, values, and codes of conduct in a society that favor entrepreneurship.³ Research has shown that these types of informal institutions tend to change much more slowly than formal institutions, and only over rather long periods of time (North 1994; Williamson 2000; Nunn 2009). Therefore, an entrepreneurial culture should, at least to some degree, be independent of changes in the social, political, and economic environment, and may even survive disruptive shocks such as devastating wars and radical transformations of political regimes (North 1994; Williamson 2000).

Based on the case of the Kaliningrad region, Fritsch et al. (2019a) introduce a potential explanation for persistence of entrepreneurship, namely a general awareness of the regional entrepreneurial history. Put differently, a collective memory of the historical experience of entrepreneurship that could have triggered the reemergence of entrepreneurship after a more than 40 years lapse, during which time private economic activity was suppressed by the political regime. They argue that the collective memory may have been induced by knowledge of firms and industries that existed in pre-war times that were obvious to the incoming population in the form of the physical remains of buildings and infrastructures, or known from documents and narratives (Olick, Vinitzky-Seroussi & Levy 2011).⁴ The pre-existing industry and firm size structures may have given the new citizens an indication of the type of economic activity for which the place-specific endowments are particularly suitable. After the dissolution of the Soviet Union, the collective memory of entrepreneurship may have become activated, and encouraged people to start their own companies.

³ Beugelsdijk (2007) understands an entrepreneurial culture “as a positive collective programming of the mind”. A further conceptualization of entrepreneurial culture is to characterize it as an “aggregate psychological trait” (Freytag and Thurik 2007, 123) in the regional population that favors entrepreneurial values such as individualism, independence, and motivation for achievement.

⁴ This knowledge may have been passed on by the expelled German population to the newly arriving Russians, or was documented in statistics and other preserved written documents on the local economy of East Prussia.

III. Why the case of Poland is so interesting

This section provides a brief overview of the recent economic history of Poland. We then derive two hypotheses about persistence of entrepreneurship in Polish regions. The case of Poland analyzed in this paper offers a unique opportunity to examine the above mentioned sources of the persistence of entrepreneurship in a single setting. In particular, it allows us to compare areas where, like in Kaliningrad, an exchange of the local population took place with areas where the population remained. Thus, we can analyze whether the persistence of entrepreneurship requires the persistence of population with the resulting opportunities for the intergenerational transmission of values and traditions.

A. A brief overview of the recent economic history of Poland

The political and social landscape of 18th century Poland was dominated by nobility. As a result, its economy lagged behind many western European countries (Koryś 2018, 15–18). From 1795 until 1918 the Polish state ceased to exist, and the territory that is Poland today was divided among Austria-Hungary, Prussia (which became part of the German Empire founded in 1871), and Russia (see Figure 1). Poland regained sovereignty over parts of its former territories at the end of the First World War (WW I) in 1918, when the Second Republic of Poland was established. Between 1918 and 1945, modern day Poland's territory was divided into a German and a Polish part. At that time, Poland also claimed territories in the east (the *Kresy*) that became part of the Soviet Union after WW II, and are currently part of the Ukraine, Belarus, and Lithuania. It was also after WW II that the former German part was reinstated to Poland.⁵

In the years after WW II, the Germans who lived in the pre-1945 German territories of the country were expelled and replaced by Poles from other parts of pre-war Poland, particularly from the area that became

⁵ In the first years after WW II, the affiliation of the formerly German areas with Poland appeared uncertain. Presumably, as a result of this uncertainty the local population of these areas revealed a relatively strong tendency to invest in intangible human capital (for details, see Becker et al. 2018).

part of the Soviet Union after 1945 (for more details, see Curp 2006).⁶ However, the Polish government allowed Germans who were crucial for economic renewal and development of Polish companies to remain in Poland for a longer period of time, and urged them to teach Poles how to manage their firms. Lack of potential managers among both the remaining Polish population, and repatriates, made it necessary to attract such people from other parts of the country (Kacprzak 2010).

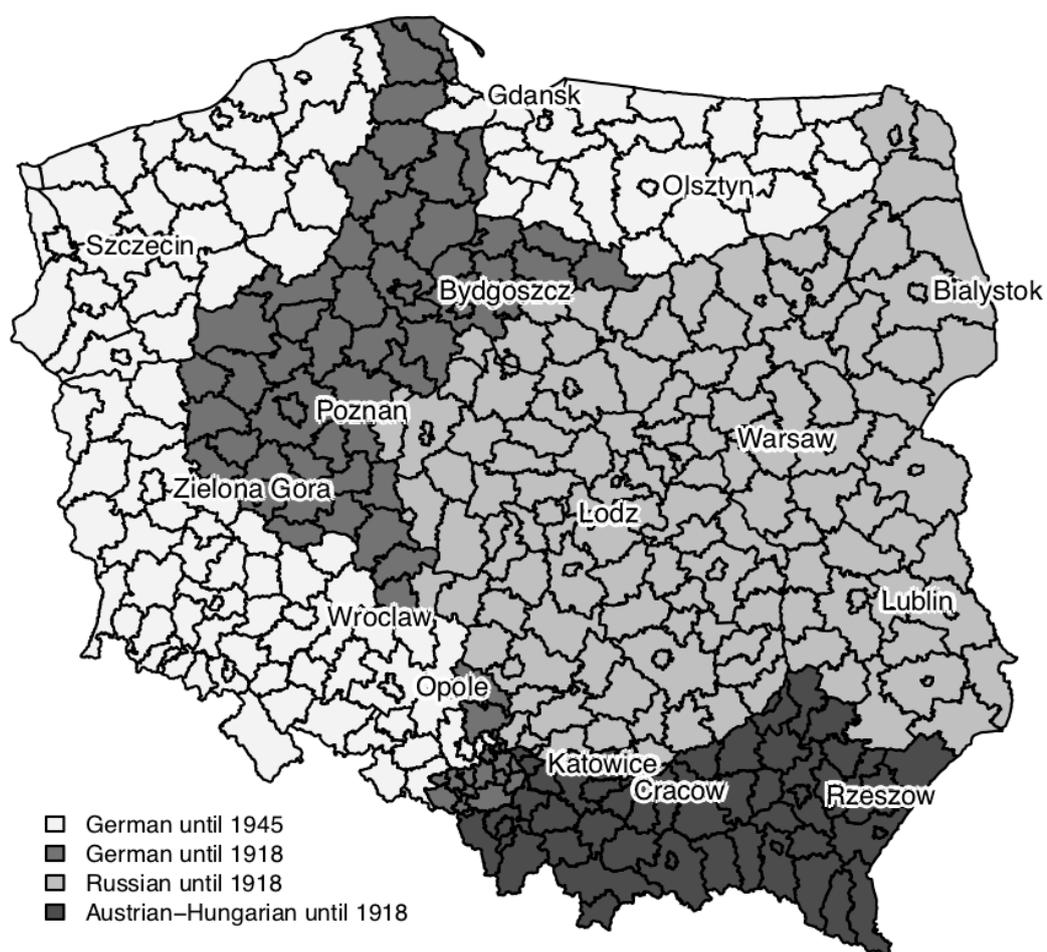


Figure 1: Affiliation of current counties of Poland to Prussia, Russia and Austria-Hungary between 1815 and 1945

Note: Some counties of Upper Silesia were incorporated into the territory of Poland after three Polish uprisings in the period between 1919–1921.

⁶ In 1950 only 19.6% of the population in the pre-1945 German areas were indigenous, while 49.1% were displaced from other regions of post-war Poland and 29.5% were repatriates and returnees, mostly (86.1%) from former Polish territory (Kosiński 1963, 47, 61).

There are tremendous differences between Polish regions with respect to the levels of entrepreneurship, industrialization, and economic development. In the southeastern part that was German until 1945 (Silesia), private sector self-employment flourished until WW II fueled by rapid industrialization, high levels of innovation activity, and a relatively well-developed education system (Geiss 2013, 32–34; Kouli, 2014). In contrast, the economic structure of the northeastern part of the pre-1945 German territory was dominated by large-scale farming, often by landowners who hailed from the noble class. The northeastern part lagged behind the southern part both economically and technologically, had lower living standard and was characterized by higher levels of out-migration (Kokot 1959; Tipton 1974; Pierenkemper 1979).

Before WW II economic activity in many small towns of the former German territory along the border with Poland was significantly nourished by the presence of military forces. Due to their strategic positions, these areas also benefited from relatively high levels of infrastructure investments. Significant parts of German communication and transport infrastructure (12.4%), including 18% of state long distance roads (*Reichsstrassen*), were located in the territories that fell to Poland after WW II (Kokot 1959, 207–209).

Those parts of Poland that belonged to Russia and Austria-Hungary before WW I were characterized by general economic backwardness, which coincided with a permanent lack of capital and low levels of private investments (Sawicki & Sawicka-Brockie 1982), factors that severely hampered any attempts of industrialization. The education level of the workforce in these regions was considerably lower than in the German part. The economy in these regions was dominated by agriculture with a few industrial centers, such as steel and textile industries around Lodz and Biaystok, or oil industry around Boryslaw and in the Carpathians region (Koryś 2018). After WW I the newly established Polish state showed a pronounced tendency to take over private firms, particularly those who had

economic problems after the Great Depression of the late 1920s (Maciejaja 2001).

With the switch to a socialist regime after WW II large parts of the Polish economy were nationalized and were subjected to a planned economic system. During the socialist period that lasted until 1990, self-employment was not illegal as in the Soviet Union (Gerber 2004, 277), but it became highly regulated and was fraught with challenges caused by arbitrary laws and state despotism (Åslund, 1985). After the re-introduction of a market economic system, there was a tremendous blossoming of self-employment leading to 1.3 million self-employed people in 1995, which counts for 9% of total employment (Rutkowski 2018, 48). The number of self-employed people stabilized at 1.33 million in 2002 (13.8% of total employment), and reached 1.52 million in 2011 (11.3% of total employment), a level that was rather similar to post-socialist East Germany (Fritsch et al. 2014).

Summarizing, we can say that the different parts of Poland experienced various disruptive shocks of the socio-economic conditions including war time destruction, four decades of socialism, and a rather radical transition to a market economy. Although these regions all have the same formal institutions and political framework conditions today, there are significant differences with regard to their histories.

B. Hypotheses

Generally, more than forty years of a socialist regime in Poland (from 1945 until 1990) should have left traces that hampered the persistence of entrepreneurship. The examples of East Germany and particularly the case of Kaliningrad demonstrate, however, that entrepreneurship can survive such a period and re-emerge along historical lines (Fritsch et al. 2014; Fritsch and Wyrwich 2014, 2019; Fritsch et al. 2019a). If we find persistence in the former German part, where large parts of the original population was exchanged after WW II, it may be driven by a collective memory of entrepreneurship that was activated during the period of transformation to a market economy in the 1990s, similar to the case of Kaliningrad (Fritsch et

al. 2019a). If we should find persistence in the other parts of Poland, it could also be driven by the intergenerational transmission of an entrepreneurial culture as an additional source (Andersson & Koster 2011; Bosma et al. 2012; Minniti 2005; Nanda & Sorensen 2010). Based on the empirical evidence from previous studies, we expect:

Hypothesis I: Historical levels of regional self-employment are positively related to current levels of start-up activity in Poland.

In a study for Germany, Fritsch et al. (2019b) found that marginal forms of historical self-employment (e.g. homeworking) and self-employment in agriculture are statistically unrelated to future entrepreneurship in a region. The authors argue that marginal forms of self-employment are unlikely to drive the self-perpetuation of entrepreneurship over time because they are often characterized by a low degree of self-determination and do not represent economic success that is likely to induce strong role model and peer effects. Self-employment in agriculture represents a rather special case for several reasons. First, in the early 20th century, farms in Germany and Poland consisted almost entirely of family businesses that were passed down by customs of inheritance. Hence, hardly any farm owner had to experience the risky process of founding and establishing his or her business. Second, since growth of farms was limited by available acreage, expansion played a rather minor role, if any. As a result, self-employment in agriculture is unlikely to generate strong entrepreneurial role model and peer effects that may induce start-ups outside the agricultural sector (for details, see Fritsch and Wyrwich 2017, 2019). Based on these considerations we consider only the influence of non-agricultural self-employment for testing hypothesis I.⁷

Compared to agriculture, self-employment in non-agricultural parts of the economy is much more strongly related to economic success in terms of firm size and the income of the entrepreneur (Sorgner, Fritsch and Kritikos 2017). This should especially be the case for self-employment

⁷ Another reason for the omission of agriculture is that this sector was often subject to special regulations that considerably impaired the effect of market forces in this sector.

in manufacturing, where firms tend to be considerably larger than in the service sector. Hence, when compared to less developed areas, well developed industrialized areas have more historical examples of successful entrepreneurs that create additional entrepreneurial opportunities and can serve as role models for entrepreneurship. Hence, we expect:

Hypothesis II: The impact of historical levels of self-employment on current start-up activity is more pronounced in areas with a historically high degree of manufacturing activities.

Taken together, we expect that there is a persistence of regional entrepreneurship in Poland, and that this persistence of entrepreneurship is more pronounced in regions with historically high levels of industrialization. Since the former German part of Poland was much more industrialized and economically developed than the rest of the country (see section IIIA), the historical economic structure of the former German part may have been particularly conducive to a persistence of entrepreneurship. In contrast to this argument, the replacement of the original German population after 1945 impeded an intergenerational transmission of entrepreneurial values, which could imply lower levels of persistence. Altogether, we have no firm hypothesis on whether the persistence of entrepreneurship is weaker or stronger in the former German areas when compared to the rest of Poland. However, we can test whether the persistence of entrepreneurship requires the persistence of population with concomitant opportunities for the intergenerational transmission of values and traditions, or whether the historical success of entrepreneurship as such is sufficient, if not a necessary condition for persistence.

IV. Data sources and variables

A. Main variables of interest

This paper adopts a historical perspective specific to the various territories that make-up Poland today to investigate the persistence of entrepreneurship. We measure current entrepreneurial activity by the start-up rate according to the labor approach (Equation 1). That is, we divide the number

of new businesses in the private sector by the number of employees in the non-agricultural private sector (Audretsch & Fritsch 1994). In order to avoid interferences of short-term and stochastic effects, we use the average start-up rate over a longer period of time. The longest time series of available data on start-ups covers a period of 15 year (2003–2017), and is provided by Statistics Poland (GUS). Information on the number of persons employed in the non-agricultural private sector is available for the years 2002 and 2011. We use the information on employment for the year 2011 (EMP_{2011}) because it is in the middle of the observation period. Hence, the current start-up rate ($CURR_SUR$) is

$$CURR_SUR = \frac{\frac{1}{n} \sum_{i=1}^n N_{CURR_SURi}}{EMP_{2011}}, n \in \{2003, \dots, 2017\} \quad (1)$$

where N_{CURR_SURi} is the number of newly registered private sector establishments in year i . Since registration is mandatory in Poland for both self-employed persons and commercial legal companies, the indicator should reliably reflect the level of new business formation.⁸ New branch plants are generally not included in the number of start-ups unless they have a separate VAT number.

We rely on two different data sources for constructing our historical variables. The historical data for the former German regions is based on the full population and occupation censuses (*Volks- und Berufszählungen*) conducted on June 16, 1925 (Statistik des Deutschen Reichs 1927). The census comprises an industry/occupation stratification that provides information on the number of people working in 26 industries, divided into self-employed and paid employees. The historical data for Poland is based on the first dwellings, population and occupation census conducted on September 30, 1921 (GUS 1927), and covered the entire Polish territory of

⁸ The register also contains some micro-firms that never take up any significant commercial activity. There is, however, no indication that the share of these firms varies across regions.

that time.⁹ This census provides information on the number of self-employed persons and paid employees, and includes 43 industries. Both the German and the Polish censuses cover the complete universe of population and establishments in their respective countries. Because the censuses have been conducted in quite similar ways, the data are highly comparable. Both censuses provide information at the NUTS 3 (county) level.¹⁰ Since the historical borders of the counties differ considerably from the current ones, we transformed the data into current NUTS 3 regions using Geographical Information Systems software (ArcGIS and QGIS). Definitions of industries have been harmonized so that the joint data set that is based on both censuses provides information on 22 industries.

Because information on historical levels of new business formation is not available, we follow previous studies (e.g. Fotopolous & Storey 2017; Fritsch & Wyrwich 2014) by using the self-employment rate to capture the entrepreneurial tradition. The self-employment rate reflects the share of historical entrepreneurial role models, but also the historical conditions for running an own business. The historical self-employment rate is measured as the number of self-employed (both employing and not employing additional workers, but without helping family members) excluding homeworkers and self-employed in agriculture, forestry, fishery, and the public sector divided by the total number of economically active persons (including unemployed persons).

To test Hypothesis II we distinguish between areas that had an above- and a below-median level of industrialization (share of manufacturing employment) in the early 1920s. We expect that historical entrepreneurship is only positively associated with current entrepreneurship when

⁹ There are some few regions where historical self-employment rates are not available: (1) The Free City of Danzig that was a semi-autonomous city-state under the protection of the League of Nations, and thus, did neither belong to Germany nor Poland at that time; (2) some Upper Silesian counties incorporated into the territory of Poland after three Polish uprisings in the years 1919–1921 were not included in the Polish Census in 1921 nor the German Census in 1925.

¹⁰ NUTS (Nomenclature des unités territoriales statistiques) is a standard for referencing the subdivisions.

the share of manufacturing employment is above the median level. As an additional test of Hypothesis II, we introduce the share of self-employed in knowledge-intensive manufacturing industries¹¹ divided by the economically active persons in the region as a measure for successful entrepreneurship in the early 1920s. The idea behind this measure is that running a firm in knowledge-intensive manufacturing industries requires a highly qualified founder. Moreover, such firms may be, on average, more innovative than firms in other parts of the manufacturing sector and, hence, faced with more risk.

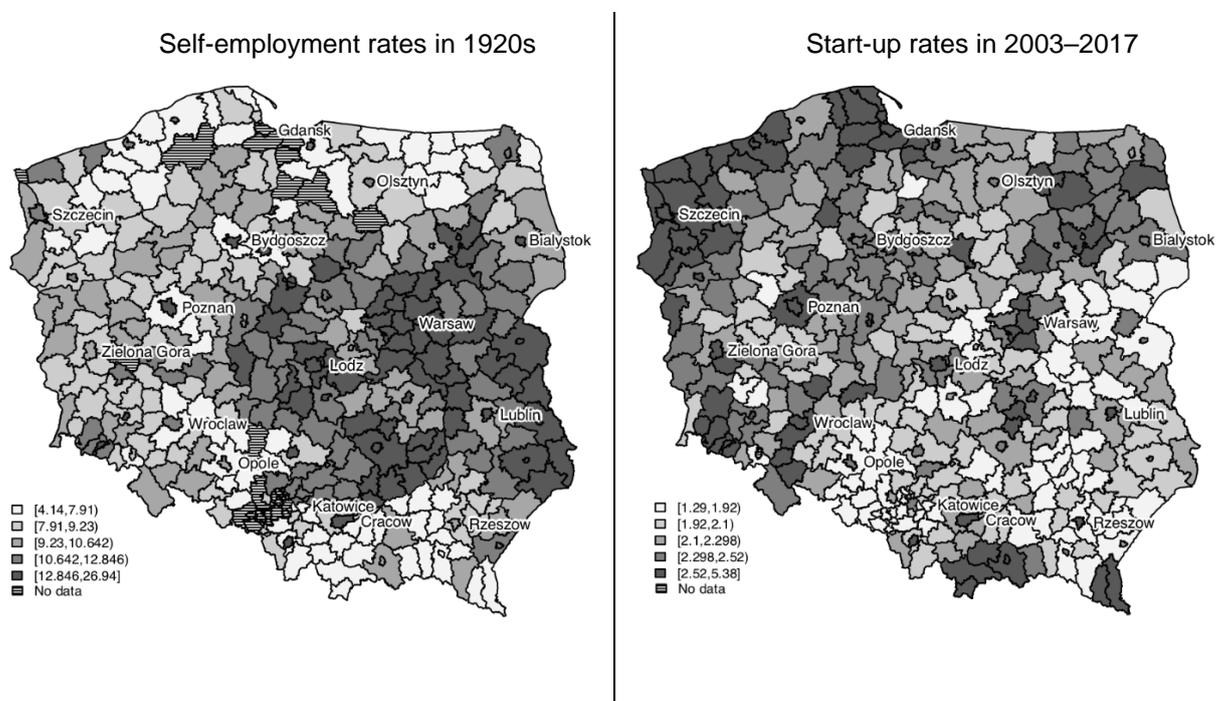


Figure 2: Self-employment rates in the 1920s (left) and start-up rates in 2003–2017 (right), non-agricultural sector only

Figure 2 presents both the historical self-employment and current start-up rates. It shows that in the 1920s entrepreneurial activity was particularly concentrated in and around the cities of Warsaw, Lodz, Kielce,

¹¹ The following industries are classified as knowledge-intensive: manufacture of machinery and electro-technical equipment; manufacture of basic precious metals, watches and clocks and precision instruments; manufacture of chemicals and chemical products.

and Lublin. In contrast, self-employment rates in the former German territories were rather moderate, reflecting larger average firm size that may be regarded an indication of higher economic success. At the outset of the 21st century, the pattern of start-up rates is rather different from the regional distribution of historical self-employment. The highest rates can be found in the western and northern parts of Poland, while the lowest levels can be seen in the central, eastern and southern parts. Examples for regions with relatively low levels of both historical and current entrepreneurship are Upper Silesia (the south-eastern part of the former German territory with Opole and Katowice), Rzeszow, and the northern part of the Krakow region.

B. Control variables

Based on the two historical periods to be compared, we consider two groups of control variables: the pre-war period of the 1920s, and the most recent years. The first group of variables includes population density in the 1920s as a “catch-all” variable covering several regional characteristics that could influence the level of entrepreneurship, such as urbanization economies that might facilitate demonstration effects of entrepreneurship learning (see for example, Andersson & Koster 2011, Fotopoulos 2014, Fritsch et al. 2018b). We use the historical population density and not the current level to avoid any distortions that may emerge if entrepreneurial activity in the 1920s has caused tendencies of agglomeration that resulted in high population density today.

Apart from urbanization economies, according to the knowledge spillover theory of entrepreneurship (Acs et al. 2009; Acs, Audretsch & Lehmann 2013) it is plausible to expect that the level of entrepreneurship is shaped by the available knowledge and access to higher education. Thus, we also include into the model the distance to the nearest university in the 1920s. The rationale behind this variable is that knowledge spillovers are limited in space. Since Stuetzer et al. (2016) found a significant relationship between the level of entrepreneurship and the geographic distance to coal mines (low levels of entrepreneurship in and close to coal

mining regions), we include the distance of a county to the nearest coalfield in the 1920s. The information of coalfields are taken from Atlas Chatel et Dollfus (1931).

To account for industry structure we introduce the share of people working in manufacturing industries in the total number of the working population in the 1920s.¹² We also distinguish between areas with an above-median level of manufacturing in the 1920s in order to test the conjecture that the persistence of entrepreneurship is higher in industrialized areas where a relatively large part of the entrepreneurial activity is in the non-agricultural sector. We use the share of people working in knowledge-intensive manufacturing industries in the total number of working population as a control variable in the models where we employ the number of self-employed in knowledge-intensive manufacturing industries over the economically active population. For additional robustness checks, we also employ the share of people working in non-agricultural industries.

We control for an effect of regional shifts of population after WW II on the persistence of regional entrepreneurship with several variables.¹³ First we consider the share of the indigenous population, i.e., the share of the total regional population in 1950 that already lived in the same Voivodeship (NUTS 2) in 1939. To capture interregional migration, we introduce the share of repatriates from former Polish territories that became part of Russia after WW II (mostly from *Kresy*) in the total population of the year 1950, as well as the share of population that in-migrated from other regions of today's Poland. Moreover, we consider the share of repatriates and re-immigrants from other countries in the total population of 1950. The

¹² We use the historical industry structure instead of the current industry structure in order to rule out an effect of the current structure on the level of current new business formation. A relationship between the historical industry structure and the level of start-ups today can, however, be expected if the current and the historical structures are related.

¹³ Data on migration and the place of residence in August 1939 comes from the census of December 3, 1950 (GUS 1955).

distance to the current German border is supposed to control for unobserved heterogeneity related to the new spatial organization of post-war Poland and Germany.

Data on the historical controls are taken from the German and the Polish censuses. Data on the locations of universities in Poland in the mid-1920s come from the statistical yearbook of Poland (GUS 1923, p. 292). Information on the location of historical German universities is from *Deutsche Hochschulstatistik* (1929).

We include dummy variables that represent the historical heritage referring to two periods of Polish history. The first set of dummy variables covers the years after the Congress of Vienna in 1815 until the end of WW I in 1918. At that time, the territory of Poland was divided between Germany, Russia and Austria-Hungary. The second period covers the years 1918–1945 when after WW I, Poland regained its independence. Thus, we have four groups of regions (see Figure 1). If a region was German until 1945, the respective dummy variable assumes the value of 1 (0 otherwise). Similar dummies are defined for regions that were German until 1918 and became Polish thereafter, for regions that formerly belonged to Austria-Hungary, and for those regions that were Russian until 1918.

Table A.1 in the Appendix summarizes the main variables of interest and the two groups of control variables with their definitions and sources. Table A.2 provides descriptive statistics for four parts of Poland with different political heritages. Table A.3 depicts correlations between variables. The descriptive statistics show quite remarkable differences between those areas that were German until 1945 and the rest of Poland. In the 1920s the share of people working in non-agricultural industries in the regions that belonged to Germany until 1945 is more than twice as high than in that part that was German until 1918 (55% and 25% respectively). Similarly, the share of people working in manufacturing industries in the pre-WW II German territories is twice as high (16%) as in other areas (6.3–8.5%).

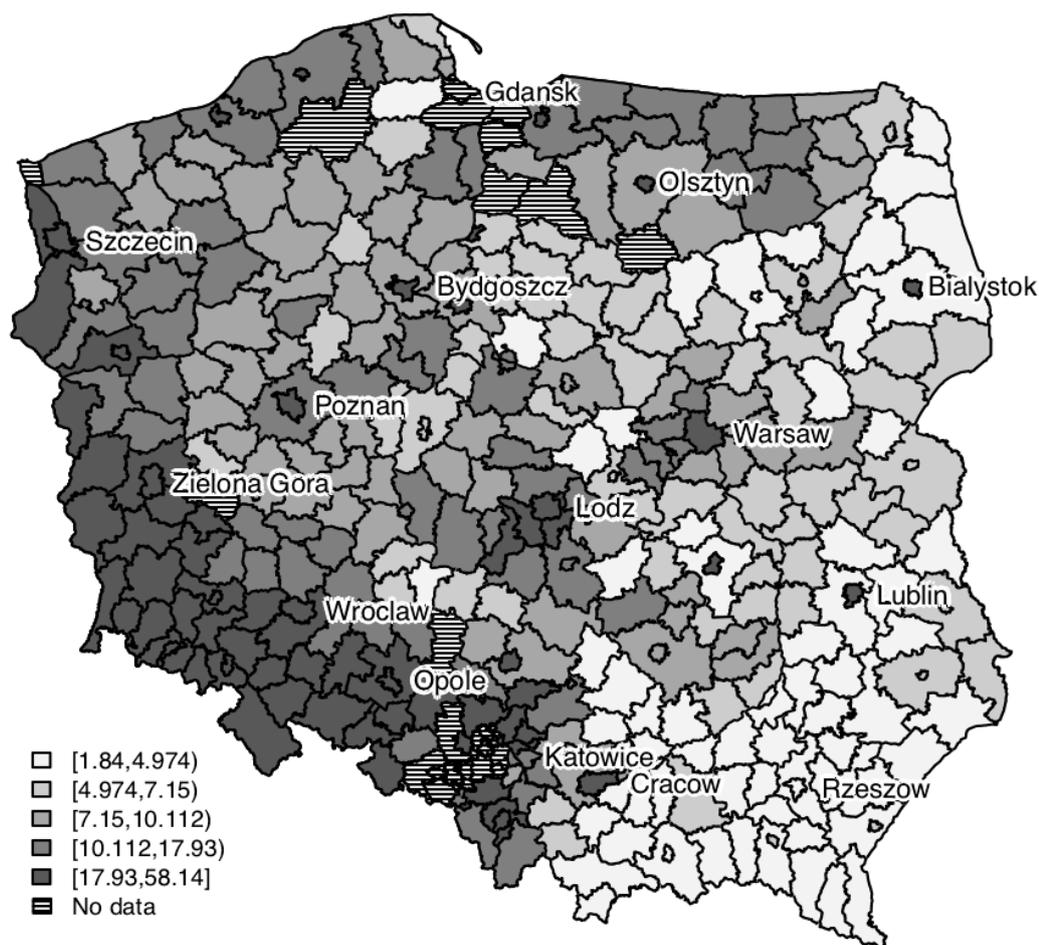


Figure 3: The share of people employed in manufacturing industries in the total working population (including agriculture) in the 1920s

In the area that was German until 1945, only 16.5% of the population in 1950 had already lived there before WW II. This is obviously a result of the expulsion of Germans after the war. In the other parts of Poland, the share of the population in 1950 that lived in the region before WW II reached levels between 84% and 92%. Half of the new population in the former German regions came from other parts of the current Polish territory, and every third inhabitant of this area came from former Polish areas that fell to the USSR after WW II. About 2.5% came from other countries (Table A.2).

The average current start-up rates are rather similar in the different parts that we differentiate based on their political heritage, ranging from 2.1% in the former Austrian area to 2.4% in the regions that were German

until 1945. Historical self-employment rates are also quite similar in the regions that were formerly German (until 1918 or 1945) and Austrian (8.6%, 8.1% and 8.1% respectively). However, in the area that was Russian until 1918 the rate is much higher (12.4%).

V. Results of the empirical analysis

A. Main results

The baseline results of our analysis of the effect of historical self-employment levels on current start-up activity are presented in Table 1. In Model 1 we only consider the self-employment rate in the early 1920s as our independent variable and find no significant effect. In Models 2-6 we include dummy variables for the political heritage of the regions. First, we consider a dummy variable indicating areas that were part of Germany until 1945 (Model 2). In Model 3, we include additional dummies for areas that were part of Germany until the end of WW I, and for areas that belonged to the Russian Empire until 1918. According to our estimates, there is a significantly positive effect only for former pre-1945 German areas. Apparently, having been part of the Russian Empire in the early 20th century has no significantly different effect on current start-up rates than having belonged to Austria-Hungary, which is the reference category.

The results of Model 2 and 3 may be largely explained by socio-economic differences that date back to the 1920s in the four areas. Controlling for the basic factors at that time in Model 4, namely population density, the share of manufacturing employment, distance to the nearest university and distance to the nearest coalfield, leads to drastic changes in the size and the directions of the coefficients for the political heritage dummies. The same applies when introducing controls for migration after WW II in Models 5 and 6. In particular, the historical self-employment rate is insignificant when controlling for historical conditions before WW II (Models 4–6).

Table 1: Differences in start-up rates across Polish counties 2003–2017:
The role of political heritage

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---------------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate | 0.019 (0.033) | 0.080** (0.034) | 0.130*** (0.042) | 0.029 (0.051) | -0.009 (0.050) | -0.071 (0.045) |
| German until 1945 | | 0.110*** (0.022) | 0.112*** (0.029) | 0.017 (0.043) | -0.153** (0.061) | -0.167*** (0.054) |
| German until 1918 | | | 0.048 (0.033) | -0.021 (0.035) | -0.019 (0.035) | |
| Russian until 1918 | | | -0.036 (0.033) | -0.093*** (0.034) | -0.096*** (0.035) | |
| Austrian until 1918 | | | Reference | | | |
| Population density 1920s | | | | -0.005 (0.008) | -0.004 (0.007) | 0.001 (0.007) |
| Share of manufacturing 1920s | | | | 0.078*** (0.025) | 0.069*** (0.024) | 0.069*** (0.023) |
| Distance to nearest university 1920s | | | | -0.017 (0.012) | -0.025** (0.011) | -0.022* (0.011) |
| Distance to nearest coal-field 1920s | | | | 0.045*** (0.007) | 0.047*** (0.007) | 0.044*** (0.007) |
| Distance to current German border | | | | | -0.009 (0.013) | -0.008 (0.013) |
| Share of migrants central Poland 1950 | | | Reference | | | |
| Share of indigenous population 1950 | | | | | -0.103*** (0.021) | -0.095*** (0.021) |
| Share of migrants Russia 1950 | | | | | -0.018 (0.019) | 0.0002 (0.018) |
| Share of migrants other 1950 | | | | | -0.014 (0.017) | -0.001 (0.017) |
| Constant | -3.763*** (0.077) | -3.654*** (0.078) | -3.533*** (0.109) | -3.616*** (0.128) | -3.200*** (0.141) | -3.450*** (0.112) |
| Number of observations | 352 | 352 | 352 | 352 | 352 | 352 |
| Adjusted R ² | -0.002 | 0.064 | 0.082 | 0.173 | 0.266 | 0.251 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. Historical self-employment, share of manufacturing, and distances are for 1921 (Poland) and 1925 (Germany) respectively. Population shares are for 1950. All independent variables except dummies are in logs. Robust standard errors are shown in parentheses. ***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.

Models 4, 5 and 6 show a positive relationship between the historical level of manufacturing employment and start-up activity today. This is an unexpected pattern, because manufacturing industries have a larger minimum efficient size and higher entry barriers. Therefore, regions specialized in manufacturing should have lower start-up rates (e.g., Geroski 1995; Fritsch & Falck 2007). Apparently, industrialized regions are characterized by low levels of entrepreneurship in the 1920s (see Figure 2), but large shares of manufacturing employment in these regions indicate economic success as an outcome of entrepreneurial initiative. This economic

success might have triggered a collective memory about profitable historical entrepreneurship that positively affects current start-up rates.

Somewhat surprisingly, population density is not significantly related to start-up rates today. Running models where we either drop population density or the employment share in manufacturing does not lead to considerable changes of the coefficient estimates. Thus, the insignificance of population density is not due to the considerable correlation with the historical level of manufacturing employment (corr = 0.6, see Table A.3 in the Appendix). In line with previous research (Stuetzer et al. 2016), we find a positive relationship between geographic distance to coalfields and entrepreneurship today indicating that the coal mining regions have low levels of new business formation. Distance to historical universities is not robustly related to current entrepreneurship rates. This finding is in contrast with results for contemporaneous Germany (Fritsch & Wyrwich 2018).

In Models 5 and 6, we introduce controls for the period after WW II regarding the distance to the current German border and our proxies for migration patterns. The share of the indigenous population is negatively related to start-up activity today. The other migration variables are insignificant, as is geographic distance to the current German border. It should be kept in mind that this distance variable is, by definition, highly correlated with the heritage dummies as well as with the share of the indigenous population. Actually, the “horse race” between the correlated variables for heritage, distance to the current German border, and the share of indigenous population indicates that the latter is a dominating factor for explaining spatial variation in contemporaneous start-up activity.¹⁴ The results of Models 5 and 6 for the historical employment share in manufacturing, distance to the nearest university, and the distance to the nearest coalfield confirm the findings from previous models.

¹⁴ The weakly significant negative coefficient for areas being part of Germany until 1945 should not be overstressed given the correlation with the share of the indigenous population and the distance to the current German border.

Summarizing the findings attained so far, we can say that there are no specific heritage effects of historical self-employment on current levels of new business formation when controlling for economic conditions in the 1920s.¹⁵ This is in contrast to Hypothesis I, but does not mean that history is unimportant, since the historical controls indicate significant effects. The positive sign for the historical specialization in manufacturing lays the foundations for testing Hypothesis II in more detail. Before doing so, we want to confirm whether or not the effect of an entrepreneurial tradition is moderated by the political heritage of the regions.

Table 2 investigates the differential effect of historical self-employment on current start-up rates in areas that share a German history until 1945. To this end, we interact the historical self-employment rates with the respective heritage dummy. In this type of dummy-continuous interaction, the constituting heritage dummy variable cannot be reasonably interpreted for itself (for details, see Brambor, Clark & Golder 2006). The interpretation for self-employment rates that we are interested in is more convenient. The interaction terms with the dummy variable for being part of Germany until 1945 measures the effect of a variable on current start-up activity in the pre-1945 German areas, while the respective constitutive term indicates the effect of this variable in all other current Polish regions.

The results on the effect of historical self-employment in the models of Table 2 are quite remarkable. For the regions that were already part of Poland before 1945, we find the same pattern as in Table 1. Namely, there is no significantly positive effect of the historical self-employment rate on current levels of new business formation. We find, however, a robust positive effect for the pre-1945 German areas across all the models of Table 2.

¹⁵ At the same time, regional differences in the 1920s might be an outcome of different historical developments during the Polish partitions since the late 18th century.

Table 2: Differences in start-up rates across Polish counties 2003–2017:
The role of being German until 1945

| | (1) | (2) | (3) | (4) | (5) |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate | 0.030 (0.036) | 0.060 (0.047) | -0.045 (0.054) | -0.075 (0.055) | -0.047 (0.054) |
| German until 1945 | 0.981*** (0.239) | 0.925*** (0.254) | 0.978*** (0.247) | 1.166*** (0.443) | -1.369 (1.075) |
| German until 1918 | | 0.058* (0.032) | -0.011 (0.035) | -0.015 (0.035) | -0.128*** (0.049) |
| Russian until 1918 | | -0.006 (0.034) | -0.064* (0.035) | -0.056 (0.035) | -0.108*** (0.039) |
| Austrian until 1918 | | | Reference | | |
| Population density 1920s | | | -0.009 (0.007) | -0.006 (0.008) | -0.008 (0.007) |
| Share of manufacturing 1920s | | | 0.074*** (0.024) | 0.082*** (0.027) | 0.074*** (0.027) |
| Distance to nearest university 1920s | | | -0.023** (0.011) | -0.039*** (0.013) | -0.027** (0.013) |
| Distance to nearest coalfield 1920s | | | 0.047*** (0.007) | 0.049*** (0.009) | 0.039*** (0.009) |
| Distance to current German border | | | | | -0.100** (0.041) |
| Share of migrants central Poland 1950 | | | Reference | | |
| Share of indigenous population 1950 | | | | | -0.560*** (0.151) |
| Share of migrants Russia 1950 | | | | | -0.004 (0.021) |
| Share of migrants other 1950 | | | | | -0.050** (0.023) |
| German until 1945 x historical self-employment rate | 0.360*** (0.098) | 0.330*** (0.102) | 0.386*** (0.098) | 0.536*** (0.130) | 0.321** (0.131) |
| German until 1945 x population density 1920s | | | | -0.035 (0.033) | 0.002 (0.037) |
| German until 1945 x share of manufacturing 1920s | | | | -0.021 (0.065) | -0.054 (0.069) |
| German until 1945 x distance to nearest university 1920s | | | | 0.069** (0.029) | 0.056 (0.035) |
| German until 1945 x distance to nearest coalfield 1920s | | | | -0.005 (0.014) | 0.001 (0.015) |
| German until 1945 x distance to current German border | | | | | 0.104** (0.044) |
| German until 1945 x share of indigenous population 1950 | | | | | 0.438*** (0.155) |
| German until 1945 x share of immigrants Russia 1950 | | | | | -0.312*** (0.102) |
| German until 1945 x share of immigrants other 1950 | | | | | 0.110** (0.049) |
| Constant | -3.765*** (0.082) | -3.709*** (0.121) | -3.781*** (0.132) | -3.790*** (0.132) | -0.659 (0.790) |
| Number of observations | 352 | 352 | 352 | 352 | 352 |
| Adjusted R ² | 0.096 | 0.106 | 0.206 | 0.232 | 0.333 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. All independent variables except dummies are in logs. Robust standard errors are shown in parentheses.

***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.

Thus, there is pronounced persistence of entrepreneurship in those former German areas that became part of Poland after 1945. This is astonishing given the replacement of the entire German population after WW II that largely rules out an intergenerational transmission of entrepreneurship culture as a source of persistence in these regions.

The significantly positive coefficient for the former German areas also remains robust when interacting other historical controls with the German heritage dummy (Models 4 and 5). The results show that the historical share of manufacturing has a positive and significant effect on current start-up activity regardless of the political heritage. Similarly, distance to coal mines is positively related to current start-up activity in all Polish regions. Proximity to universities is positively related to today's levels of start-ups in all regions except for the pre-1945 German regions. As in the models of Table 1, population density is insignificant regardless the political heritage.

In accordance with Model 5, the interaction term of the heritage dummy with the share of the indigenous population is positive and statistically significant (0.438), albeit the value of the respective coefficient is lower than that for the main effect of the indigenous population in other areas (-0.56). This indicates that the overall effect in pre-1945-German areas is still negative (-0.122). It is rather remarkable that the share of Poles who migrated from areas that became part of the USSR after WW II and settled in other areas of modern day Poland has a significantly negative effect on current levels of new business formation in the pre-1945-German areas, while it is insignificant in other Polish areas.

The negative coefficients of the shares of the indigenous population, of immigrants from areas that became part the Soviet Union after WW II, as well as for immigrants from outside Poland for pre-1945 German areas (Table 2) imply that the reference group, namely the share of people that moved from Central Poland (pre-1945 Polish territories that were still Polish in 1950) to the region is positively related to new business formation today. One explanation for this pattern could be that many of

these migrants had entrepreneurial mindsets and values that were transferred across generations yielding higher start-up rates after the breakdown of communism. Since areas in Central Poland had the highest self-employment rates in the 1920s (Figure 2), the migration of people with an entrepreneurial mindset from these regions could be regarded as a spillover effect of entrepreneurial tradition.

Taking the results of Tables 1 and 2 together, it is remarkable that there is no persistence of entrepreneurship in those areas of Poland that did not belong to Germany until 1945. It is also remarkable that the positive effect of historical industrialization (employment share of manufacturing in the 1920s) is robust and statistically significant regardless of the historical political heritage.

In the models of Table 3, we consider interactions between all the other heritage dummies and historical self-employment, as well as interactions between the heritage dummies and the control variables for socioeconomic conditions in the 1920s. Note that in these models the coefficients for the non-interacted historical self-employment rates and control variables capture the effect for the pre-1945 German areas, and turns out to be significantly positive. In contrast, nearly all of the coefficients for the interactions between the other heritage dummies and the level of historical self-employment have significantly negative values. In total, the negative coefficients of the interactions are about the same size as the positive main effect for pre-1945 German areas. This means that the overall effect for historical self-employment in former Austrian, Russian and the pre-1918 German areas is close to zero.

Table 3: Differences in start-up rates across Polish counties 2003–2017:
Political heritage and historical conditions

| | (1) | (2) | (3) | (4) | (5) |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate | 0.390*** (0.091) | 0.341*** (0.094) | 0.461*** (0.116) | 0.274** (0.113) | 0.300*** (0.113) |
| German until 1945 | | | Reference | | |
| German until 1918 | -1.071*** (0.363) | -1.076*** (0.346) | -1.230** (0.530) | -0.417 (1.666) | -0.241 (0.612) |
| Russian until 1918 | -0.794*** (0.260) | -0.973*** (0.258) | -1.079** (0.449) | -0.562 (1.970) | 0.359 (0.640) |
| Austrian until 1918 | -1.113*** (0.310) | -1.064*** (0.303) | -0.859* (0.483) | 38.275** (17.288) | -5.711** (2.415) |
| Population density 1920s | | -0.009 (0.008) | -0.041 (0.032) | -0.006 (0.035) | 0.018 (0.032) |
| Share of manufacturing 1920s | | 0.073*** (0.024) | 0.061 (0.058) | 0.020 (0.060) | -0.018 (0.058) |
| Distance to nearest university 1920s | | -0.022* (0.012) | 0.031 (0.025) | 0.029 (0.031) | 0.027 (0.024) |
| Distance to nearest coalfield 1920s | | 0.046*** (0.007) | 0.044*** (0.010) | 0.040*** (0.011) | 0.040*** (0.010) |
| Distance to current German border | | | | 0.004 (0.014) | -0.025** (0.012) |
| Share of indigenous population 1950 | | | | -0.122*** (0.032) | |
| Share of migrants Russia 1950 | | | | -0.316*** (0.095) | |
| Share of migrants other 1950 | | | | 0.060 (0.041) | |
| Share of migrants central Poland 1950 | | | | | 0.126*** (0.036) |
| German until 1918 x historical self-employment rate | -0.416*** (0.151) | -0.423*** (0.143) | -0.454** (0.183) | -0.237 (0.173) | -0.271 (0.176) |
| German until 1918 x pre-WW II controls | No | No | Yes | Yes | Yes |
| German until 1918 x distance to German border and migrants from the East and abroad | No | No | No | Yes | No |
| German until 1918 x distance to German border and migrants from Central Poland | No | No | No | No | Yes |
| Russian until 1918 x historical self-employment rate | -0.264** (0.111) | -0.354*** (0.108) | -0.496*** (0.138) | -0.326** (0.137) | -0.324** (0.137) |
| Russian until 1918 x pre-WW II controls | No | No | Yes | Yes | Yes |
| Russian until 1918 x distance to German border and migrants from the East and abroad | No | No | No | Yes | No |
| Russian until 1918 with distance to German border and migrants from Central Poland | No | No | No | No | Yes |
| Austrian until 1918 x historical self-employment rate | -0.405*** (0.125) | -0.420*** (0.120) | -0.494*** (0.158) | -0.314* (0.159) | -0.319** (0.157) |
| Austrian until 1918 x pre-WW II controls | No | No | Yes | Yes | Yes |
| Austrian until 1918 x distance to German border and migrants from the East and abroad | No | No | No | Yes | No |
| Austrian until 1918 with distance to German border and migrants from Central Poland | No | No | No | No | Yes |
| Constant | -2.784*** (0.223) | -2.809*** (0.243) | -2.624*** (0.415) | -2.028*** (0.694) | -3.764*** (0.464) |
| Number of observations | 352 | 352 | 352 | 352 | 352 |
| Adjusted R ² | 0.107 | 0.203 | 0.260 | 0.395 | 0.356 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. All independent variables except dummies are in logs. Robust standard errors in parentheses. ***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.

It is also worth mentioning that the results of the regressions shown in Table 3 suggest that the population share of those who migrated to the pre-1945 German territories from Central Poland is positively related to start-up activity (Model 5). As already mentioned with regard to the results in Table 2, this pattern suggests that after WW II there was a selective migration of people to the pre-1945 German regions who had a more entrepreneurial mindset (Model 5), and this may have triggered the reemergence of entrepreneurship beginning in the 1990s.

B. The role of historical industrialization

The previous results showed that the historical share of manufacturing is positively related to start-up activity today (see Tables 1–3). This is remarkable since specialization in manufacturing implies low entry rates due to relatively high entry barriers resulting from comparatively large minimum efficient size and, thus, low levels of self-employment (e.g., Geroski 1995; Fritsch & Falck 2007) as we found for the 1920s (see Figure 2). Historical specialization in manufacturing may, however, also indicate that an area was economically well developed with high levels of per capita GDP (Koryś 2018). Hence, if entrepreneurship was a main source of wealth in the industrialized regions then it can be regarded as successful and, therefore, more likely to trigger a positive attitude towards entrepreneurial activity in the population. This explanation would be in line with the results of Fritsch et al. (2019a) for Kaliningrad where persistence was particularly pronounced in regions and industries where entrepreneurship was economically successful.

Based on these considerations, the non-persistence of the rather high levels of historical entrepreneurship in terms of self-employment that characterized many eastern regions of Poland could be explained by their relatively low degree of industrialization at the outset of the 20th century. This conjecture implies that historical entrepreneurship in the non-manufacturing sector did not trigger a self-perpetuating entrepreneurial culture.

Results of separate regressions for regions with above- and below-median levels of historical industrialization are consistent with this hypothesis. For regions with an above-median level of manufacturing employment in the 1920s we find a robust and significantly positive effect of historical self-employment rates on average start-up activity today (Table 4). In these regions the interaction effect of the historical self-employment rate with a dummy indicating pre-1945 German areas is only statistically significant in some of the models and attains only the 5% percent level of statistical significance in Model 4. This pattern may well be explained by the observation that nearly all regions that were German until 1945 (see Figure A.1 in the Appendix) showed an above-median degree of manufacturing employment in the early 1920s. Thus, the “German” interaction effect found in Table 2 and 3 may be mainly an artifact of a higher degree of historical industrialization reflecting the prevalence of successful entrepreneurship that was conducive for the persistence of start-up activity.

In the models for regions with below-average employment shares in manufacturing in the 1920s (Table 5) we do not interact the dummy for being German until 1945 with control variables, because basically none of the pre-1945 German regions qualify. The results suggest that historical self-employment rates in regions with a below-average share of manufacturing in the 1920s are negatively related with start-up activity today. Altogether, persistence can only be found in regions that had a historically high degree of industrialization. Our findings are robust when focusing on regions with an above-average employment share in non-agricultural industries in the 1920s (Table A.4 in the Appendix). This confirms that there is no persistence in areas with a historical specialization in agriculture.

Table 4: Differences in start-up rates across Polish counties 2003–2017:
Regions with an above-median share of historical manufacturing
employment

| | (1) | (2) | (3) | (4) | (5) |
|---|----------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate | 0.205*** (0.057) | 0.303*** (0.074) | 0.220*** (0.081) | 0.181** (0.091) | 0.225*** (0.083) |
| German until 1945 | 0.616** (0.251) | 0.401 (0.282) | 0.551** (0.271) | 0.719 (0.446) | -1.302 (1.406) |
| German until 1918 | | 0.055 (0.060) | -0.080 (0.063) | -0.029 (0.074) | -0.050 (0.074) |
| Russian until 1918 | | -0.055 (0.067) | -0.195*** (0.071) | -0.131 (0.084) | -0.129* (0.078) |
| Austrian until 2018 | | | Reference | | |
| Population density 1920s | | | -0.005 (0.010) | 0.002 (0.011) | 0.003 (0.010) |
| Share of manufacturing 1920s | | | 0.017 (0.037) | 0.020 (0.056) | 0.019 (0.052) |
| Distance to nearest university 1920s | | | -0.022* (0.012) | -0.045*** (0.014) | -0.038*** (0.013) |
| Distance to nearest coalfield 1920s | | | 0.043*** (0.008) | 0.039*** (0.014) | 0.029* (0.016) |
| Distance to current German border | | | | | -0.074 (0.064) |
| Share of migrants central Poland 1950 | | | Reference | | |
| Share of indigenous population 1950 | | | | | -0.468** (0.219) |
| Share of migrants Russia 1950 | | | | | -0.052 (0.048) |
| Share of migrants other 1950 | | | | | -0.013 (0.036) |
| German until 1945 x historical self-employment rate | 0.199* (0.106) | 0.101 (0.115) | 0.212* (0.109) | 0.286** (0.142) | 0.058 (0.132) |
| German until 1945 x pre-WW II controls | No | No | No | Yes | Yes |
| German until 1945 x post WW II controls | No | No | No | No | Yes |
| Constant | -3.367*** (0.123) | -3.152*** (0.181) | -3.240*** (0.210) | -3.299*** (0.210) | -0.659 (1.255) |
| Number of observations | 175 | 175 | 175 | 175 | 175 |
| Adjusted R ² | 0.176 | 0.192 | 0.324 | 0.368 | 0.522 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. All independent variables except dummies are in logs. Robust standard errors are shown in parentheses. ***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.

Table 5: Differences in start-up rates across Polish counties 2003–2017:
Regions with a below-median share of historical manufacturing
employment

| | (1) | (2) | (3) | (4) |
|---------------------------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate | -0.112** (0.047) | -0.170*** (0.065) | -0.247*** (0.070) | -0.249*** (0.073) |
| German until 1945 | 0.141 (0.117) | 0.182 (0.117) | 0.078 (0.126) | -0.177 (0.174) |
| German until 1918 | | 0.099** (0.040) | 0.049 (0.052) | -0.026 (0.069) |
| Russian until 1918 | | 0.072* (0.040) | 0.022 (0.044) | -0.024 (0.055) |
| Austrian until 1918 | | Reference | | |
| Population density 1920s | | | -0.040*** (0.012) | -0.041*** (0.012) |
| Share of manufacturing 1920s | | | 0.072 (0.053) | 0.070 (0.056) |
| Distance to nearest university 1920s | | | -0.005 (0.026) | 0.001 (0.026) |
| Distance to nearest coalfield 1920s | | | 0.027* (0.015) | 0.023 (0.016) |
| Distance to current German border | | | | -0.082 (0.066) |
| Share of migrants central Poland 1950 | | Reference | | |
| Share of indigenous population 1950 | | | | -0.181* (0.098) |
| Share of migrants Russia 1950 | | | | 0.013 (0.025) |
| Share of immigrants other 1950 | | | | -0.052 (0.035) |
| Constant | -4.099*** (0.109) | -4.292*** (0.168) | -4.181*** (0.217) | -2.951*** (0.531) |
| Number of observations | 177 | 177 | 177 | 177 |
| Adjusted R ² | 0.033 | 0.057 | 0.123 | 0.140 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. All independent variables except dummies are in logs. Robust standard errors are shown in parentheses. ***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.

Table 6: Differences in start-up rates across Polish counties 2003–2017:
The role of historical self-employment rates in knowledge-intensive manufacturing industries

| | (1) | (2) | (3) | (4) | (5) |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate in knowledge-intensive manufacturing | 0.087*** (0.020) | 0.084*** (0.021) | 0.075*** (0.024) | 0.076*** (0.024) | 0.080*** (0.022) |
| German until 1945 | 0.456 (0.310) | 0.477 (0.316) | 0.612** (0.301) | 0.427 (0.442) | -3.382*** (1.017) |
| German until 1918 | | 0.031 (0.032) | -0.002 (0.032) | -0.002 (0.031) | -0.142*** (0.047) |
| Russian until 1918 | | -0.008 (0.028) | -0.061** (0.029) | -0.064** (0.029) | -0.117*** (0.034) |
| Austrian until 1918 | | | Reference | | |
| Population density 1920s | | | -0.008 (0.007) | -0.008 (0.008) | -0.012 (0.007) |
| Share of knowledge-intensive manufacturing 1920s | | | 0.016 (0.010) | 0.009 (0.011) | 0.011 (0.011) |
| Distance to nearest university 1920s | | | -0.022** (0.011) | -0.044*** (0.012) | -0.029** (0.012) |
| Distance to nearest coalfield 1920s | | | 0.040*** (0.006) | 0.041*** (0.008) | 0.036*** (0.009) |
| Distance to current German border | | | | | -0.112*** (0.040) |
| Share of migrants central Poland 1950 | | | Reference | | |
| Share of indigenous population 1950 | | | | | -0.654*** (0.147) |
| Share of migrants Russia 1950 | | | | | -0.016 (0.020) |
| Share of migrants other 1950 | | | | | -0.042* (0.022) |
| German until 1945 x historical self-employment rate | 0.070 (0.049) | 0.073 (0.049) | 0.096** (0.047) | 0.107 (0.066) | -0.028 (0.070) |
| German until 1945 x pre-WW II controls | No | No | No | Yes | Yes |
| German until 1945 x post-WW II controls | No | No | No | No | Yes |
| Constant | -3.223*** (0.140) | -3.244*** (0.153) | -3.240*** (0.165) | -3.184*** (0.165) | 0.434 (0.765) |
| Number of observations | 352 | 352 | 352 | 352 | 352 |
| R ² | 0.134 | 0.140 | 0.238 | 0.276 | 0.394 |
| Adjusted R ² | 0.126 | 0.127 | 0.218 | 0.248 | 0.356 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. All independent variables except dummies are in logs. Robust standard errors are shown in parentheses. ***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.

Narrowing down our focus to historical self-employment in those manufacturing industries that can be regarded as knowledge-intensive (Table 6), we find a positive effect on the general level of regional new business formation today. This is rather remarkable because the share of knowledge-intensive manufacturing employment in the economy of the

early 1920s was rather small (see Table A.2 in the Appendix). The results of Models 3-5 in Table 6 indicate that the positive impact of self-employment in knowledge-intensive manufacturing is enhanced by a robust positive impact of closeness to a university. Interestingly, the effect of self-employment in knowledge-intensive manufacturing industries holds for all regions, while for general self-employment we only find an effect in regions with an above-average level of industrialization. This result suggests that self-employment in knowledge-intensive industries is particularly likely to generate role model and peer effects that lead to a positive attitude towards entrepreneurship in the population and an entrepreneurial culture.

VI. Discussion

A. Main findings

Our investigation focuses on the persistence of entrepreneurship in Poland, a country that provides a particularly interesting setting for such an assessment. The territory that makes up modern day Poland has a rich history that includes occupation by a variety of different countries (Austria-Hungary, Germany, and Russia) with different institutional and economic frameworks. In the part of Poland that was German territory until 1945, this rich historical background also includes a large-scale exchange of the population after WW II. From 1945 until 1990, Poland was essentially occupied by the Soviet Union and was exposed to more than four decades of a socialist planned economy that massively restricted private self-employment. In 1990, with the dissolution of the Soviet Union, Poland began to transition to a market-based economy, and underwent a rapid privatization of state-owned enterprises and the emergence of a significant number of new businesses.

Focusing on the distinction between the historical political heritages of regions (i.e., Austrian-Hungarian, German, or Russian), we find a positive relationship between historical self-employment and current levels of entrepreneurship only in those Polish regions that belonged to Germany

until 1945. Hence, we cannot confirm the persistence of entrepreneurship in general and, thus, Hypothesis I is rejected.

Seeking to uncover the reasons behind the rejection of Hypothesis I, we dug deeper into regional differences and discovered that differing regional economic conditions in the 1920s, particularly the share of manufacturing employment, plays an important role. Taking the manufacturing sector as a whole, we find persistence only in those areas that had an above-median share of manufacturing employment in the early 1920s, regardless of whether these areas belonged to pre-WW II Germany or to other parts of Poland. This confirms Hypothesis II, which states that the persistence of entrepreneurship is particularly pronounced in regions with a high degree of industrialization in the 1920s. Since nearly all of the regions that were German in the 1920s had high levels of industrialization, the persistence of entrepreneurship in that part of the country can be largely explained by its historic economic structure. Accordingly, non-persistence of entrepreneurship in most of the other Polish regions may be due to their relatively low levels of industrialization in the 1920s. Isolating historical self-employment in the knowledge-intensive part of the manufacturing sector, we find that this type of entrepreneurship is, in general, positively related to current start-up activity across all Polish regions.

The explanation that we provide for the pronounced role of the manufacturing sector in the persistence of entrepreneurship is that manufacturing firms are, on average, larger than firms in other parts of the economy. As such, founding and running these firms requires a specific set of entrepreneurial abilities. Hence, the presence of manufacturing firms in a region can be regarded as an indication of high quality and successful entrepreneurship¹⁶ that may generate pronounced role-model and peer effects. This may especially hold for self-employment in knowledge-intensive manufacturing industries that require a highly qualified owner, and tend to come with relatively high risk.

¹⁶ Because the income of a firm owner tends to be positively related to firm size (Sorgner, Fritsch & Kritikos 2017), success may particularly mean earning a relatively high income.

While persistence of entrepreneurship in regions of pre-WW II Poland may be driven by the intergenerational transmission of cultural values and attitudes in favor of entrepreneurship, such an explanation can hardly apply to the part of Poland that was formerly held by Germany. It was in the former German territories where the German population was more or less completely replaced after WW II. In these regions, persistence of entrepreneurship could be induced by historical experience of successful entrepreneurship, comparable to the case of the Kaliningrad region where the original German population was also replaced after WW II (Fritsch et al. 2019a). Similar to the case of Kaliningrad, a collective memory of historically successful entrepreneurship among the newly arriving population could have prevailed in those former German territories that were already characterized by relatively high levels of industrialization, or high employment shares in the knowledge-intensive manufacturing sector. Obviously, when the German population was expelled from the formerly held German areas, the culture of entrepreneurship that existed there could not have been transferred to the newly arriving Polish settlers. All that was left was the collective memory of the economic structure established by the Germans. This collective memory was strong enough to have a profound impact on the current levels of new business formation.

Another interesting finding is that the population share of people migrating from those regions that were part of Poland before and after WW II to the former German areas is positively related to current levels of start-up activity. One potential reason for this pattern could be that people with an entrepreneurial mindset and values were overrepresented among these migrants. Transferring this mindset and values across generations may have yielded higher start-up rates after the breakdown of communism. This could be an additional explanation for the persistence in the former German territories.

B. Policy implications

Our finding that regional histories and a collective memory matter for the development of entrepreneurship clearly indicates that any policy that

aims at stimulating entrepreneurship should account for ‘soft’ factors such as historical experiences and the resulting attitudes of the regional population. In particular, one can expect that local cultures and attitudes shape the responsiveness of regions to such policy measures. Hence, different strategies and instruments may be appropriate for different kinds of regions.

In regions where an entrepreneurial culture is missing, a considerable part of entrepreneurship policy may be devoted to creating and stimulating such a culture. One way of doing so could be to disseminate success stories of local entrepreneurs and provide roadmaps to become an entrepreneur. If a significant regional entrepreneurial culture already exists policy could focus on improving the conditions for private businesses, particularly for new and young firms.

C. Limitations

An important limitation of our study is the availability of data. In particular, we do not have any indicators available that represent values and attitudes of the regional population in the past. Furthermore, we can only speculate about the mechanisms behind the persistence of entrepreneurship in Poland. The empirical patterns that we find suggest that collective memory about historical success of entrepreneurship plays a role for the persistence of entrepreneurship, but we do not have any direct measure for such a collective memory, nor for other potential transmission channels.

Finally, we lack information on the development of regional differences of self-employment during the communist period and the early transition years. Thus, we cannot analyze whether persistence can be confirmed for other time periods.¹⁷

¹⁷ Fritsch et al. (2014) analyze the spatial structure of self-employment in East Germany in the 1920s, at the end of the socialist period in 1989 as well as in the early years of the transition period.

D. Further research

Generally, there is much more research warranted to understand the mechanisms behind the persistence or non-persistence of regional entrepreneurship. This may include developing other indicators for entrepreneurship, information about government policies towards entrepreneurship and the supporting infrastructure, as well as information about the historical and current social values and attitudes of the regional population. This type of more comprehensive data would not only lead to a better description of historical entrepreneurship and related issues, but could also enable researchers to identify those elements of the historical regional entrepreneurship ecosystems that are of key relevance for persistence over longer periods of time. An important direction of data mining should be to make information about more distant time periods available that would allow for the investigation of regional development trajectories over even longer time spans.

An important question in this regard is why self-employment in certain types of industries is more conducive to the persistence of entrepreneurship than in other industries? What is responsible for the importance of manufacturing industries in perpetuating entrepreneurship? Why exactly do knowledge-intensive manufacturing industries play a special role in this regard? What were the reasons for the regional differences of the industry structures and the levels of self-employment in the 1920s? Why did regional cultures of entrepreneurship emerge in some places, but not in others? Do social practices, such as the prevailing modes of inheritance, play a role? What is the specific effect of formal institutions, such as region-specific barriers to entry, or a legal framework that allowed for a relatively high level of economic freedom?

Another key question that deserves further investigation is how attitudes of the local population are transferred across generations despite severe disruptive shocks of the social, political, and economic framework conditions? While the transfer of an entrepreneurial spirit from parents to their offspring has been well investigated in the literature is (e.g., Chlosta

et al. 2012; Dohmen et al. 2012; Laspita et al. 2012; Lindquist et al. 2015), we still know very little about the drivers of persistence in regions where such an intergenerational transfer could not take place because the original population was more or less completely exchanged. An important source of persistence could be people's spatial mobility. Are people with an entrepreneurial mindset particularly attracted to regions that are characterized by high levels of entrepreneurship? What drives persistence of entrepreneurship when population is replaced which largely excludes an intergenerational transfer of entrepreneurial attitudes, as was the case in those Polish regions that belonged to Germany until WW II. Based on both this paper and recent findings for the case of Kaliningrad (Fritsch et al. 2019a), we conjecture that a collective memory of historically successful entrepreneurship may play a role together with the inflow of migrants with entrepreneurial mindsets. In our setting, this memory implies the re-emergence of entrepreneurship after decades of socialism. It can be regarded as a starting point for the development of an entrepreneurial culture that emerged after 1990. In other countries of the world, collective memory about historical success of entrepreneurship may be an important component of an already existing entrepreneurship culture. Future research should try to disentangle the role of this component.

A further point that deserves attention is the design of appropriate political strategies. What policies can be recommended for regions that have a pronounced culture of entrepreneurship? What measures are appropriate if such a culture is missing? How can policy support the emergence and the development of an entrepreneurial culture? Do regions with a strong entrepreneurial culture respond differently to certain policy measures than regions lacking, or with a weaker, entrepreneurial culture? At this point, we are still seeking answers to these and other questions.

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Appendix 1: Additional tables and figures

Table A.1: Summary of the main variables of interest, the two groups of control variables, and dummy variables with definitions and sources

| Variable | Definition | Source |
|--|---|---|
| <i>Main variables of interest</i> | | |
| Current start-up rate | The share of new businesses (mainly headquarters) of the years 2003–2017 in the total number of employees in the private sector outside agriculture in 2011 | Local Data Bank of the Central Statistical Office of Poland for numerator; National Population Census from 2011 for denominator |
| Historical self-employment rate | The share of self-employed (both employing and not employing additional workers but without helping family members) excluding homeworkers and self-employed in agriculture, forestry, and fishery, in the total number of economically active persons in 1921 (for Polish part) and 1925 (for former German part) | Statistik des Deutschen Reichs (1927) for the German part; (GUS 1927) for the Polish part |
| Historical self-employment in knowledge-intensive manufacturing industries | Number of self-employed in knowledge-intensive manufacturing industries ^{a)} in the 1920s over economically active persons in the region. | Statistik des Deutschen Reichs (1927) for the German part; (GUS 1927) for the Polish part |
| Historical self-employment in the non-agricultural sector | Number of self-employed in ... in the 1920s over economically active persons in the region. | Statistik des Deutschen Reichs (1927) for the German part; (GUS 1927) for the Polish part |
| <i>Control variables for the pre-War period of the 1920s</i> | | |
| Population density | Population density: Number of population per square kilometer | As historical self-employment rate |
| Distance to nearest university | Distance measured in km to the nearest county with the state or private university that existed in the 1920s (distance to the same county is equal to zero) | For Germany: Deutsche Hochschulstatistik (1929); for Poland GUS (1923, p. 292). |
| Distance to nearest coalfield | Distance measured in km to the nearest county with a coalfield (distance to the same county is equal to zero) | Atlas Chatel & Dollfus (1931) |
| Share of manufacturing | The share of people working in manufacturing industries in the total number of working population (including agriculture) in 1921 (for Poland) and in 1925 (for Germany) | As historical self-employment rate |

| <i>Control variables for the most recent years</i> | | |
|--|---|--|
| Share of indigenous population | Number of population of the year 1950 that lived in the same Voivodeship (NUTS2) in 1939 over total population of 1950 | Special issues of census from 3 rd of December 1950 concerning place of residence in August 1939 (GUS 1955) |
| Share of migrants Russia | Number of repatriates from the formerly Polish area that became Russian after World War II (mostly from <i>Kresy</i>) over total population of year 1950 | Special issues of census from 3 rd of December 1950 concerning place of residence in August 1939 (GUS 1955) |
| Share of migrants from central Poland | Number of migrants from regions that were Polish before and after 1945 over total population of year 1950 | Special issues of census from 3 rd of December 1950 concerning place of residence in August 1939 (GUS 1955) |
| Share of migrants other | Number of repatriates and re-emigrants from other countries (especially Germany and France) in the total population of 1950 | Special issues of census from 3 rd of December 1950 concerning place of residence in August 1939 (GUS 1955) |
| Distance to current German border | Distance measured in km to the nearest county with the current German border (distance to the same county is equal to zero) | Current maps |
| <i>Variables for regional cultural heritage</i> | | |
| German until 1945 | Value of 1 if county belonged to Germany until 1945; 0 otherwise | Historical maps from 1925 |
| German until 1918 | Value of 1 if county belonged to Prussia until 1918; 0 otherwise | Historical maps from 1925 |
| Austrian until 1918 | Value of 1 if county belonged to Austria-Hungary until 1918; 0 otherwise | Historical maps from 1925 |
| Russian until 1918 | Value of 1 if county belonged to Russia until 1918; 0 otherwise | Historical maps from 1925 |

a) Industries classified as knowledge-intensive: manufacture of machinery and electro-technical equipment; manufacture of basic precious metals, watches and clocks and precision instruments; manufacture of chemicals and chemical products.

Table A.2. Descriptive statistics for parts of Poland belonging to Germany until 1945, Prussia until 1918, Russia until 1918, and Austria-Hungary until 1918

| Variable | <i>German until 1945</i> [n=97] | | | | <i>German until 1918</i> [n=61] | | | | <i>Russian until 1918</i> [n=144] | | | | <i>Austrian until 1918</i> [n=50] | | | |
|--|---------------------------------|--------------------|---------|---------|---------------------------------|--------------------|---------|---------|-----------------------------------|--------------------|---------|----------|-----------------------------------|--------------------|---------|---------|
| | Mean | Standard Deviation | Minimum | Maximum | Mean | Standard Deviation | Minimum | Maximum | Mean | Standard Deviation | Minimum | Maximum | Mean | Standard Deviation | Minimum | Maximum |
| Current start-up rate | 0.024 | 0.005 | 0.013 | 0.044 | 0.023 | 0.005 | 0.016 | 0.054 | 0.022 | 0.003 | 0.015 | 0.032 | 0.021 | 0.005 | 0.016 | 0.039 |
| Self-employment rate 1920s | 0.088 | 0.017 | 0.061 | 0.138 | 0.095 | 0.018 | 0.062 | 0.156 | 0.128 | 0.031 | 0.065 | 0.269 | 0.084 | 0.026 | 0.041 | 0.177 |
| Self-employment in non-agricultural sectors 1920s | 0.157 | 0.031 | 0.081 | 0.209 | 0.238 | 0.061 | 0.100 | 0.356 | 0.385 | 0.100 | 0.132 | 0.561 | 0.287 | 0.100 | 0.108 | 0.566 |
| Self-employment in manufacturing 1920s | 0.044 | 0.007 | 0.031 | 0.064 | 0.053 | 0.009 | 0.031 | 0.072 | 0.065 | 0.011 | 0.041 | 0.111 | 0.037 | 0.009 | 0.019 | 0.078 |
| Self-employment in small-scale manufacturing 1920s | 0.037 | 0.006 | 0.027 | 0.054 | 0.046 | 0.008 | 0.027 | 0.066 | 0.056 | 0.010 | 0.032 | 0.100 | 0.031 | 0.007 | 0.017 | 0.057 |
| Self-employment in knowledge-intensive manufacturing 1920s | 0.002 | 0.001 | 0.001 | 0.005 | 0.001 | 0.001 | 0.000 | 0.003 | 0.001 | 0.001 | 0.000 | 0.005 | 0.001 | 0.001 | 0.000 | 0.005 |
| Population density | 153.4 | 279.7 | 31.5 | 1,957.9 | 205.8 | 684.6 | 0.100 | 4,983.0 | 256.1 | 1,472.7 | 0.700 | 12,215.5 | 170.5 | 544.7 | 4.3 | 3,908.6 |
| Share non-agriculture sector | 0.542 | 0.182 | 0.321 | 0.974 | 0.332 | 0.204 | 0.115 | 0.992 | 0.228 | 0.180 | 0.087 | 0.990 | 0.220 | 0.225 | 0.069 | 0.988 |
| Share manufacturing | 0.204 | 0.111 | 0.085 | 0.522 | 0.105 | 0.054 | 0.036 | 0.302 | 0.088 | 0.074 | 0.035 | 0.581 | 0.066 | 0.076 | 0.018 | 0.416 |
| Share small-scale manufacturing | 0.143 | 0.068 | 0.073 | 0.472 | 0.085 | 0.040 | 0.031 | 0.250 | 0.060 | 0.036 | 0.029 | 0.282 | 0.045 | 0.043 | 0.015 | 0.243 |
| Share of knowledge-intensive manufacturing | 0.022 | 0.028 | 0.003 | 0.216 | 0.008 | 0.012 | 0.000 | 0.051 | 0.003 | 0.006 | 0.000 | 0.039 | 0.007 | 0.013 | 0.000 | 0.078 |
| Share indigenous population | 0.165 | 0.203 | 0.023 | 79.39 | 0.842 | 0.01 | 0.497 | 0.901 | 0.919 | 3.17 | 0.757 | 0.96 | 0.923 | 0.001 | 0.875 | 0.927 |
| Share migrants Central Poland | 0.523 | 0.157 | 0.01 | 72.87 | 0.103 | 0.076 | 0.054 | 0.37 | 0.055 | 3.26 | 0.015 | 0.206 | 0.038 | 0.018 | 0.023 | 0.10 |
| Share migrants Russia | 0.286 | 0.08 | 0.101 | 41.13 | 0.049 | 0.027 | 0.018 | 0.133 | 0.024 | 1.51 | 0.01 | 0.053 | 0.036 | 0.012 | 0.017 | 0.049 |
| Share migrants other | 0.025 | 0.017 | 0.003 | 0.05 | 0.005 | 0.005 | 0.002 | 0.03 | 0.002 | 0.15 | 0.0006 | 0.0068 | 0.003 | 0.001 | 0.0023 | 0.0068 |
| Distance to nearest university | 109.68 | 54.12 | 0.000 | 240.31 | 67.540 | 37.324 | 0.000 | 142.250 | 79.202 | 47.91 | 0.000 | 255.96 | 86.01 | 53.20 | 0.000 | 207.19 |
| Distance to nearest coalfield | 104.37 | 118.78 | 0.00 | 422.50 | 105.11 | 67.70 | 0.00 | 248.06 | 196.93 | 102.52 | 0.000 | 469.80 | 94.34 | 71.76 | 0.000 | 228.02 |
| Distance to current German border | 159.19 | 140.56 | 0.00 | 507.88 | 201.06 | 71.09 | 63.20 | 334.62 | 405.33 | 105.42 | 195.84 | 618.92 | 446.78 | 81.54 | 307.04 | 580.62 |

Table A.3. Correlation matrix between main variables of interest and control variables

| | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | |
|---|------|---------------------|-------------|-------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---|
| 1 Current start-up rate | .042 | <i>-.250</i> | -.029 | -.034 | .363 | .162 | .290 | .251 | .294 | .234 | <i>-.336</i> | .373 | .249 | .222 | .178 | .040 | <i>-.273</i> | |
| 2 Historical self-employment rate | | .352 | .888 | .879 | .358 | .398 | .212 | .214 | .202 | .065 | .313 | <i>-.302</i> | <i>-.314</i> | <i>-.229</i> | <i>-.171</i> | .212 | .257 | |
| 3 Historical self-employment rate in non-manufacturing sector | | | .461 | .459 | <i>-.528</i> | <i>-.111</i> | <i>-.732</i> | <i>-.641</i> | <i>-.633</i> | <i>-.491</i> | .624 | <i>-.608</i> | <i>-.605</i> | <i>-.550</i> | .010 | .460 | .652 | |
| 4 Historical self-employment rate in manufacturing | | | | .986 | .162 | .194 | -.008 | .059 | .042 | <i>-.120</i> | .370 | <i>-.355</i> | <i>-.374</i> | <i>-.271</i> | <i>-.180</i> | .297 | .198 | |
| 5 HIST_SER_SMALL | | | | | .162 | .177 | -.005 | .029 | .052 | <i>-.115</i> | .373 | <i>-.357</i> | <i>-.380</i> | <i>-.279</i> | <i>-.183</i> | .284 | .184 | |
| 6 Historical self-employment rate knowledge-intensive manufacturing | | | | | | .395 | .855 | .789 | .859 | .640 | <i>-.585</i> | .557 | .585 | .567 | .052 | <i>-.227</i> | <i>-.469</i> | |
| 7 Population density | | | | | | | .404 | .360 | .304 | .228 | .011 | -.003 | -.025 | -.011 | <i>-.194</i> | -.012 | .006 | |
| 8 Share of non-agriculture | | | | | | | | .904 | .904 | .714 | <i>-.563</i> | .543 | .552 | .532 | -.076 | <i>-.344</i> | <i>-.519</i> | |
| 9 Share of manufacturing | | | | | | | | | .897 | .733 | <i>-.547</i> | .505 | .568 | .593 | <i>-.113</i> | <i>-.372</i> | <i>-.528</i> | |
| 10 MAN_SMALL | | | | | | | | | | .834 | <i>-.602</i> | .574 | .598 | .591 | -.051 | <i>-.298</i> | <i>-.552</i> | |
| 11 MAN_KNOW | | | | | | | | | | | <i>-.416</i> | .411 | .388 | .395 | -.039 | <i>-.228</i> | <i>-.341</i> | |
| 12 Share of indigenous population | | | | | | | | | | | | <i>-.984</i> | <i>-.957</i> | <i>-.812</i> | <i>-.230</i> | .258 | .660 | |
| 13 Share of immigrants Polish | | | | | | | | | | | | | .892 | .732 | .250 | <i>-.197</i> | <i>-.634</i> | |
| 14 Share of immigrants Russia | | | | | | | | | | | | | | .864 | .200 | <i>-.325</i> | <i>-.647</i> | |
| 15 Share of immigrants other | | | | | | | | | | | | | | | -.012 | <i>-.462</i> | <i>-.658</i> | |
| 16 Distance to nearest university | | | | | | | | | | | | | | | | .449 | .083 | |
| 17 Distance to nearest coalfield | | | | | | | | | | | | | | | | | .645 | |
| 18 Distance to the current German border | | | | | | | | | | | | | | | | | | 1 |

Notes: bold and italic = statistically significant at the 1% level; bold = statistically significant at the 5% level; italic = statistically significant at the 10% level.

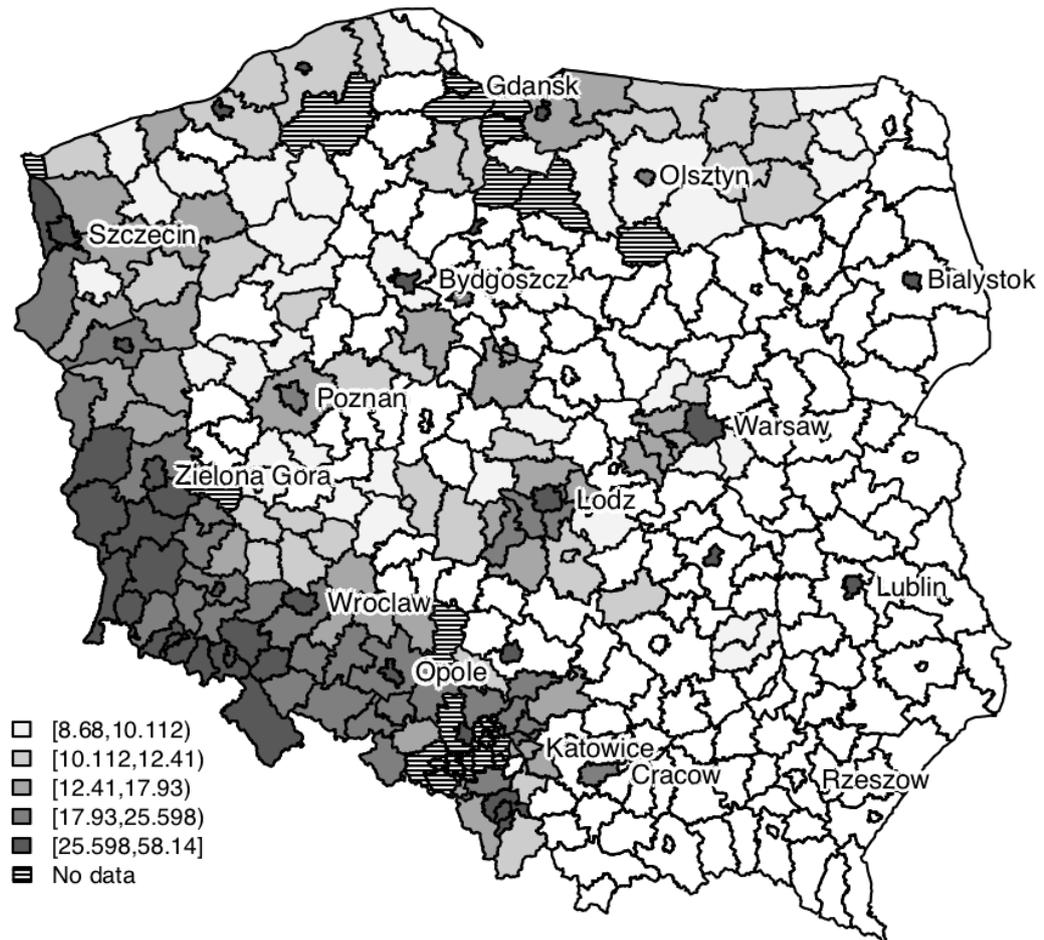


Figure A.1. The share of people employed in manufacturing industries in the total working population (including agriculture) in the 1920s (counties with below-median shares left white)

Source: Own illustration.

Appendix 2: Robustness checks

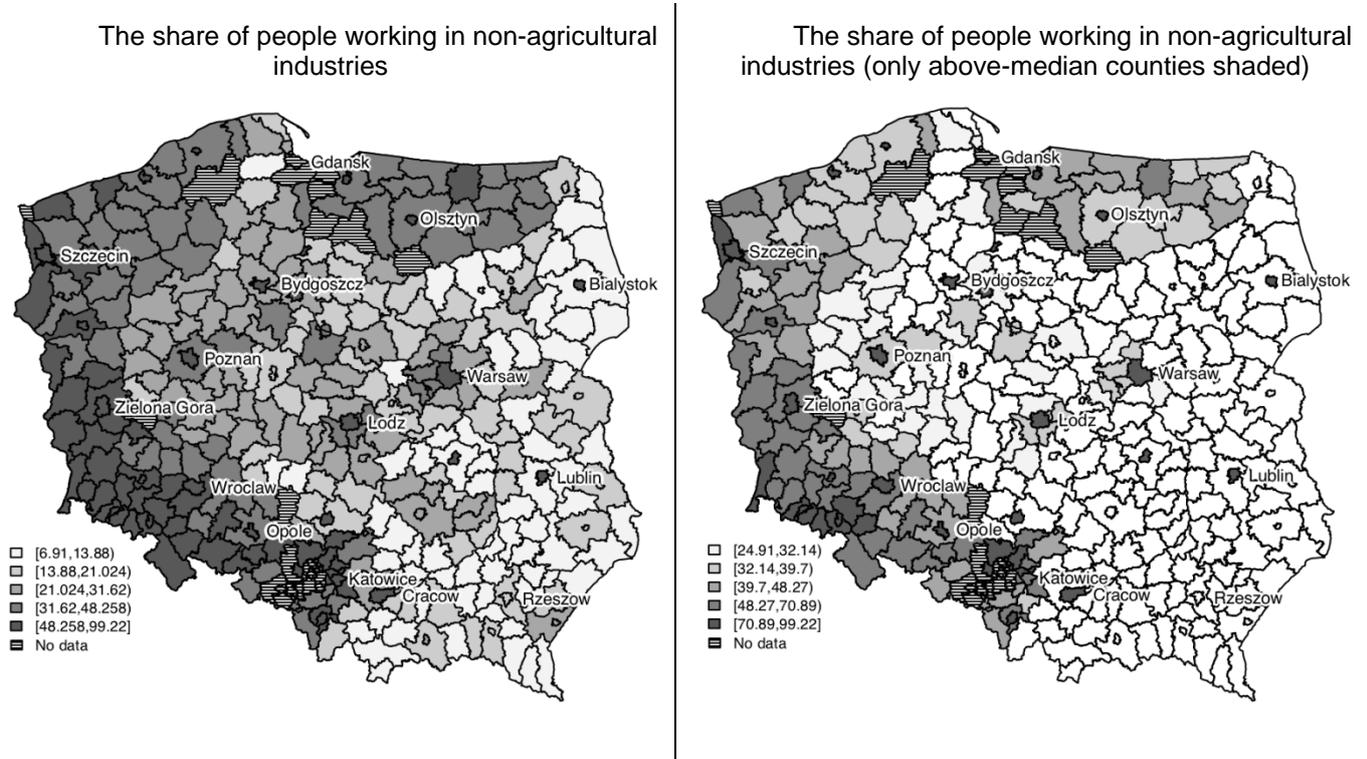


Figure A.2: The share of people working in non-agricultural industries in the 1920s, territory of current Poland

Source: Own illustration.

Table A.4: Differences in start-up rates across Polish counties 2003–2017:
Regions with an above-median share of non-agricultural industries

| | (1) | (2) | (3) | (4) | (5) |
|--|----------------------|----------------------|----------------------|----------------------|----------------------|
| Historical self-employment rate | 0.206*** (0.058) | 0.308*** (0.076) | 0.200** (0.080) | 0.165* (0.086) | 0.203** (0.079) |
| German until 1945 | 0.579** (0.253) | 0.363 (0.281) | 0.542** (0.270) | 0.714 (0.437) | −0.597 (1.292) |
| German until 1918 | | 0.054 (0.058) | −0.049 (0.057) | −0.023 (0.059) | −0.060 (0.065) |
| Russian until 1918 | | −0.055 (0.065) | −0.159** (0.064) | −0.130* (0.067) | −0.151** (0.063) |
| Austrian until 2018 | | | Reference | | |
| Population density 1920s | | | −0.001 (0.010) | 0.003 (0.010) | 0.004 (0.010) |
| Share of manufacturing 1920s | | | 0.024 (0.036) | 0.039 (0.052) | 0.033 (0.049) |
| Distance to nearest university 1920s | | | −0.019 (0.012) | −0.040*** (0.014) | −0.034** (0.013) |
| Distance to nearest coalfield 1920s | | | 0.042*** (0.008) | 0.041*** (0.012) | 0.039*** (0.012) |
| Distance to current German border | | | | | −0.039 (0.054) |
| Share of migrants central Poland 1950 | | | Reference | | |
| Share of indigenous population 1950 | | | | | −0.352* (0.205) |
| Share of migrants Russia 1950 | | | | | −0.033 (0.049) |
| Share of migrants other 1950 | | | | | 0.005 (0.035) |
| German until 1945 x historical self-employment rate | 0.184* (0.106) | 0.082 (0.117) | 0.199* (0.110) | 0.297** (0.138) | 0.071 (0.129) |
| German until 1945 x population density 1920 | | | | −0.044 (0.032) | −0.010 (0.033) |
| German until 1945 x share of manufacturing 1920s | | | | 0.022 (0.075) | −0.013 (0.073) |
| German until 1945 x Distance to nearest university 1920s | | | | 0.071** (0.027) | 0.063** (0.031) |
| German until 1945 x Distance to nearest coalfield 1920s | | | | 0.003 (0.015) | 0.001 (0.016) |
| German until 1945 x Distance to current German border | | | | | 0.043 (0.056) |
| German until 1945 x share of indigenous population 1950 | | | | | 0.230 (0.207) |
| German until 1945 x Share of migrants Russia 1950 | | | | | −0.284*** (0.099) |
| German until 1945 x Share of migrants other 1950 | | | | | 0.056 (0.051) |
| Constant | −3.363*** (0.127) | −3.147*** (0.179) | −3.328*** (0.200) | −3.337*** (0.197) | −1.432 (1.131) |
| Number of observations | 175 | 175 | 175 | 175 | 175 |
| Adjusted R ² | 0.172 | 0.184 | 0.324 | 0.370 | 0.525 |

Notes: The dependent variable is the average start-up rate (log) in 2003–2017. All independent variables except dummies are in logs. Robust standard errors are shown in parentheses. ***Statistically significant at the 1% level; **statistically significant at the 5% level, *statistically significant at the 10% level.