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Economic Growth Spurred by Diversity: Central Europe at the Turn of the 20th Century

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Economic growth spurred by diversity: Central Europe at the turn of the 20th century

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Abstract

This paper contributes to the social diversity literature in economics and extends the scope of previous research by exploiting historical origins of ethnic and religious diversity as well as low levels of social and geographical mobility of 19th century societies. In particular, I find that economic performance of townships in Hungary at the turn of the 20th century was strongly enhanced by social diversity: mixed localities recorded up to 1 percent higher annual growth than their homogenous counterparts. Moreover, extensive analysis and a novel IV strategy based on exposure to armed conflicts in the preceding centuries allow for a causal interpretation of these results. The paper also proposes a plausible and testable explanation as to how diversity gains were generated: with occupational sorting taking place along ethnic and religious lines, social and economic profiles of townships became closely related and diverse localities could benefit from more complex local economies and the presence of high-tech industries in particular.

JEL-Classification: C30, N13, O40, R10, Z13
Keywords: Economic Development, Economic History

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1 Introduction

Economists have always been interested in the determinants of long-term growth and development. In recent years, considerable attention has been paid to assessing the importance of principally non-economic factors like quality of governance, legal origins or bureaucratic efficiency (Acemoglu et al., 2001; La Porta et al., 2008; Becker et al., 2011) in this regard. So far, the question of how the ethnic, cultural or religious composition of a particular society shapes the growth process has merited less consideration. This undoubtedly owes much to the fact that social diversity has, from the earliest of times, been affected by and responsive to economic development, which presents all sorts of difficulties to the researcher. For example, the emergence, from the late 19th century onwards, of the modern centralized state and its assimilating tendencies drastically reduced social variety in many developed countries (Weber, 1976). Not only does this render cross-country comparisons dubious, is also hinders research with a regional or local level focus, as good quality data is rarely available for the surviving diverse areas. Globalization and the sharp increase in international migration over the last few decades has renewed interest in the question, but it has proven hard to isolate, in a convincing fashion, the effect of social diversity itself from the plethora of other contemporaneous factors shaping the social and economic landscape.

This paper takes a historical approach in order to sidestep the above-mentioned difficulties. This is made possible by the fact that, in most historical periods, economic migration was only a secondary source of social mixing behind localized interactions between the multitude of distinctive, self-contained communities as well as mass population transfers associated with ethnic, religious, political or military conflicts. This has the consequence that, until the 20th century, the level of social diversity in a given area was largely independent from contemporaneous change, which allows the researcher to better isolate the economic consequences of diversity from the effects of migration or assimilation. Moreover, the considerably lower level of social and geographical mobility that characterized traditional societies also limits the impact of potential endogeneity problems and promises more accurate estimates when cumulative, reciprocal or lagged effects are associated with social change (Borjas, 2003).[1]

The particular focus of this work is the Austro-Hungarian Monarchy at the turn of the 20th century, during a period of economic liberalism, continuous peace and prosperity. While modernization and the industrial revolution brought about a fairly complete yet largely similar transformation of most European societies, the Habsburg Monarchy stands out in two important ways. First, due to its perpetual

[1]For historical patterns of social and occupational mobility, see Andorka (1982); Kaelble (1986); Ferrie (2005). The issue of geographical mobility is more delicate , see **?**Moch (2003)

lack of imperial stability, Central Europe was still characterized by unparalleled social diversity in modern times, reminiscent only of Western feudal societies. Moreover, this extreme convolution of different peoples, historical heritage long-standing political and military turmoil at the crossroads between Eastern and Western civilizations, existed not only across states or regions but also between and within settlements. Second, Austro-Hungary operated an well-functioning and respected administrative system, part of which was an eminent statistical service that led the way in terms of the magnitude and richness of data collected and presented. This data allows to accurately measure the social make-up as well as the economic performance even at the local level.

The empirical analysis is based on a unique dataset that I compiled and digitized from census information and other official sources published by Hungarian Statistical Office in the pre WW1 period. The dataset contains extensive information on the social profiles and economic performance of close to 1700 of the largest settlements in more than 500 districts in 72 counties of Hungary at the turn of the 20th century. Due to repeated measurement for the main variables of interest, I am able to employ a generalized difference-in-differences technique with continuous diversity treatment to uncover the relationship between ethnic and religious diversity and economic growth of townships in the 1880-1910 period. Moreover, using a highly original instrumental variable strategy based on the exposure of settlements to armed conflicts in the preceding centuries, I can exploit exogenous variation in social diversity to provide a causal interpretation of these results. The richness of this dataset makes it possible also to investigate the relationship between different aspects of diversity and learn about the potential pitfalls associated with focusing only on a single one of these. Finally, the 1910 census contains detailed information on the sectoral and industrial affiliations of the local populace in each settlement, which makes it possible to investigate different mechanisms through which social diversity translates into superior economic growth.

My findings complement, deepen and challenge the existing literature at the same time. Contrary to the somewhat ambiguous and negative overall effects usually attributed to diversity in the literature, I estimate a sizable and qualitatively significant positive causal effect of both ethnic and religious diversity on economic growth. Moreover, the paper proposes occupational sorting across specific population groups as the main channels through which the additional economic benefits are realized: more diverse localities grew faster because they had a broader pool of people with specific human skills. All these have important policy implications as regards the circumstances under which diversity can be expected to reap economic benefits.

The paper is structured as follows. Section 2 introduces the reader to the relevant literature, presents the uncertainty surrounding most findings and discusses

the potential reasons for it. Section 3 provides some historical background, describes the data and discusses measurement strategy. Section 4 introduces the main estimation methodology, presents the main results and discusses a series of robustness tests. Section 5 presents an exciting instrumental variable strategy based on townships' exposure to medieval wars to sidestep potential endogeneity issues and allows for a causal interpretation of the main results. Section 6 proposes a possible and empirically justified explanation for the positive diversity effects based on occupational sorting that leads to more complex local economies in more diverse settlements. Section 7 concludes and draws a few policy conclusions.

2 Review of literature

While sociologists and political scientist have long been aware of the importance of the social and economic effects of cohabitation of peoples with different racial, ethnic or cultural backgrounds, the attention of economists has only been directed to these issues with the re-emergence and recent prominence of development economics over the last two decades. While, in a diverse society, the potential conflicts of preferences and prejudices can clearly have destructive economic consequences, a multitude of peoples might, at the same time, provide productive varieties in abilities, experiences and attitudes. Theoretical work on diversity has focused on these trade-offs between potential inefficiencies and spillovers.[2]

In turn, empirical research is devoted to measuring which of these two opposing effects dominates, under what conditions and through which channels. In the relevant literature, diversity is analyzed almost exclusively from a racial or ethnic (ethnolinguistic) standpoint, with only a handful of studies looking at the relationship between religious or cultural heterogeneity and economic performance (Alesina et al., 2003; Montalvo and Reynal-Querol, 2003; Florida, 2002). In addition, heterogeneity is almost always construed as fractionalization, even though a few authors have emphasized the relative importance of polarization (Arcand et al., 1999; Montalvo and Reynal-Querol, 2003) also. Regardless of these differences, the overwhelming majority of studies in the field have found negative associations between diversity and economic progress.

On country level, for example, the seminal investigation by Easterly and Levine (1997) finds that racially more fragmented countries grew less on average and argues that this is a major determinant of Africa's poor economic performance. The main source of these growth differentials is widely thought to be suboptimal public policies in heterogeneous communities (Alesina et al., 2003), but the potential endogeneity of these to economic development as well as the demonstrated high

[2]For a concise summary, see Alesina and La Ferrara (2004).

correlation between ethnic fractionalization and alternative drivers of development such as latitude (La Porta et al., 1999), institutional quality (Rodrik, 1999) or colonizers' experience (Acemoglu et al., 2001) makes causal interpretations rather unconvincing. Moreover, while some authors find that the economic loss associated with diversity depends on communication costs (Arcand et al., 1999) or the type of political regime (Collier, 2000), a number of studies find no statistical relationship between diversity and growth across countries at all (Sachs and Warner, 1997; Arcand et al., 2000; Bhattacharyya, 2009; Bertocchi and Guerzoni, 2010).

Similar incertitude surrounds empirical research on the regional or local level, despite the fact that the relevant literature is almost entirely confined to the US. Earlier studies (Poterba, 1997; Alesina et al., 1999) employed a rather narrow conception of social variety based on race and found that the provision of "productive" public goods is significantly lower in more fragmented cities, even though this does not directly translate to lower population or economic growth rates (Glaeser et al., 1995; Rappaport, 1999).[3] A plausible conjecture is that diversity takes effect through decreasing social capital, as evidenced by higher growth in segregated townships (Alesina and La Ferrara, 2004; Glaeser et al., 1995; Cutler and Glaeser, 1997) and less engagement in social activities and lower trust levels in racially mixed communities (Alesina and La Ferrara, 2000, 2002). By contrast, more recent papers taking a more nuanced view of social diversity tend to draw more optimistic conclusions. For example, Ottaviano and Peri (2005, 2006) find that US-born individuals living in more diverse cities with a higher share of foreigners tend to earn higher wages and pay higher rents, while Sparber (2009, 2010) show that racial fragmentation can increase the wage level in certain states and industries. Florida (2002) documents similar findings by looking at preponderance of some specific creative industries in major cities.

From a conceptual point of view, it is very important to understand what drives the divergence in these findings. As already noted, endogeneity issues and omitted variable bias are particularly susceptible to play a crucial role in this regard. For example, many regional and city level studies cited above focus on wage dynamics between 1970 and 2000, a period which coincided with rising immigration (Borjas, 1994), offshoring (Blinder, 2006), wage polarization (Autor et al., 2006) and geographical sorting of high-skilled workers (Moretti, 2013), all of which directly affect the spatial patterns of both social diversity and economic activity.[4] The relationship between different aspects of diversity seems equally important, even though this is almost completely ignored by the literature. For example, with po-

[3]In these studies, social fragmentation is measured by the relative shares of non-white (e.g. black, Hispanic, Asian) population.

[4]In fact, Diamond (2013) builds a model that explain much of the local wage, housing costs and amenities dynamics in US cities by divergence in labor demand for collage graduates alone, without making even a passing reference to either traditional aspect of social diversity.

litical identification and voting becoming increasingly partisan along racial lines in southern US cities (Giles and Hertz, 1994), lower public good provision may well be less an artifact of racial diversity than of divided local politics. Indeed, Jha (2008) argues that religious tolerance between Hindus and Muslims depended on the economics complementarity and exchange mechanisms in medieval India. This already leads to the question of how social fragmentation translates to the economic domain, which also crucially affects the economic consequences of diversity.

3 Historical background, data and measurement

From its creation in 1867 until its dissolution at the end of the First World War, the monarchic union between the crowns of the Austrian Empire and the Kingdom of Hungary was among the leading powers of Europe, tying together roughly 13% of Europe's population in the largest political, economic, monetary and customs union of the continent. That its former territory is now divided by no fewer than 23 national borders between 12 countries is a true testament to the idea of the Habsburg Monarchy being less of a true state than a 'mildly centripetal agglutination of bewilderingly heterogeneous elements' (Evans, 1984). Indeed, standing at the crossroads of Western and Eastern civilizations for centuries turned Austria-Hungary by far the most ethnically and culturally diverse country formation in all of modern Europe: its national anthem was sung in eleven different tongues and its peoples professed seven different religious faiths.[5] The economic landscape was characterized by a similarly high degree of disparity and variability, as evidenced by the more than threefold differences in per capita GDP estimates between the highly industrialized Western regions of Upper Austria and Bohemia and the least developed agrarian provinces of Galicia and Bukovina in the East (Schulze, 2000).[6]

The relationship between societal diversity and economic development in the Austro-Hungarian Monarchy has not been systematically analyzed so far. This

[5] As the enlightened Austrian aristocrat, Victor-Franz von Andrian-Werburg famously put it in his anonymously published 1841 essay *Austria and Her Future*, 'Austria is a purely imaginary name, which means neither a distinct people nor a land or nation. It is a conventional name for a complex of clearly differentiated nationalities'. In similar vein, modernist Austrian writer Robert Musil, in his novel entitled *The Man Without Qualities*, repeatedly refers to the Danube Monarchy as "Kakania" and the elusive life in it as "kakanisch". *The Good Soldier Svejk*, the main character of Jaroslav Hasek's satirical novel of the same name, is even more frank in his appraisal that 'a monarchy as idiotic as this ought not to exist at all'.

[6] Much of the scientific work of Hungarian economic historians Ivan T. Berend and Gyorgy Ranki is devoted to the study of the uneven, retarded and lop-sided economic development and modernization of Central Europe (Berend and Ranki, 1976, 1987; Berend, 2012). See Good (1984) and Komlos (1983) for further work on the Habsburg economy.

omission is all the more glaring since social and economic historiography offer very contrasting narratives. Social historians typically focus on the political origins and consequences of nationality conflicts and stress the increasing antagonism between different ethnic and religious groups, to the extent that the disintegrative forces of intra-empire social cleavages have frequently been identified as key ingredients of the Empire's decline and dissolution.[7,8] In contrast, quantitative research on economic history speaks of intra-empire economic integration and stability due to the gradual diffusion of Western inventions and resources to less advanced Eastern regions, as evidenced by market harmonization (Uebele, 2011), heightened infrastructural development (Tominac, 1905) and significantly higher growth of originally underdeveloped regions (Berend and Ranki, 1960; Schulze, 2000). That these views are not mutually exclusive and that centrifugal (political) and centripetal (economic) forces are likely to have been simultaneous in their effect has been argued eloquently by Jaszi (1929), emphasized by Lorenz (2006) and tested by Schulze and Wolf (2012), among others.[9]

The large body of existing literature comparing the economic and political situation of different regions, nationalities or social classes in the Habsburg Monarchy is not particularly relevant in this regard, because, contrary to other diverse European countries like France or Switzerland at the time, the degree of social mixing in Central Europe was much higher *within* regions than between them. While certain areas have always been entrepôts of ethnicity and religion, the convolution of different identities really started to flourish after the emergence of the Ottoman Empire

[7]Irrespective of whether an agency-based (Taylor, 1990), a more structural (Jaszi, 1929) or principally historical (Kann, 1950) approach is taken, whether narrow constitutional (Konirsh, 1955) or broad legitimist (Bibo, 1986) concerns are emphasized, nationalism features as one of the ultimate causes of Austria-Hungary's demise.

[8]Religious conflicts feature less prominently in these accounts, even though they were no less important. Anti-semitism was particularly wide-spread and virulent, culminating in the creation of nation-wide repression movements, an infamous blood libel case and a series of anti-Jewish riots, and virtually prohibiting any representation of particular Jewish interests on the political scene throughout the period (Kovacs, 1998). Confrontations between other religions were also commonplace and manifested themselves both in relation to the privileged and powerful Catholic Church as well as across different confessions within certain nationalities (Fazekas, 2008).

[9]Jaszi (1929), in his classic analysis, claims that intensifying economic nationalism fully undermined the economic coherence and performance of the Habsburg Monarchy, to the point of becoming a defeated empire even before the war. Schulze and Wolf (2012) exploit linguistic proximity between regions and argue that market integration was asymmetric and took place predominantly within ethnically homogeneous areas. Lorenz (2006), for his part, emphasizes the importance of ethnic-based cooperative movements in promoting economic nationalism. The overall importance of economic partisanship is hard to judge, in no small part because Austria-Hungary was characterized by strong autarchic tendencies and depended just as much upon internal geographic division of labour as its European neighbors relied on international specialization (Berend and Ranki, 1987)

at the frontiers of Europe in the 14th century. The advancement of Turks and their incursions into the Carpathian basin forced great segments of population to flee and set off population movements of unparalleled frequency, magnitude and directional heterogeneity for centuries (Sokal, 1997). Much of this was directly related to the continuous warfare that accompanied the Ottoman rule in the 16th and 17th centuries, but the massive and organized re-population of previously abandoned war-torn areas after the Habsburg reconquest at the turn of the 18th century was equally important in this regard.[10] Long-standing segregation practices, strategic proprietary considerations and differences in feudal institutions across settlements further contributed to the increase of social mixing right until the era of political and economic liberalism, making Austria-Hungary's population as varied as only pre-modern societies were (Weber, 1976).

3.1 Data sources and measurement

The empirical analysis in this paper concerns only the Hungarian territories, the more socially diverse constituent of the Habsburg Monarchy. Using various official publications of the Hungarian Statistical Office, I compiled and digitized unique and comprehensive dataset on Hungarian townships. The principal sources of information were the official decennial censuses of 1880 and 1910, which contain information on the size, ethnolinguistic and religious affiliation as well as literacy rates of the local populace for every township. In addition, the 1910 census features, for every settlement, the entire distribution of the local populace across 11 occupational classes and 30 industry groups. Among the more than 15000 Hungarian townships, I included those in the sample of which the population exceeded 2000 at the time of the earliest census in 1869.[11] The resulting sample contains altogether 1689 townships in 517 administrative districts in 72 counties, covering more than half of the country's total population and one tenth of the total number of municipalities.[12]

[10] After the Habsburg reconquest at the turn of the 18th century, the re-population of previously abandoned and war-torn areas took place in massive state-sponsored or privately organized manner that often resembled colonization practices employed in the Reconquista of Spain. A good example is the Banat which offers a microcosmos of all these processes in a magnified manner. It had about fifty towns of differing racial composition in the 14th century. Later, fleeing Serbs moved in, then became terra incognita, then settlers and movers (O'Reilly, 2003).

[11] To ensure appropriate geographical coverage, in the few such cases when no settlement reached the aforementioned population threshold in a given district, I selected the most populated locality regardless of its size. The choice of using the earliest possible information to construct the list of townships in the sample is motivated by the intention to mitigate potential sample selection issues. In the few cases where settlements merged or disintegrated between 1869 and 1910, I consistently treat the totality of the separate constituents as single observations.

[12] Among the sampled localities, 301 belong to the semi-autonomous lands of Croatia. Since the principal budgetary informations used to measure economic progress is not available for these

The main variables of interest are the measures of social variety and economic performance. Considering the former, I follow the literature in identifying diversity as the probability that two randomly drawn individuals from the same locality belong to different social groups. Hence, the measure of ethnic and religious diversity is a type of Herfindahl-index defined as

$$\text{Diversity} = 1 - \sum_{q} s_q^2$$

where s_q denotes the relative share of group q in a given settlement. Naturally, this diversity measure equals zero in a completely homogeneous population and converges to one as the number of groups increases. Regarding the outcome variable, I am able to improve on the existing literature by using townships' tax base as the main measure of economic performance.[13] The tax base in question formed the basis for all direct taxes payable to the central government by locals, including taxes on property and housing as well as income, corporate and capital gains. As such, it makes for a very nuanced and accurate indicator of the totality of economic life on the local level - one that can interpreted as a per-capita measure also.[14] Moreover, since the tax base, along with townships' local budgets, is observed repeatedly, I am able to take a dynamic perspective and focus on differences in economic growth over time.[15]

To account for differences in growth potential across localities, I collected information on wide range of natural, political or economic factors. Specifically, my controls include townships' access to navigable waterways, railways and mines, their geographical area and distance to Budapest and Vienna (as dual capitals and political centers of the Habsburg Monarchy) as well as their altitude. I further classify townships based on their administrative and legal status and keep

townships, they do not feature in the main analysis.

[13]Comparable studies use less refined outcome measures such as the share of the labor force in non-agriculture or annual income of elementary schoolteachers (Becker and Woessmann, 2009), land values or agricultural income (Donaldson and Hornbeck, 2012; Donaldson, 2013), population growth (Glaeser et al., 1995) or average wages (Ottaviano and Peri, 2006; Sparber, 2009).

[14]Direct taxes were an importance source of the Hungarian government's budget, even though their importance decreased significantly over time: while they made up close to 40% of all state revenues in 1869, their financing share decreased to less than 15% in 1910. Part of the reason is that property tax revenues, reflecting officially set and unadjusted land quality, remained stable (at around 60 million krones) through the years, while housing tax as well as income, corporate and capital gains tax revenues each tripled over the same period (totaling 111 million krones in 1910). But even they lagged behind the fivefold magnification of sales and consumption taxes and other state revenues that were mainly responsible for the overall expansion of the government budget during the years (from around 300 million krones in 1869 to 1400 million krones in 1910).

[15]Systematic collection of settlements' tax base and budgetary position took place in 1881 and 1908. While budgetary information is fully comprehensive, tax base information is missing in 1881 for townships not levying local taxes at the time.

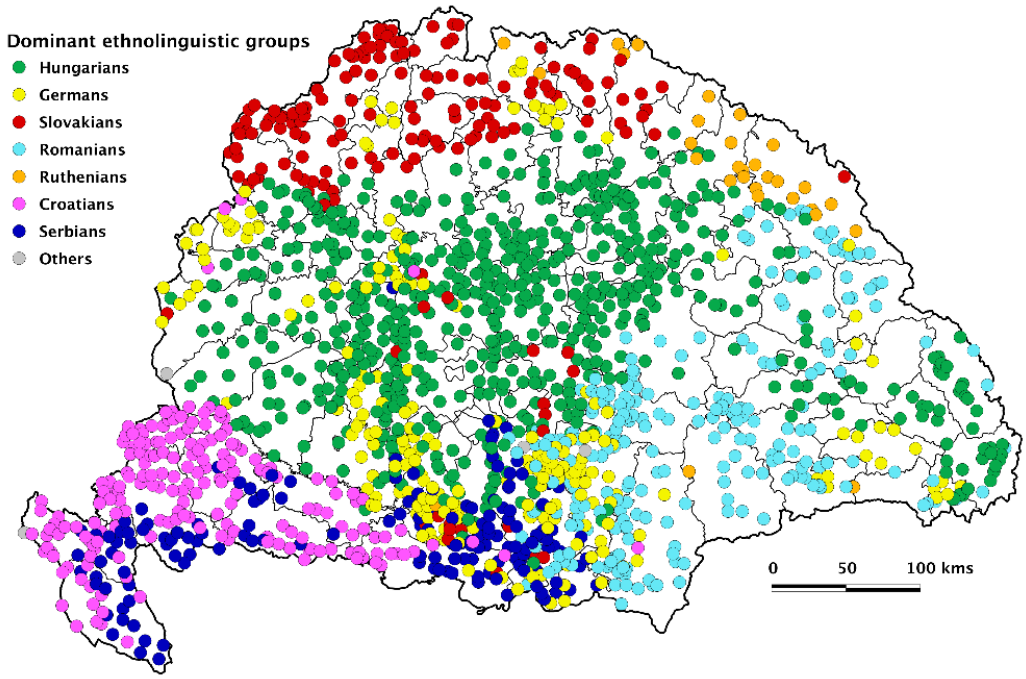


Figure 1a: Dominant ethnolinguistic groups in the sampled townships

track of the size, density and literacy of the local populace. The description of all variables used can be found in the Appendix with the corresponding data source.

3.2 Stylized facts

Table 7 in the Appendix contains descriptive statistics for demographic profiles, economic performance and selected non-categorical control variables of the sampled localities. However, a spatial representation is probably a more illuminating way to showcase the main social phenomena of interest. Figure 1a shows the dominant ethnolinguistic group in each sampled township and reveals a very high level of ethnic variety: beside the Hungarian majority, all other ethnic groups can claim dominance over certain townships' populace throughout the country, often in areas several hundreds of kilometers away from their natural habitat. Figure 1b shows that the confluence of different peoples were equally marked within townships as well: ethnolinguistic fractionalization scores indicate that most Slovakian, Romanian or Serbian territories of today were populated by truly multiethnic townships. Even here, the neighboring regions of Vojvodina (now mainly in Serbia) and Banat (now mainly in Romania) stand out as veritable melting pots for virtually all nationalities of Central Europe.

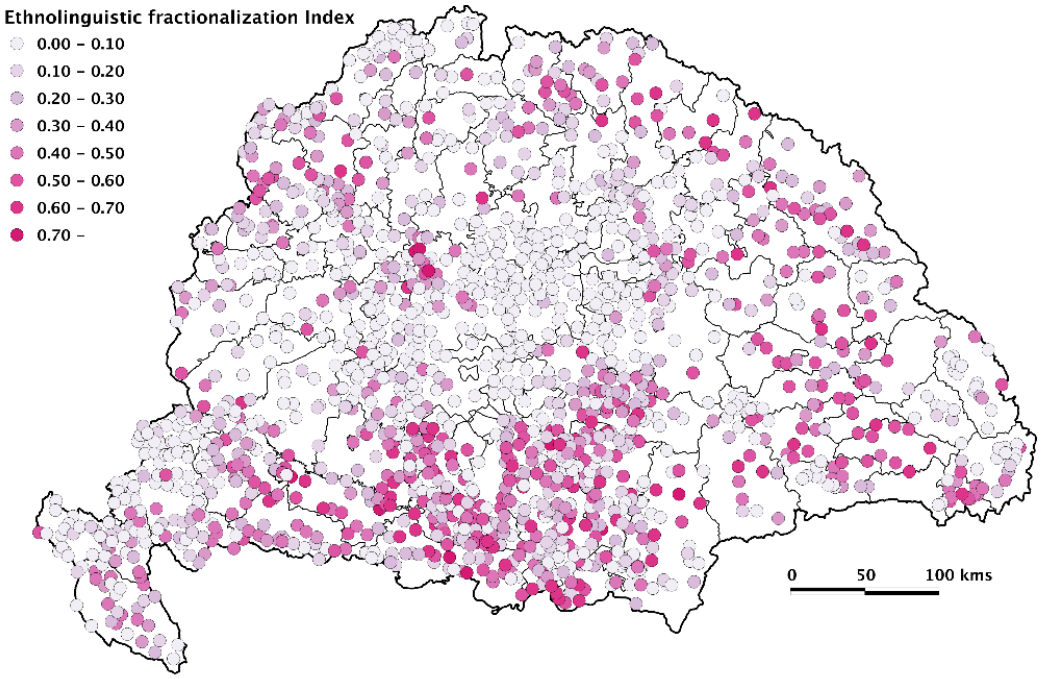


Figure 1b: Ethnolinguistic fractionalization of sampled townships

While relative groups shares in Table 7 in the Appendix seem to imply a somewhat more homogeneous society from a religious standpoint, Figure 2a reveals that there is abundant cross-sectional variation in the dominant religious group also. In fact, religious diversity *within* townships is actually higher than ethnic diversity: while the probability of two randomly chosen locals speaking different mother tongues was, on average, only 23% in 1910, almost one in three accidental meetings involved practitioners of different religions. Figure 2b confirms these findings and highlights the widespread incidence of religious mixing in most areas, with regions like Transcarpatia (bordering now upon Slovakia, Ukraine, Romania and Hungary) and Transylvania (now in Romania) being real meccas for different religions.

In a certain sense, the documented large variety in social matters also carries over to the economic sphere. By 1910, a hundredfold difference appears in the per capita tax base between the most and least affluent localities (see Table 7 in the Appendix). Similar disparities are revealed by employment shares: while 99% of the local populace were employed in industry, services or the public sector in the most developed townships, agriculture was virtually the only economic activity in the least advanced regions. Surprisingly, the correlation between per capita tax base and employment share in non-agriculture is moderate (0.36) at best, which

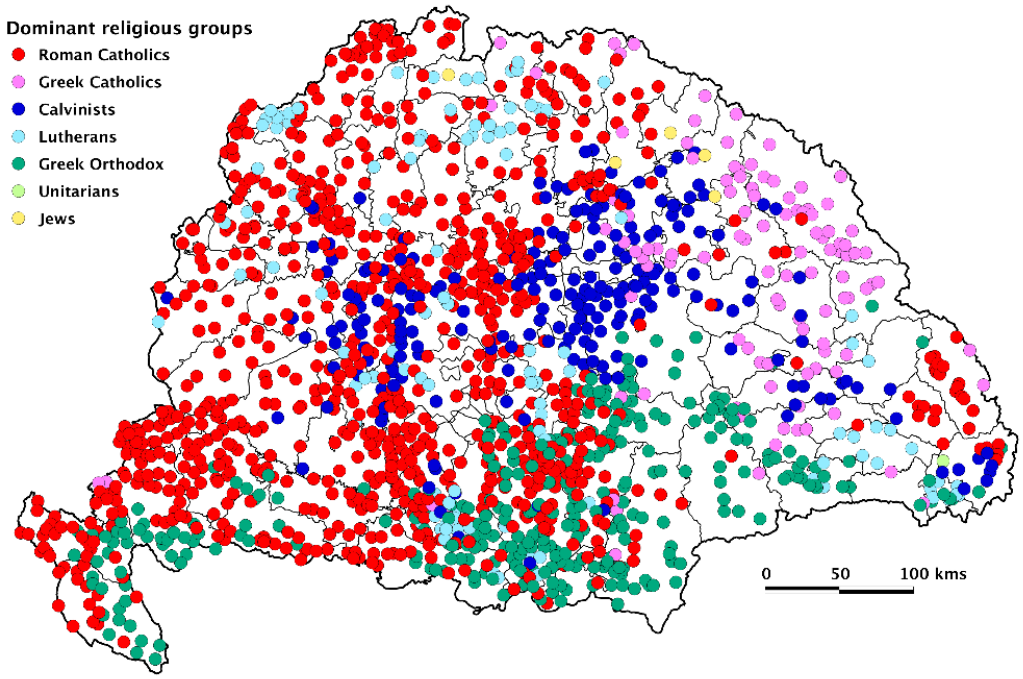


Figure 2a: Dominant religious groups in the sampled townships

presumably reflects the degree to which compound indicators (such as the tax base) can outperform lopsided ones (such as employment shares) in capturing the true state of economic development.[16]

Before the main analysis, it is important to review briefly the relationship between the principal variables of interest and assess whether the purported benefits of using historical data are actually afforded by the data. First, ethnic and religious profiles of townships display markedly different patterns, as evidenced by multi-ethnic localities uniting in a single faith or given nationalities practicing different religions.[17] The moderate correlation (0.51) between ethnic and religious mixing within townships warrants studying the growth effect along both dimensions separately. Second, raw associations between population size, economic develop-

[16]Comparing Figure 6a and Figure 6b in the Appendix reveals that many localities in the predominantly non-agrarian territories in the north, west or southeast of the country were actually rather poor, while some primarily rural regions (such as Vojvodina and Banat in the south) could sustain relatively high standards of living. This is in line with historical accounts focusing on geographical differences in crop yields and the field system (Berend and Ranki, 1967).

[17]Comparing Figures 1 and 2 nonetheless reveals also that ethnic and religious cleavages are almost identical in some areas. Such are the divisions separating Catholic Croatians and Orthodox Serbs in Croatia or dividing Catholic Hungarians, Protestant Germans and Orthodox Romanians in the southeast provinces of Transylvania.

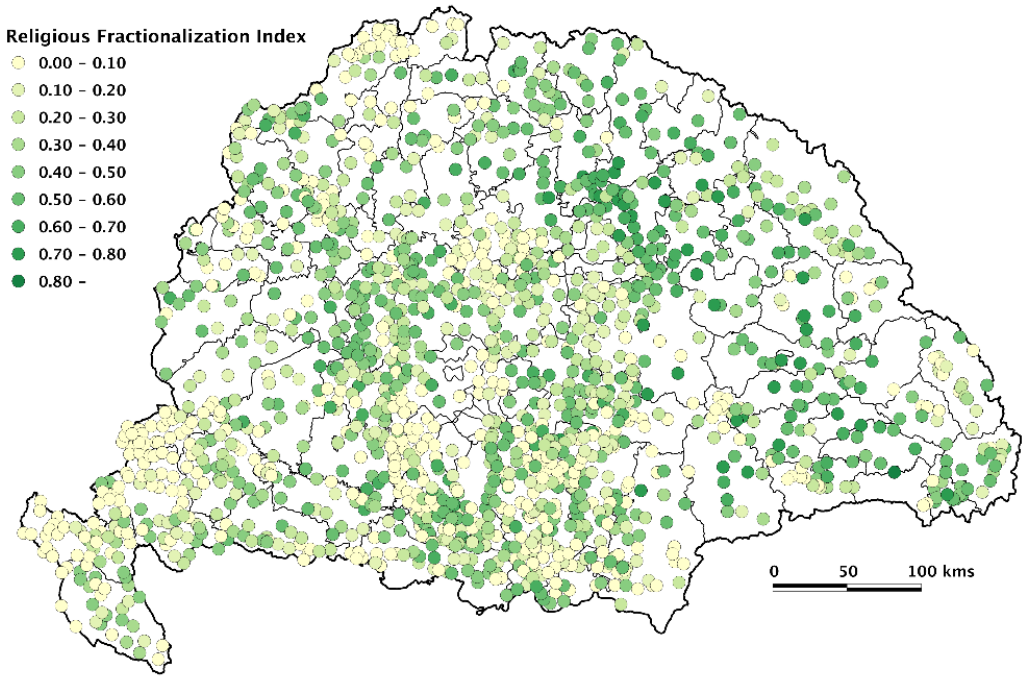


Figure 2b: Religious fractionalization of sampled townships

ment and social diversity (presented in Figures 7(a) and 7(b) in the Appendix) reveals that, in 1880, diverse localities were only marginally larger or more affluent than their homogeneous counterparts. This shows that societal variety was by no means an urban phenomenon at the time and ensures that selected observations are indeed comparable. Third, demographic profiles of townships exhibit very high stability over time, with a correlation coefficient of about 0.9 for diversity indices and even higher for individual group shares between 1880 and 1910 (see Figure 7(c) in the Appendix). Such low levels of social mobility implies that observed diversity levels at the beginning of the period should exert, if anything, a steady and lasting influence on townships' economic development over the subsequent years.

4 Main estimation results

The proposed estimation strategy relies on three crucial features. The first concerns the repeated observation of development indicators that makes it possible to focus on growth rates. The second is a hypothesis that the level of diversity at the time of the first observation is unrelated to all unobserved factors that can potentially affect townships' subsequent economic development. The third feature is that there has not been considerable or systematic changes in diversity over the

sample period so that initial diversity levels remain effective. These features allow me to compare growth rates between townships that are different in the ethnic and religious diversity of their populace. Econometrically, this boils down to using a difference-in-differences estimation technique with diversity as the continuous treatment. Specifically, I estimate the following baseline specification by ordinary least squares:

$$y_{i,1910} = \alpha + \beta \text{Diversity}_{i,1880} + \delta X_{i,1880} + \gamma y_{i,1880} + \epsilon_i \tag{1}$$

where the subscript i denotes individual townships, $y_{i,1910}$ measures economic development in 1910, $\text{Diversity}_{i,1880}$ stands for ethnic or religious diversity in 1880, $X_{i,1880}$ is a vector of controls as of 1880, while $y_{i,1880}$ captures the level of economic development at the beginning of the period.[18]

Table 1a and 1b show OLS estimates of the baseline model separately for the ethnic and religious dimensions. Regardless of the choice of the dependent variable and whether regional differences in growth are accounted for by county dummies, the coefficient on diversity is large, positive and statistically highly significant in all specifications. Results indicate that a township with a completely diverse populace (and a diversity index approaching unity) attained, on average, 20-30% higher growth between 1880 and 1910 than its socially homogeneous twin, on settlement-level and in per capita terms alike. This implies an annual growth advantage of about 0.5% for mixed townships composed of two equally sized ethnic or religious groups, while a one standard deviation (0.21-0.22) increase in diversity corresponds to a development gain of 3-5% over the entire period.

Given the difference in methodology, it is not easy to interpret the magnitude of these diversity gains in the context of the existing literature. The few referenced studies (Ottaviano and Peri, 2006; Sparber, 2009) that find positive relationship between diversity and economic performance rely on fixed-effects regressions and exploit changes in diversity over time. This study, on the contrary, exploits enduring cross-sectional differences in the *level* of diversity to look past endogenous migratory changes. While diversity estimates in the cited papers tend to be larger and even imply an elastic income response, my findings seem to suggest that a significant part of such diversity benefits may well accumulate even in the absence of labour mobility.[19]

[18]Note that this specification qualifies as difference-in-differences estimation in the general sense. A more straightforward DID specification would restrict the coefficient on the initial level of development to one and would feature the growth rate explicitly on the left-hand side:

$$\Delta y_{i,1910-1880} = y_{i,1910} - y_{i,1880} = \alpha + \beta \text{Diversity}_{i,1880} + \delta X_{i,1880} + \epsilon_i$$

Estimation results, other than the goodness of fit, are qualitatively identical regardless of which specification is used.

[19]To verify that the documented diversity gains are indeed unrelated to within township

	Settlement level tax base		Per capita tax base	
	(1)	(2)	(3)	(4)
Ethnic diversity	**.331****	**.337****	**.247****	**.207****
	(.063)	**(.066)**	**(.064)**	**(.065)**
Relevant 1880 tax base	.540**	.514**	.597**	.492**
	(.045)	(.050)	(.046)	(.046)
Literacy share	.602**	.546**	.808**	.710**
	(.080)	(.087)	(.081)	(.085)
Population size	.515**	.516**	.041	.019
	(.052)	(.056)	(.022)	(.025)
Population density	.032	.032	.020	.015
	(.020)	(.023)	(.011)	(.013)
Railway dummy	.011	.040	-.003	.017
	(.026)	(.029)	(.026)	(.028)
Navigable waterway dummy	.069**	.041	.082**	.041
	(.026)	(.029)	(.026)	(.027)
Mountain dummy	-.346**	-.232**	-.340**	-.233**
	(.050)	(.073)	(.048)	(.066)
Mining dummy	.009	-.024	.066	.003
	(.039)	(.052)	(.037)	(.048)
Distance to dual capitals	YES	YES	YES	YES
Legal and administrative status	YES	YES	YES	YES
County dummies	NO	YES	NO	YES
Nr. of observations	1008	1008	1008	1008
R squared	.897	.913	.691	.760

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. Population size as well as Settlement level and per capita tax base are measured in logs. Above results are obtained by using the widest (25kilometer) distance band to capture access to railways and navigable waterways but results are robust to using lower distance thresholds as well.

Table 1a: Main regression results for ethnic diversity

As regards coefficient estimates of control variables, they corroborate established findings in development economics about the important role of education and path-dependency in explaining economic performance (Barro, 1991; Beeson et al., 2001).[20]

4.1 Robustness of results

The baseline regression specification presented in the last section relies on specific measurement choices and omits several variables that, in principle, could greatly

changes in diversity over time, I explored running fixed-effects regressions on my data using the 1880 and 1910 cross-sections. As expected, diversity estimates (not reported here) are all highly insignificant, regardless of the specification used.

[20]It is nevertheless interesting that urbanization by itself does not correspond to higher living standards, as shown by insignificant estimates on either population size or density. While mountainous areas lag behind in growth, the presence of mines, access to railway (as of 1880) do not affect economic outcomes later.

	Settlement level tax base		Per capita tax base	
	(1)	(2)	(3)	(4)
Religious diversity	**.251****	**.343****	**.110***	**.313****
	(.054)	**(.062)**	**(.056)**	**(.060)**
Relevant 1880 tax base	.561**	.497**	.616**	.471**
	(.044)	(.050)	(.044)	(.046)
Literacy share	.517**	.457**	.761**	.639**
	(.078)	(.085)	(.080)	(.084)
Population size	.505**	.537**	.047*	.022
	(.052)	(.056)	(.023)	(.024)
Population density	.036	.033	.023*	.015
	(.020)	(.025)	(.011)	(.014)
Railway dummy	.012	.048	-.001	.021
	(.027)	(.029)	(.027)	(.027)
Navigable waterway dummy	.081**	.042	.089**	.040
	(.026)	(.028)	(.027)	(.027)
Mountain dummy	-.354**	-.231**	-.349**	-.226**
	(.050)	(.073)	(.048)	(.066)
Mining dummy	.016	-.001	.070	.018
	(.040)	(.053)	(.038)	(.047)
Distance to dual capitals	YES	YES	YES	YES
Legal and administrative status	YES	YES	YES	YES
County dummies	NO	YES	NO	YES
Nr. of observations	1008	1008	1008	1008
R squared	.896	.914	.691	.760

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. Population size as well as Settlement level and per capita tax base are measured in logs. Above results are obtained by using the widest (25kilometer) distance band to capture access to railways and navigable waterways but results are robust to using lower distance thresholds as well.

Table 1b: Main regression results for religious diversity

influence my results. This subsection is devoted to testing whether the estimated effects of diversity are robust to a wide range of alternative settings.

First, I test whether the choice of the outcome variable matters and estimate the same baseline model with population growth, employment share in non-agriculture and local budget size as the respective dependent variables. Table 8a in the Appendix shows the main diversity estimates and confirms that the strong positive diversity effect carries over, at 1% significance level, to both population growth and employment shares.[21] Interestingly, neither ethnic nor religious diversity is significantly related to townships' budget size in most specifications, the political economy of which remains unknown to me.

[21]Note that the specification using the 1910 employment share in non-agriculture as the dependent variable does not qualify as diff-in-diffs since employment shares are not observed at the beginning of the period. Results thus suggest that townships with two equally sized population groups (and a diversity index of 0.5) recorded, on average, up to 7 percent higher population growth and 13 percent higher workforce share in non-agriculture by 1910 than fully homogeneous twin localities.

Second, I investigate the robustness of results to sample choice. More specifically, I estimate the baseline regression model on separate sub-samples with below median initial population size, below median population growth and below median initial level of development level (as measured by per capita tax base). Diversity estimates in Table 8b in the Appendix reveal that results are not driven by a small subset of mixed booming townships: both ethnic and religious diversity are associated with an equally high growth advantage in smaller, poorer or less expansive places.

In principle, it is also a possibility that higher economic growth is not endemic to diversity itself but is due to the presence of certain social groups that are exceptionally productive or endowed with abundant resources. To check this, I estimate a series of extended models that feature the population share of a given ethnic or religious group alongside the diversity measure. Results in Table 8c in the Appendix show that diversity estimates remain unchanged even in the presence of large and statistically significant group-specific differences in growth rates.[22]

Given the dominance of agriculture in production, an equally plausible conjecture is that divergence in economic growth across townships is the result of differences in land quality or crop yields - especially since taxable land and property values account for a significant part of the tax base. While land quality is usually hard to measure and is typically derived from property transaction values or agricultural income (Donaldson and Hornbeck, 2012; Donaldson, 2013), the system of centrally determined monetized yield estimates (or krone values) in the Habsburg Monarchy allows me to use accurate direct information in this regard.[23] Since the 1908 fiscal report by the Hungarian Statistical Office contains, for each township, the total size, krone value and fair (market) value estimate of all its cultivable lands, I was able to calculate separate indicators of land quality (as per arpent values) and land endowment (as value shares in townships' tax base). Table 8d in the Appendix presents, for the subset of townships with cultivable lands, the main parameter estimates for the respective extended specification featuring one of the land quality or land endowment measures. As expected, results show a strong positive relationship between land quality (one standard deviation difference in land quality is associated with up to 8 percent higher growth when measured by

[22]In light of the substantial literature devoted to the issue (Becker and Woessmann, 2009), it is interesting to see that a higher share of Roman Catholics is associated with higher than average growth, while inverse is true in relation to Protestant groups. Also, while the agrarian communities of Ruthenians doing relatively worse is expected, the relatively low average growth rate associated with a higher share of German population is somewhat puzzling.

[23]The krone value was a centrally assessed expected monetized yield for all types of cultivable land. This meticulous system was put in place in 1875 in the entire Austro-Hungarian Monarchy and accounted for a wide range of factors (such as soil quality, crop type and climate) influencing expected yields. It has remained largely intact since its inception and for long served as a basis for direct land taxation and other administrative purposes.

	Number of township pairs		Parameter estimates			
	Total	Used	Township level tax base		Per capita tax base	
A. Ethnic dimension						
Township pairs within 5 kms	261	116	.243	.238	.440**	.217
			(.203)	(.132)	(.161)	(.137)
Township pairs within 10 kms	1609	799	.264**	.234**	.329**	.202**
			(.077)	(.056)	(.065)	(.059)
Township pair dummies			YES	YES	YES	YES
Control variables			NO	YES	NO	YES
B. Religious dimension						
Township pairs within 5 kms	261	116	.455*	.422**	.549**	.331
			(.183)	(.151)	(.181)	(.173)
Township pairs within 10 kms	1609	799	.295**	.204**	.418**	.199**
			(.075)	(.058)	(.064)	(.055)
Township pair dummies			YES	YES	YES	YES
Control variables			NO	YES	NO	YES

Heteroskedasticity-robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. Controls are the same as in the baseline regression specifications.

Table 2: Diversity estimates based on pairwise analysis of adjacent townships

the krone value) and the growth rate and a (less clear) negative association in relation to land endowment. Diversity estimates, however, remain qualitatively unaffected in most specifications.

As a final robustness check, I exploit the spatial characteristics of the network and consider the potentially important role of geography in shaping economic development (Klein and Crafts, 2012; Ploeckl, 2012). In particular, I focus on growth differentials between townships that are close enough to one another so that differences in location specific factors like climate, access to transportation or market potential should be negligible. In practice, I form settlement pairs using townships' geo-coordinates and estimate the following regression model

$$y_{ip,1910} = \beta \text{Diversity}_{ip,1880} + \theta D_p + \delta X_{ip,1880} + \gamma y_{ip,1880} + \epsilon_{ip} \tag{2}$$

where all previous notation remains unchanged except that each township i now considered is part of one or more township pairs p. Two townships are paired if the distance between them is below a given threshold, in which case both are assigned the same dummy variable D_p to capture common location specific characteristics.[24] This way, coefficient estimates capture average growth differentials

[24]Note that, due to the presence of pair-specific dummies D_p, the generic constant α is omitted in Equation 2 by reason of multicollinearity.

between members of the same pair only. Table 2 above presents the number of township pairs and corresponding diversity estimates for distance thresholds as low as 5 and 10 kms.[25] Diversity parameter estimates are once again large and positive in all specifications as well as being highly significant in most cases. Moreover, the statistical insignificance of the remaining estimates are due only to the increased standard errors associated with the relatively small number of township pairs below the 5 kms distance threshold. Pairwise analysis therefore clearly demonstrates that growth differentials across townships are essentially unrelated to differences in location-specific characteristics.

5 IV estimations

In the previous section, I have provided ample empirical evidence in favor of a strong and positive relationship between social diversity and economic growth at the beginning of the 20th century. No matter how robust these results are to different specifications and controls, they might nevertheless be driven by unobserved heterogeneity across localities or their populace. To establish causality in a fully convincing way, one needs an identification strategy based on some exogenous source of variation in diversity. Ideally, one wants to use only that part of the variation in social diversity that can be explained by factors unrelated to subsequent growth. Researchers in the literature have had a hard time proposing such factors. On regional and city level, researchers in the immigration and urban economics literature like to use the distance from gateways (Ottaviano and Peri, 2006) or past values (Card, 2001) of the endogenous variable to provide exogenous variation in diversity or immigration. While these methods are good in isolating recent patterns, they are generally not able to account for those unobserved enduring economic factors that have long attracted foreigners exactly for the economic benefits they confer to residents.

In this paper, I introduce a novel instrumenting strategy that does not rely on previous endogenous patterns of social mobility to identify causal effects. Specifically, I use military conflicts several hundred years before the current analysis and argue that they were one of the main factors inducing geographic mobility of the population. Historical evidence documents that from the 15th to the 18th century, a sizable fraction of the populace was involved in European military campaigns. Participating soldiers and mercenaries in armies often exceeded 100 thousand and it was commonplace to see a large number of non-fighters also directly involved in warfare as civil casualties, captives of hostages. Moreover, an even higher number of civilians were displaced and became fugitives, temporary migrants or settlers. A

[25] I calculated distances between townships based on the Haversine formula using geocoordinates of town centers.

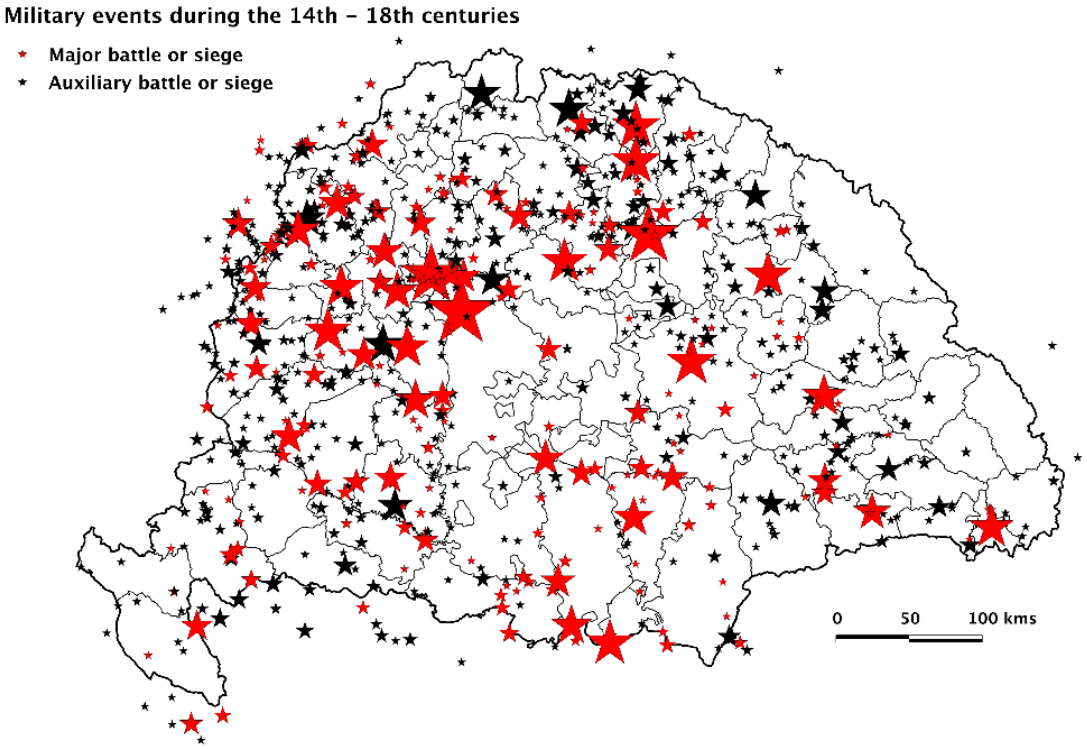
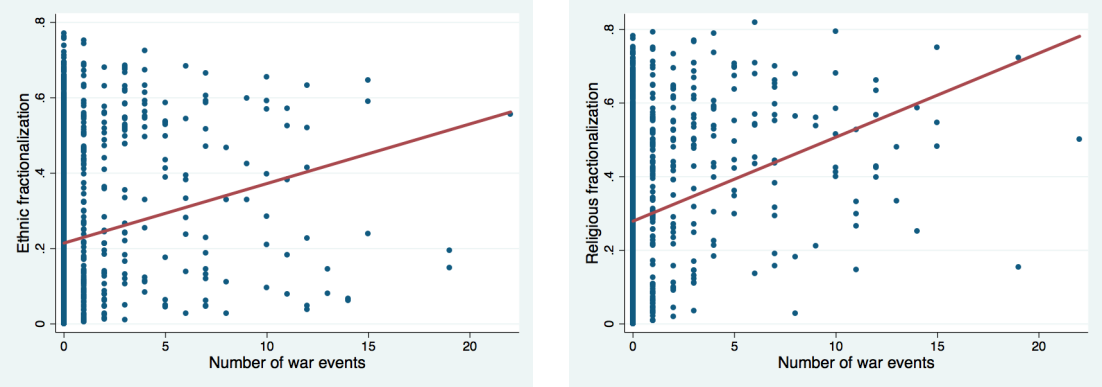


Figure 3: Military events in and close to Hungary during the 14-18th centuries

systematic exploration of the effect of medieval wars on social relations and social transformation is not available, but a large body of literature documents the social upheaval that was brought on by military campaigns. Hence, the degree to which a given locality was exposed to warfare in the past should be related to level of diversity in its population later on. Moreover, since the direct economic impact of these wars is likely to be moderate even in the short term, exposure to warfare certainly should not affect economic performance several hundred years later and thus qualifies as a good instrument for social diversity.

To this effect, I collected and digitized all documented military events that took place in Hungary and bordering territories between the first Ottoman raid in 1391 and 1718, the year by which all previously occupied Ottoman territories had been reclaimed and the geographical unity of 19th Hungary was re-established. My information source was the 24-volume monumental work entitled "Military history of the Hungarian nation" by Banlaky (1928), a penultimate achievement in Hungarian historiography which offers a detailed account of more than a thousand years of Hungarian war history. The resulting sample contains the time, location, belligerent armies and their strength as well as the outcome of more than 2048 battles and sieges. Since it became evident during data collection that the our



(a) Ethnic dimension

(b) Religious dimension

Figure 4: Empirical relationship between previous war exposure and diversity

historical knowledge is biased towards more recent, historically relevant or politically identifiable events, I also created a more homogeneous and representative subsample of 364 major events that featured at least 1000 verified fighters on both participating sides.[26] The spatial characteristics of sampled military events can be seen on Figure 3 where the size and color of the stars indicate, respectively, the number and type of events that took place at each war location. The map shows that the entire country was exposed, albeit to a different degree, to warfare, and that the number and importance of military events tend to be related to administrative borders separating Habsburg Hungary, Transylvania and the occupied Ottoman territories.

For an instrument based on war exposure to be satisfactory, war locations should be associated with subsequent social diversity but unrelated to growth potential. A strong argument in favor of the latter being true is that roughly half of the military events (1065 total and 170 major event, respectively) took place outside of all sampled townships. Moreover, ordered probit estimates in Table 9 in the Appendix reveal that there is no statistical relationship between the spatial distribution of the remaining events and the per capita tax base of localities in 1880. These battles and sieges concentrated mostly to larger and more accessible townships with distinguished administrative and legal standing, but marginal effects calculated from the respective coefficients reveal that even

[26]The availability of military history information is very much determined by the historical importance: while more than 500 event had been documented about Rakoczi's war of independence during a handful of years at the beginning of the 18th century, no information is available about 14-15th century Ottoman or Tatar raids that resulted in the complete demolition of hundreds of settlements. Also, singular events are more likely to be documented than larger campaigns involving several hundreds of smaller battles and confrontations.

these townships have a roughly 50 percent chance of not being treated at all. Good instrumentation also requires that exposure to war and subsequent social diversity be strongly related. Scatterplots in Figure 4 show just this: settlements with a higher number of war events throughout the centuries tend to be more diverse both ethnically as well as from religious standpoint.

To focus, in the statistical analysis, singularly on military events that took place in the sampled township is unappealing on both historical and statistical accounts. For one, history reveals that, even at medieval times, military activity relied to an astonishing degree on strategy, logistics and resource management, which implies that not only the actual location of wars but also their surroundings were heavily affected. Including surrounding territories also helps statistically as it introduces much more variation in the data. Hence, the idea is to use the number of war events in the vicinity of each settlement as the main instrument for subsequent social fractionalization. To determine the number of relevant war events, I not only had to calculate the distance between each war location and township, but also had to learn about the history of each sampled township. In particular, to avoid counting antecedent events, I consulted the webpage of and publicly available sources about each locality to learn the year of their founding or, in case of having been abandoned for extensive periods, their latest re-founding.[27] Figure 8 in the Appendix shows how the distribution of major war events stretches to the right and the fraction of untreated localities decreases as the distance band is increased from zero to 10, 25 and 50 kms.

The regression methodology consists in using the part of variation in ethnic and religious diversity that is explained by antecedent historical factors such as the number of war events, the century of (re)founding and the categorical variables indicating whether the given settlement was abandoned or belonged to territories bordering on the Ottoman Empire (the so-called military frontier). The first stage results are presented in Table 3 for different distance bands and specifications for major war events.[28,29] Results indicate that the data supports the proposed hypothesis: the number of medieval war events in the vicinity of settlements is strongly and positively related to both ethnic and religious diversity at the end of

[27]Among the 1689 townships, 378 was abandoned at least once for a period longer than 10 years. These are mostly settlements in the southern and central parts of the country, and their abandonment took place during the Ottoman rule.

[28]Note that using settlement level and per capita tax base leaves the reported estimates and the model fit unchanged, since the log of population and tax base measures are linear combinations of one another.

[29]Both first- and second-stage results obtained from using all war events are available in Table 10 in the Appendix. Even though they provide a better fit for religious diversity in the no-fixed effects specification, instruments are generally even weaker than in the case of major wars. Even though this analysis yields no significant diversity parameter estimates, they are not statistically different from the ones obtained from major wars.

	Without county dummies			With county dummies		
	10kms	25kms	50kms	10kms	25kms	50kms
A. Ethnic dimension						
Number of war events	.004	.006*	.003**	.004	.007*	.003*
	(.006)	(.003)	(.001)	(.006)	(.003)	(.001)
Military frontier	.043	.040	.036	.044	.037	.036
	(.030)	(.030)	(.030)	(.032)	(.032)	(.031)
Founding century	-.009*	-.007	-.005	-.010*	-.008	-.007
	(.004)	(.004)	(.004)	(.004)	(.005)	(.005)
Abandoned	.014	.029	.043*	.016	.032	.039*
	(.015)	(.016)	(.018)	(.016)	(.017)	(0.18)
Nr. of obs.	979	979	979	979	979	979
R squared	.221	.226	.229	.350	.354	.354
Partial R squared	.010	.016	.020	.013	.020	.019
F-statistic	2.04	3.41**	4.47**	2.34	3.80**	3.47**
Sargan test statistic	5.76	9.62*	7.85*	6.04	5.26	4.88
B. Religious dimension						
Number of war events	-.011	.006*	.002*	-.010	.008*	.003**
	(.007)	(.003)	(.001)	(.006)	(.003)	(.001)
Military frontier	-.037	-.043	-.045	.014	.004	.002
	(.027)	(.027)	(.027)	(.030)	(.031)	(.030)
Founding century	-.025**	-.022**	-.021**	-.013**	-.010*	-.008
	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
Abandoned	-.035*	-.007	.043*	-.018	.006	.016
	(.017)	(.018)	(.019)	(.016)	(.017)	(0.18)
Nr. of obs.	979	979	979	979	979	979
R squared	.218	.219	.220	.389	.392	.392
Partial R squared	.045	.046	.047	.013	.019	.019
F-statistic	11.05**	11.576**	11.98**	2.83*	4.15**	4.29**
Sargan test statistic	8.06*	8.99*	7.30*	2.03	4.91	4.59

Table 3: First stage estimation results

the 19th century. The partial effect of an event is by no means small (10-15 events in the vicinity corresponds with a 10 percentage point increase in diversity) and the relationship only gets stronger with a larger distance band. The estimated effect of the remaining excluded instruments is more ambiguous, but settlements (re)founded later tend to be less diverse.

Table 3 also reveals that much of the variation in social diversity across settlements is not captured by the featured exogenous factors: the coefficient of determination for the first-stage regressions remains between 20 and 40 percent. Moreover, the contribution of the excluded instruments, though significant in most cases at the 1 percent level, does not amount to more than a few percentage points (as shown by the F-statistic and partial R squared figures, respectively). Plotting the predicted fractionalization values against the observed ones (see Figure 9 in the Appendix) confirms these findings: predicted fractionalization values are much

	Without county dummies			With county dummies		
	10kms	25kms	50kms	10kms	25kms	50kms
A. Ethnic dimension						
Diversity	**1.672***	**1.748**	**1.769***	**.455**	**.480**	**.312**
	(.845)	**(.957)**	**(.802)**	**(.714)**	**(.971)**	**(.958)**
Relevant tax base	.486**	.507**	.499**	.498**	.534**	.524**
	(.090)	(.093)	(.083)	(.058)	(.058)	(.056)
Literacy share	.892**	.836**	.852**	.544**	.491**	.514**
	(.119)	(.127)	(.120)	(.157)	(.164)	(.159)
Population size	.082*	.172*	.157*	.072*	.151	.113
	(.038)	(.075)	(.078)	(.037)	(.100)	(.108)
Population density	.035	.108	.096	.052*	.101	.079
	(.031)	(.074)	(.074)	(.022)	(.064)	(.064)
Railway dummy	-.035	-.041	-.040	-.066	-.074	-.059
	(.037)	(.041)	(.039)	(.048)	(.058)	(.058)
Navigable waterway dummy	.057	.053	.054	.052	.060	.056
	(.037)	(.040)	(.039)	(.031)	(.033)	(.031)
Mountain dummy	-.253**	-.235**	-.235**	-.058	-.043	-.069
	(.072)	(.086)	(.078)	(.109)	(.131)	(.127)
Mining dummy	.060	.077	.071	.154	.168	.159
	(.050)	(.053)	(.053)	(.143)	(.153)	(.149)
Nr. of obs.	979	979	979	979	979	979
R squared	.495	.319	.349	.509	.414	.506
B. Religious dimension						
Diversity	**-.195**	**-.197**	**-.751**	**.570**	**2.539**	**2.641**
	(.293)	**(.472)**	**(.642)**	**(.709)**	**(3.177)**	**(4.276)**
Relevant tax base	.640**	.640**	.626**	.460**	.371	.367
	(.045)	(.046)	(.047)	(.086)	(.219)	(.267)
Literacy share	.787**	.784**	.989**	.445**	.063	.047
	(.107)	(.163)	(.224)	(.141)	(.546)	(.756)
Population size	.069*	.072	-.066	.065	.327	.343
	(.033)	(.077)	(.116)	(.034)	(.286)	(.429)
Population density	.054**	.057	-.033	.042	.176	.184
	(.021)	(.046)	(.081)	(.026)	(.155)	(.223)
Railway dummy	.003	.003	.020	-.042	-.033	-.030
	(.028)	(.030)	(.036)	(.051)	(.090)	(.094)
Navigable waterway dummy	.079**	.078**	.063	.050	.053	.053
	(.028)	(.030)	(.034)	(.031)	(.054)	(.056)
Mountain dummy	-.361**	-.360**	-.400**	-.076	.006	.007
	(.050)	(.055)	(.068)	(.103)	(.182)	(.219)
Mining dummy	.073	.073	.043	.155	.092	.083
	(.039)	(.042)	(.049)	(.130)	(.253)	(.277)
Nr. of obs.	979	979	979	979	979	979
R squared	.672	.670	.564	.594	-.025	-.059

Table 4: Main IV estimates obtained by the efficient GMM estimator

less dispersed around the (unconditional) mean than actual ones. This implies that the issue of weak instruments cannot be avoided when interpreting the main results. Also, results of Sargan's overidentification test reveal that war locations are

unlikely to have been fully unrelated to social diversity and are likely to have concentrated in more historically diverse regions. Since instrument validity problems evaporate once regional differences in diversity are eliminated (by county fixed effects), this is consistent with the hypothesis that military and social front-lines were not independent of one another. With these provisos, let us now turn to the main IV estimates.

Main results obtained by the efficient GMM estimator are shown in Table 4 using per capita tax base as the dependent variable in different specifications.[30] Due to instrument weakness, both the magnitude and the corresponding standard errors of the diversity effect are estimated much larger than with OLS. This prevents the detection of statistically significant relationships in most cases, but not all: in specifications without county fixed-effects, GMM estimates of the economic diversity parameter are positive and significant at the 5 percent level. This as well as the similarity of estimate patterns with that of OLS point to the direction of accepting OLS estimates as evidence of causal effect of diversity on economic growth.

6 Understanding the positive effects of diversity

Most empirical studies in the literature stop short of rigorously explaining the underlying mechanisms that drive their results. Nevertheless, several micro level studies exist that offer plausible explanations for the productivity effects of diversity that qualify as having external validity. A large body of this literature focuses on developing countries given the high share of economic transactions outside the formal sector and the importance of efficient voluntary enforcement schemes. Most of these studies document the economic importance of group membership and personal connections as well as the detrimental effect of the lack of trust between members of different groups. For example, La Ferrara (2002) analyses African production cooperatives in Nairobi and finds that ethnically homogeneous cooperatives are more likely to pursue specialization, divide labour and adopt incentivizing remuneration schemes. Similarly, among Peruvian micro finance organizations, more ethnically heterogeneous ones harness social connections less efficiently and show significantly lower repayment and savings rates (Karlan, 2007).

More recently, several micro level studies have looked at highly developed countries where trust issues might be less relevant as well as asked what different groups "bring to the table" in terms of specific knowledge or skills. It seems that, the

[30]Reduced form results obtained by the two-stage least squares (2SLS) estimator are also presented in 11 in the Appendix. These estimates are generally more precise, not statistically different from the GMM ones and follow the main OLS patterns. In one case, a positive and statistically significant relationship is detected between religious diversity and economic growth.

positive economic spillovers associated with variety in skills and backgrounds dominate potential trust issues: Trax et al. (2012) finds strong productivity increases due to cultural heterogeneity both within and across plants in Germany, while Parrotta et al. (2012) differentiates between the positive effects of educational diversity and the negative effects of ethnic diversity on the productivity of Danish firms. Based on a randomized experiment, Hoogendoorn and van Praag (2012) claims that ethnic diversity enhances business performance in the Netherlands.

As documented in numerous historical, ethnographic and literary works, partisanship and intergroup resentment were indeed instrumental in shaping the nature and intensity of interactions between different ethnic and religious groups in the dual Monarchy. Data limitations certainly do not allow me to explore this issue, but I'm more than well-equipped to investigate the apparently more relevant subject of how productive varieties in work skills and expertise translated to higher economic growth. Specifically, the 1910 census contains detailed information on the sectoral and industry distributions of the populace in all townships, which makes it possible to investigate the relationship between social and economic diversity on the local level and to offer a coherent explanation as to why diverse localities were able to outperform their more homogeneous counterparts.

My proposed mechanism is based on the premise that significant occupational sorting was taking place along ethnic and religious lines at the time. This is supported by extensive historical and ethnographic evidence and is rooted as much in centuries-long traditions, cultural traits and social factors as in endowment differences in land and natural resources.[31] Ethnic and religious concentration in specific industries or economic sectors is well documented in the development economics literature and has been attributed to present-day social divisions (Bigsten et al., 2000; Fafchamps, 2000), previous social institutions or religious norms (Botticini, 2000; Botticini and Eckstein, 2005) as well as organic development in the face of geographic variability (Michalopoulos, 2012). It follows that mixed townships that comprised peoples with different savoir-faire tended to have more diverse local economies as well. My claim is that it is exactly the confluence of different industries and the ensuing broader industry profiles that generated positive economic

[31]There are very few comprehensive analysis of the question, and most pieces of information have to be complied from various sources. One of the few exceptions is Acs (1984) which documents that while 9 in 10 Romanians and Ruthenians were still working in the agricultural sector in 1910, Jews (for whom landownership was prohibited for centuries before 1840) were highly overrepresented in intellectual professions and made up almost half of lawyers doctors; that wandering industry workers of wires and glasses were almost exclusively Slovakians who also made up a majority of miners; that Germans accounted for the majority of beer brewers and brandy distillers as well as technicians, barbers, brickmakers, smiths were predominantly of German origin; that commerce concentrated in the hands of Greeks, Macedonians and Jews; that Gypsies were involved predominantly in horseshoe making, basket weaving and nailcutting. Documents of occupational sorting according to religious identities are more sporadic.

Figure 5: Proposed mechanism between diversity and economic growth

spillovers and higher development for these settlements. The described mechanism is illustrated by Figure 5.

Before testing each element of the proposed hypothesis, it is worth reviewing the state of local economies, as captured by the distribution of working population across 11 economic sectors and 29 industry classes. Figure 10a in the Appendix shows worker shares in each sector of the economy and reveals that about half of the working population, roughly 2.5 million people were employed in agriculture alone. Approximately a quarter of the workforce concentrated in industry, while a respectable share earned their keep from domestic service, commerce, finance or the public service. Figure 10b shows how diffused economic activity was and indicates that virtually all sampled townships had at least one resident working in most of the sectors other than mining. Figure 11a presents the rich categorization of industrial professions and shows a more even distribution of workers among them, with shoemaking, clothing, tailoring and machinery sitting at the top. Figure 11b also reveals that certain industries, just like sectors, are much more concentrated than others: for example, even though not among the dozen most populous industries, smiths were the most diffused among all industrial professions.[32]

Let us now start by checking whether the idea of occupational sorting across ethnic or religious lines is actually supported by the data. If the joint distribution of social and economic affiliations within townships were known, this would be a straightforward exercise. However, since only the respective marginal distributions are available, I present a more conjectural analysis involving two different approaches. First, I look at the empirical relationship between social (that is, ethnolinguistic and religious) and economic (that is, sectoral and industrial) dissimilarity between townships. To this end, I have calculated the previously presented dissimilarity measures for all township pairs in each county and computed the correlation coefficient between the respective social and economic categories. If ethnic and religious groups indeed self select into specific occupations then this

[32]Since fermentation and civilization are widely considered inseparable, it is hardly surprising that almost all settlements have someone working in hospitality services too.

correlation should be positive as more socially disparate townships would exhibit greater difference in terms of economic activity as well. Second, I calculate the average (within-county) economic dissimilarity separately for townships with the same and townships with a different dominant social group. In case of occupational sorting, a comparison should reveal a higher average dissimilarity of economic profiles between settlements with different dominant groups (relative to settlements with the same dominant group).[33]

[33]Both type of analysis focuses on within-country differences and dissimilarities in order to abstract, as much as possible, from regional differences in land and resource endowments, cultural traits or economic development.

	SECTORAL PROFILE		INDUSTRY PROFILE	
	Ethnicity	Religion	Ethnicity	Religion
A. Average correlation between social and economic dissimilarity				
All townships	.276	.158	.194	.143
Homogeneous townships	.175	.282	.206	.187
Large townships	.025	.147	.136	.036
Large & homogeneous townships	.075	-.010	.020	.200
B. Average economic dissimilarity between townships with different/same dominant groups				
All townships	.352/.288	.321/.292	.496/.451	.477/.459
Homogeneous townships	.221/.217	.182/.165	.488/423	.505/.464
Large townships	.333/.283	.298/.287	.444/.386	.380/.382
Large & homogeneous townships	.177/.091	.190/.115	.452/.394	.468/.435

Table 5: Dissimilarity analysis of townships' social and economic profiles

Table 5 presents the results of the dissimilarity analysis for different samples of townships in each socioeconomic relation. Part A shows that townships with more dissimilar societies indeed tend to be somewhat more disparate economically and that this relationship largely holds also in the sub-samples of relatively homogeneous or populous localities where the confounding effects of diversity and size are less onerous. Observed correlations between social and economic dissimilarity are rather weak for all socioeconomic relations, which can equally highlight limited occupational sorting or the limitations of the dissimilarity measure, in particular its incapacity to differentiate between the identities of the non-overlapping constituents. Average (conditional) dissimilarities presented in Part B of Table 5 are more straightforward and reveal that two townships with different dominant groups tend to be 10-20% more disparate economically than two townships with the same dominant group. These results do not bring conclusive evidence of occupational sorting (and imply even less that ethnicity or religion should be strong predictors of economic activity in specific sectors or industries), they nevertheless confirm that townships' economic specialization was clearly related to their ethnic and religious constitution.

Hence, one can reasonably expect more diverse localities to entertain a broader mix of economic activities and thus have more complex local economy. This can be tested by regressing economic complexity on social fractionalization, the level of economic development and the standard set of control variables, with all observations coming from a single cross-section of 1910. Contrary to the difference-in-differences model, this specification certainly cannot identify the effect of neither higher development nor higher diversity on economic complexity, but can nevertheless, for a given point in time, uncover the empirical relationship between social and economic diversity. Econometrically, the following equation is estimated

$$\text{Complexity}_{i,1910} = \alpha + \beta \text{Fractionalization}_{i,1910} + \delta X_{i,1910} + \gamma y_{i,1910} + \epsilon_i \qquad (3)$$

where notation on the right hand side is consistent with that of Equation 1. I measure economic complexity primarily by the multitude of sectors or industries present in a given settlement but investigate the use of the Herfindahl-type fractionalization index for this purpose also. The empirical distributions of these measures are plotted in Figure 12 in the Appendix and show the superiority of the multitude measure due its large support.[34]

Main parameter estimates are presented in Table 6 separately for sectoral and industrial analysis, ethnic and religious diversity, specifications with and without county fixed effects. Results in Panel A indicate that higher social diversity in a township is indeed very strongly associated with a more complex local economy: regardless of the specification, residents of an ethnically or religiously very diverse settlement are employed, on average, in 0.5 more sectors than otherwise similar but homogeneous localities. Panel B shows that this relationship gets even stronger when one focuses on the industrial profiles: the conditional difference in the multitude of industries between fully diverse and not at all diverse localities increases above four, which is roughly the predicted effect of doubling the population size or tripling the per capita income. As expected, population size, per capita income, literacy rate all turn out to be strong predictors of economic complexity, but the same can be said of mountainous terrain and the presence of mining activity nearby as well.[35] Table 12 in the Appendix confirms that these findings are robust to choosing the standard fractionalization index as the measure of economic complexity also, even though the industrial analysis generally do not yield statistically significant estimates due to aforementioned reasons.

Hence, it seems plausible that diverse localities could experience higher growth primarily through the increased complexity of their local economies. This is consistent with the findings of Glaeser et al. (1992) which states that city diversity promotes innovation and growth as knowledge spills over industries.

Unfortunately, I do not have an empirically testable hypothesis as to through what channels these spillovers materialized. It might equally have been the increased productivity stemming from input diversification as predicted by the neoclassical production model, the increased resistance to idiosyncratic shocks due to diversification or numerous other factors.

[34]The use of fractionalization measure becomes really problematic in the industrial setting due to the high number of industries present in a typical township. Being subject to a strong geometric decay, the marginal fractionalization gain associated with an extra group becomes close to zero very soon. This is the reason why more than half of the probability mass is concentrated between 0.89 and 0.94, which makes it extremely hard to identify model parameters.

[35]Even though the borderline significant negative statistical association between per capita tax base and the number of sectors present is somewhat surprising.

	ETHNICITY		RELIGION	
	(1)	(2)	(3)	(4)
A. Sectoral analysis				
Diversity	**.651****	**.893****	**.892****	**.708****
	(.115)	**(.132)**	**(.113)**	**(.129)**
Per capita tax base	-.203**	-.021	-.169**	-.045
	(.063)	(.069)	(.058)	(.067)
Literacy share	1.524**	1.583**	1.304**	1.479**
	(.251)	(.273)	(.238)	(.271)
Population size	.510**	.574**	.516**	.583**
	(.046)	(.050)	(.045)	(.049)
Population density	-.004	-.005	-.005	-.004
	(.006)	(.007)	(.005)	(.006)
Railway dummy	-.057	-.075	-.046	-.030
	(.151)	(.170)	(.146)	(.168)
Navigable waterway dummy	-.130*	-.008	-.089	-.011
	(.052)	(.062)	(.052)	(.063)
Mountain dummy	.563**	.399**	.592**	.439**
	(.079)	(.117)	(.079)	(.120)
Mining dummy	.351**	.289**	.364**	.331**
	(.087)	(.094)	(.086)	(.094)
County dummies	NO	YES	NO	YES
Nr. of observations	1314	1314	1314	1314
R squared	.339	.778	.354	.994
B. Industry analysis				
Diversity	**5.289****	**4.745****	**4.129****	**4.009****
	(.426)	**(.496)**	**(.419)**	**(.471)**
Per capita tax base	1.158**	1.376**	1.594**	1.224**
	(.237)	(.280)	(.219)	(.273)
Literacy share	14.402**	16.072**	12.856**	15.483**
	(.777)	(.949)	(.773)	(.958)
Population size	4.291**	4.293**	4.299**	4.335**
	(.173)	(.195)	(.168)	(.189)
Population density	-.015	-.019	-.008	-.016
	(.023)	(.028)	(.029)	(.031)
Railway dummy	.452	.710	.668	.936
	(.511)	(.537)	(.528)	(.556)
Navigable waterway dummy	.340	.016	.592**	-.004
	(.186)	(.233)	(.193)	(.242)
Mountain dummy	.889**	1.396**	1.072**	1.617**
	(.304)	(.422)	(.304)	(.434)
Mining dummy	.351	.742*	.449	.966*
	(.292)	(.310)	(.298)	(.320)
County dummies	NO	YES	NO	YES
Nr. of observations	1314	1314	1314	1314
R squared	.754	.980	.743	.980

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively.

Table 6: Regression results for economic complexity

7 Conclusions

This paper contributes to the social diversity literature in economics and extends the scope of previous research by exploiting historical origins of ethnic and religious diversity as well as low levels of social and geographical mobility of 19th century societies. In particular, I find that economic performance of Hungarian townships at the turn of the 20th century was strongly enhanced by social diversity: mixed localities recorded up to 1 percent higher annual growth than their homogenous counterparts. Moreover, extensive analysis and a novel IV strategy based on exposure to armed conflicts in the preceding centuries allow for a causal interpretation of these results. The paper also proposes a plausible and testable explanation as to how diversity gains were generated: with occupational sorting taking place along ethnic and religious lines, social and economic profiles of townships became closely related and diverse localities could benefit from more complex local economies and the presence of high-tech industries in particular.

It follows that there are at least three almost trivial but nevertheless often neglected policy conclusions that should be drawn from this analysis. First, it is undeniable that high politics in many parts of the world is partisan, nationalistic, chauvinistic and seems to voice and represent deep-embedded divisions and confrontations between different groups of people. Yet, as the case of the Austro-Hungarian Monarchy clearly shows, it is fully possible that at the local level, citizens benefit greatly from co-habitation and close interaction with members of different groups. Hence, policy makers and the general public should probably also factor the 'grass-root' effects into the analysis and be more appreciative of the everyday experience and benefits stemming from living in diverse societies and communities. Second, the texture of society in our age is much more complex and societies are much more stratified than to be adequately captured by a single aspect. It follows that any attempt at isolating the effect of a specific aspect of social reality (such as diversity) on social and economic outcomes has to be cognizant of and knowledgeable about the nature and location of other fault lines that structure society. Third, it seems that social diversity confers economic benefits only if different constituents of the population "bring something different to the table". This analysis suggests that this was very much the case in the Danube Monarchy a 100 years ago, that produced one of the highest growth rates among industrialized nations ago as a result. This way of thinking is inherent in the leading theories of the economic effects of diversity, but is unfortunately often forgotten in applied work or policy making.

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Appendix A

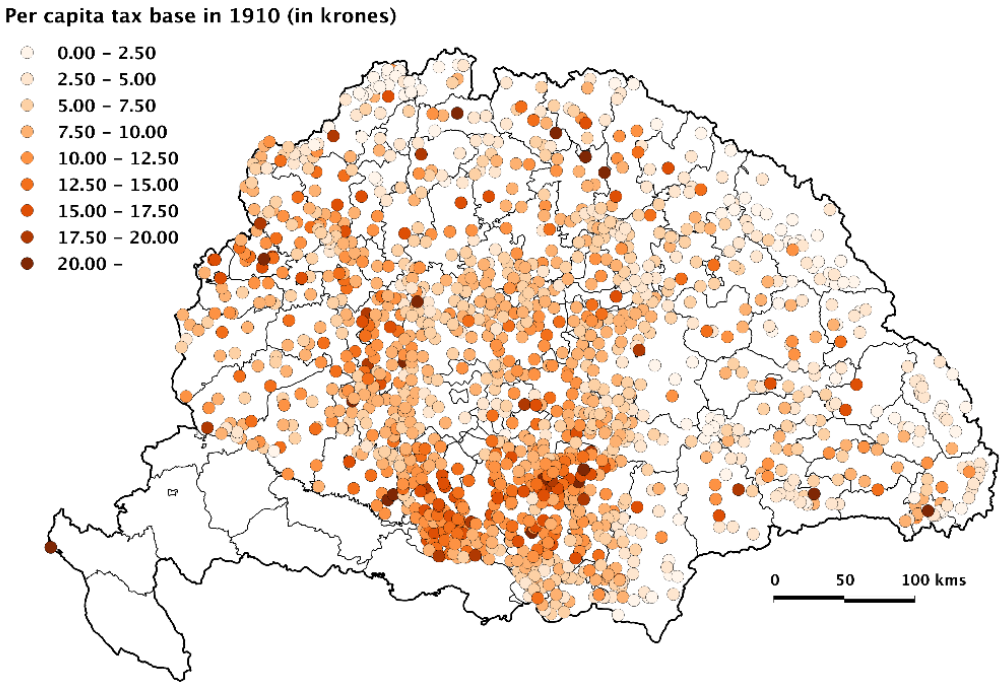


Figure 6a: Per capita tax base of sampled townships in 1910

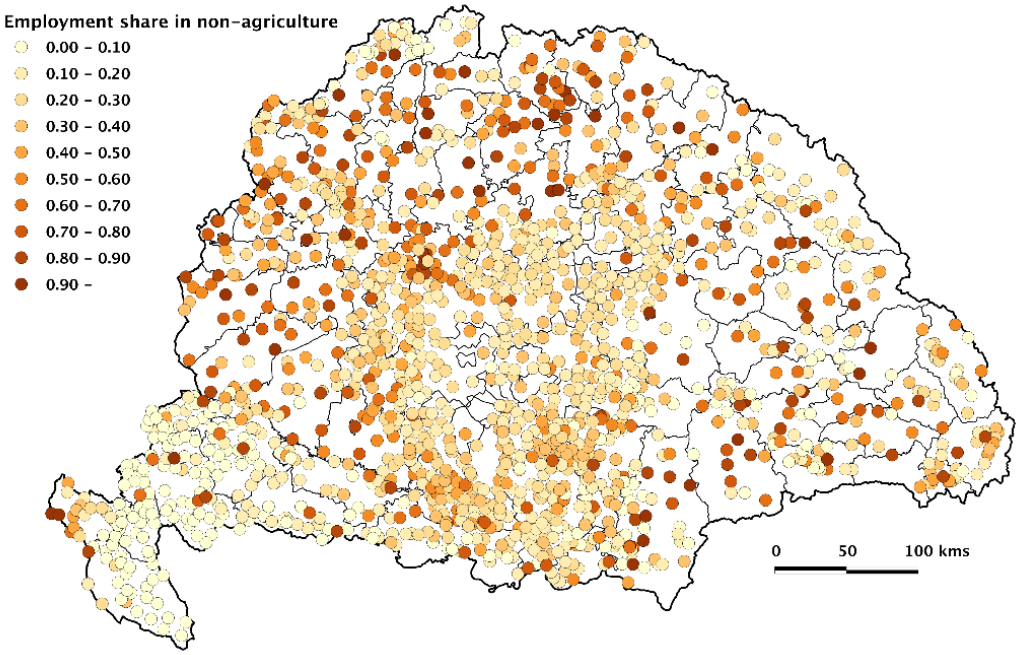
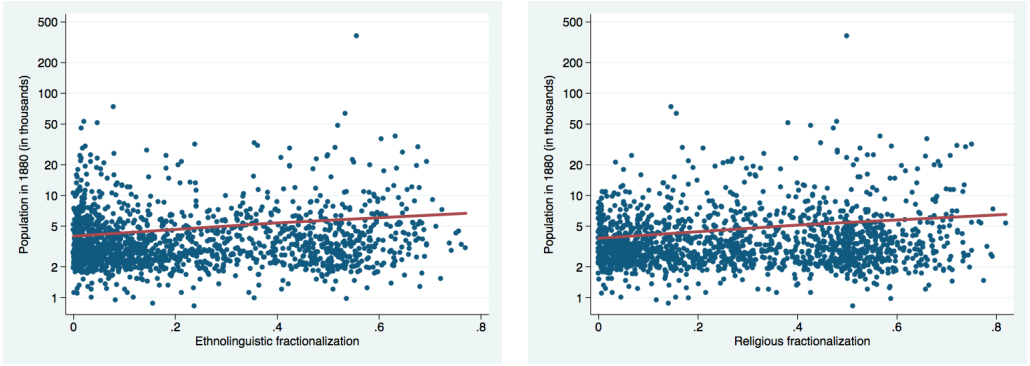
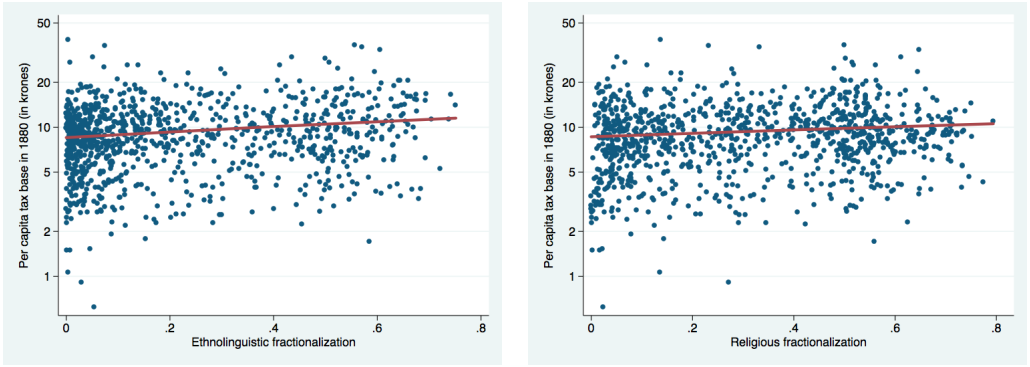


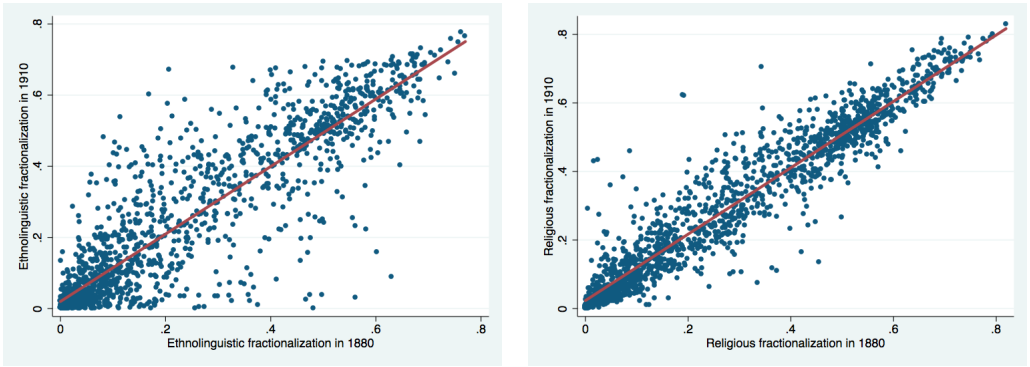
Figure 6b: Non-agricultural share of employment in sampled townships in 1910



(a) Relationship between fractionalization and population size (1880)



(b) Relationship between fractionalization and per capita tax base (1880)



(c) Relationship between fractionalization in 1880 and 1910

Figure 7: Associations between main variables of interest

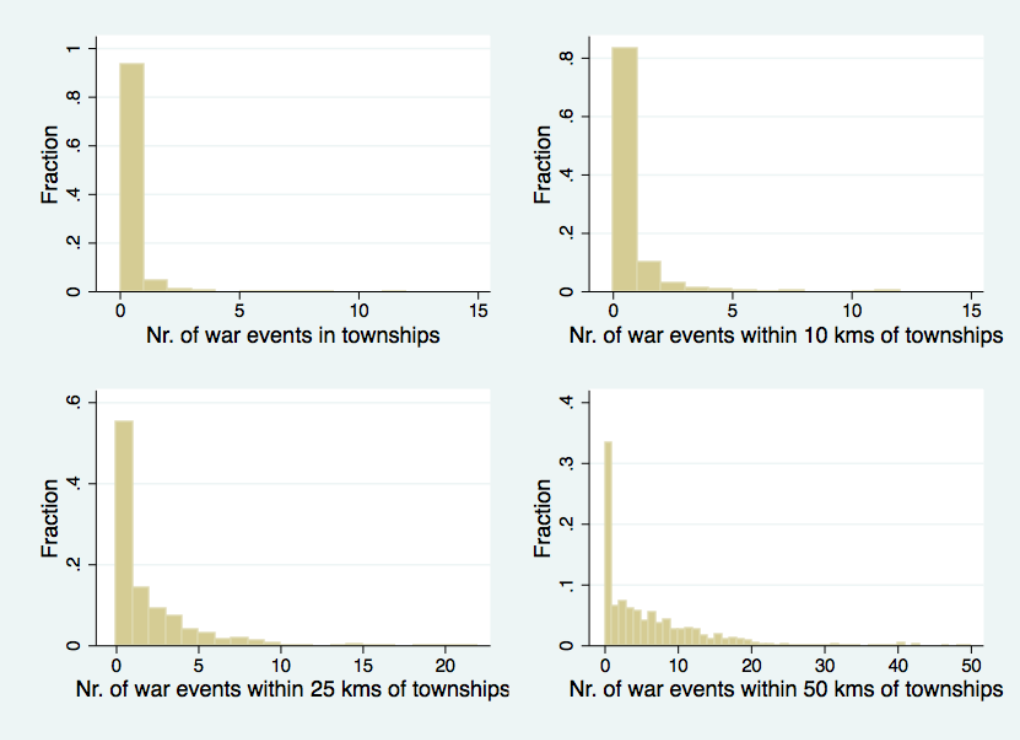


Figure 8: Distribution of major war events in and around townships

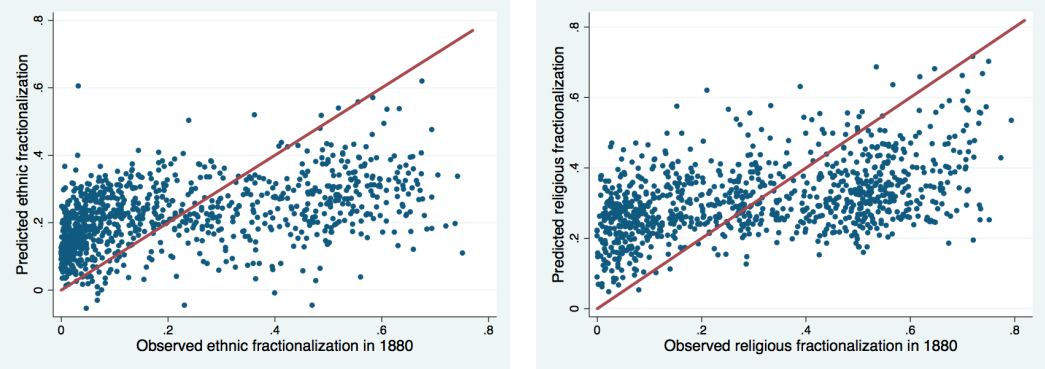


Figure 9: Predicted vs. observed values of ethnic and religious fractionalization

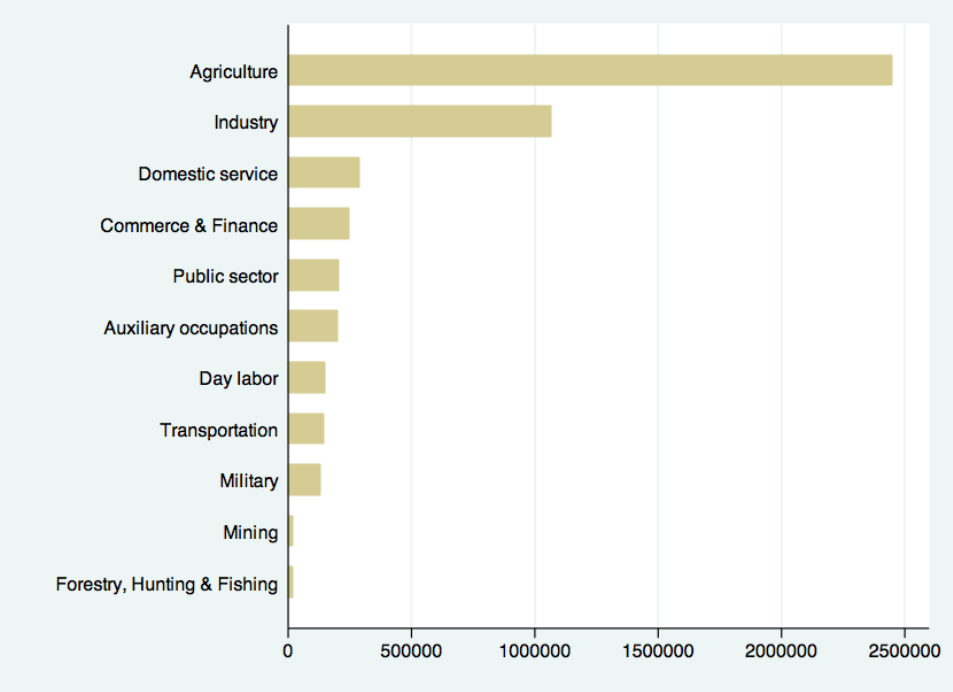


Figure 10a: Total number of people working in each economic sector (1910)

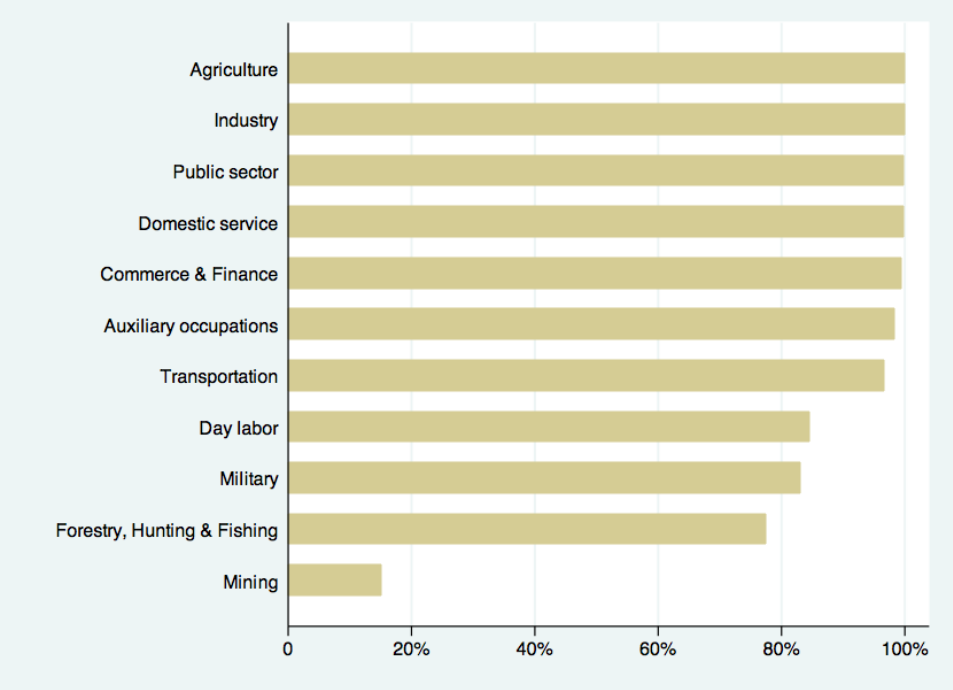


Figure 10b: Share of townships with economic activity in a given sector (1910)

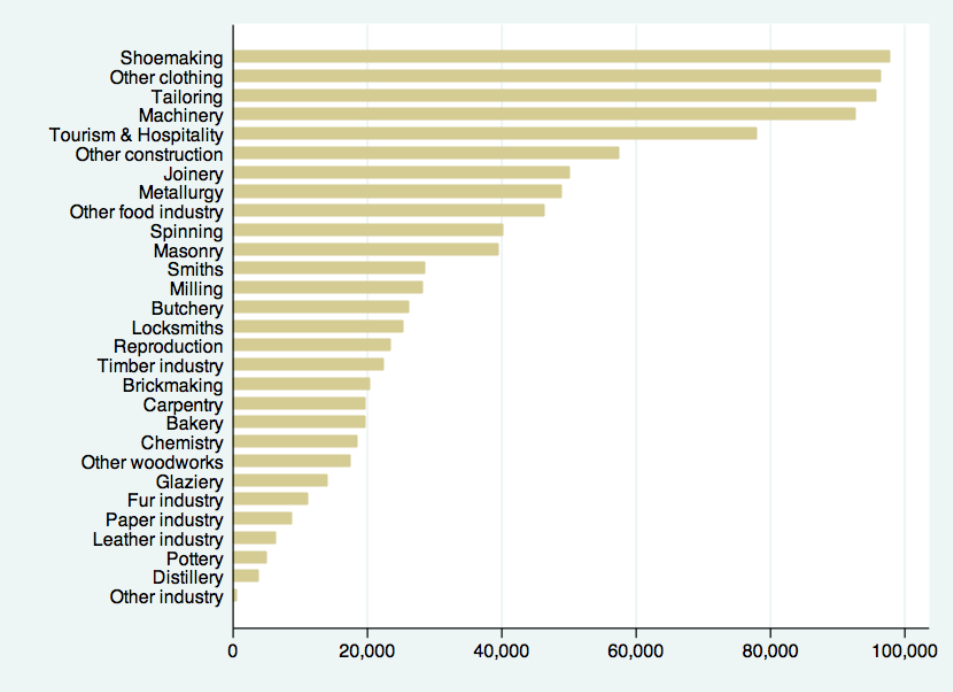


Figure 11a: Total number of people working in each industry (1910)

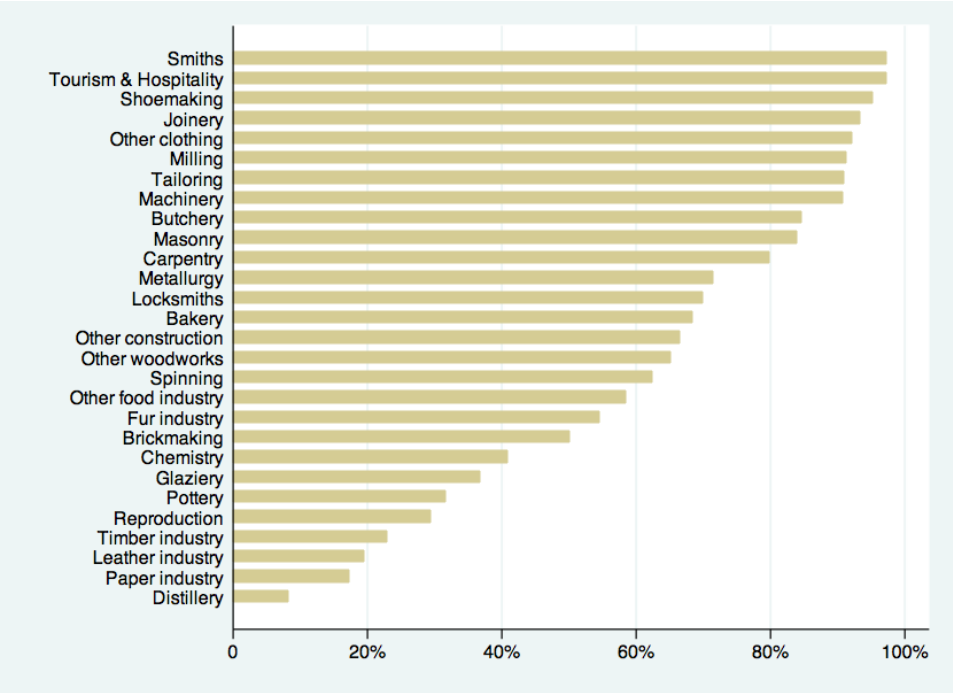
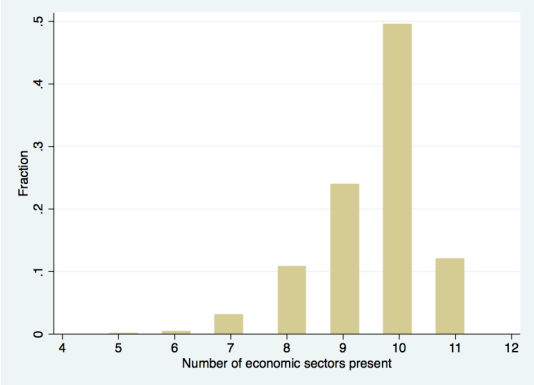
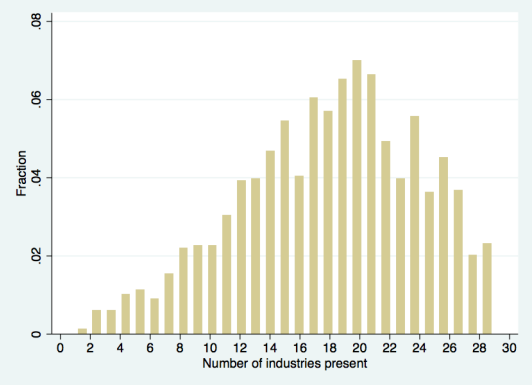
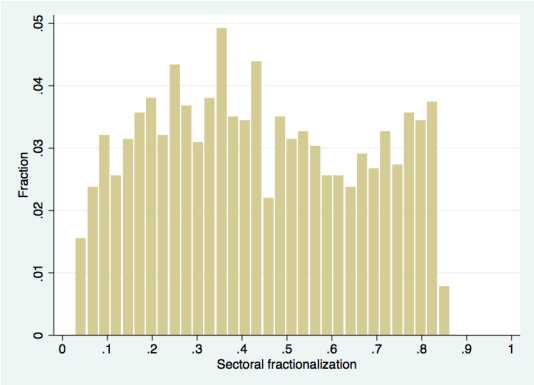


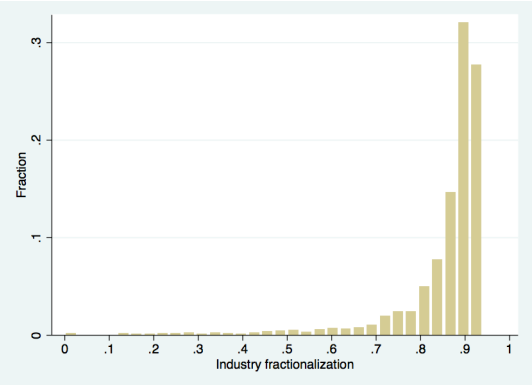
Figure 11b: Share of townships with economic activity in a given industry (1910)





(a) Sectoral and industrial multitude





(b) Sectoral and industrial fractionalization

Figure 12: Distribution of economic complexity measures across townships

	1880				1910			
	Mean	Stdev	Min	Max	Mean	Stdev	Min	Max
A. Demographic variables								
Population size	4708	10007	816	360551	6578	22338	791	863735
Ethnolinguistic shares								
Hungarians	0.39	0.43	0	1	0.41	0.42	0	1
Romanians	0.16	0.29	0	1	0.12	0.28	0	1
Germans	0.14	0.27	0	1	0.12	0.24	0	0.97
Croatians	0.11	0.29	0	1	0.14	0.32	0	1
Serbians	0.10	0.24	0	1	0.09	0.23	0	1
Slovakians	0.09	0.25	0	1	0.08	0.23	0	1
Ruthenians	0.02	0.12	0	1	0.01	0.10	0	0.95
Ethnolinguistic diversity	0.22	0.21	0	0.77	0.23	0.22	0	0.78
Religious shares								
Roman Catholics	0.50	0.38	0	1	0.54	0.38	0	1
Orthodox Catholics	0.19	0.33	0	1	0.19	0.32	0	1
Calvinists	0.13	0.25	0	0.97	0.11	0.23	0	0.99
Greek Catholics	0.07	0.19	0	0.99	0.06	0.18	0	0.99
Lutherans	0.07	0.19	0	1	0.06	0.17	0	0.97
Jews	0.04	0.06	0	0.46	0.03	0.06	0	0.44
Unitarians	0.00	0.02	0	0.56	0.00	0.02	0	0.57
Religious diversity	0.29	0.22	0	0.82	0.30	0.22	0	0.83
B. Development indicators								
Local tax base (in 1000 krones)	60.29	408.34	1.78	12776	90.11	1057.26	1.88	38080
Per capita tax base (in krones)	9.38	4.82	0.62	38.31	8.31	4.89	0.73	65.97
Local budget (in 1000 krones)	44.13	368.13	0.15	12750	249.25	3082.14	1.14	108606
Per capita budget (in krones)	4.67	5.64	0.08	53.34	14.45	22.10	0.34	309.62
Non-agriculture employment	-	-	-	-	0.35	0.26	0.01	0.99
Population growth	-	-	-	-	1.30	0.41	0.67	10.02
C. Additional non-categorical controls								
Literacy rate	0.36	0.20	0.01	0.79	0.55	0.18	0.03	0.84
Population density (per sqkm)	76.97	108.19	5.44	1859.54	106.88	263.29	8.42	8173.18
Distance to Vienna	362.39	148.07	41.74	790.37	362.39	148.07	41.74	790.37
Distance to Budapest	236.78	113.30	0	577.71	236.78	113.30	0	577.71

Table 7: Descriptive statistics

	Without county dummies			With county dummies		
	POP	ESNA	BUDGET	POP	ESNA	BUDGET
Ethnic diversity	.068*	.245**	.310**	.140**	.236**	.149
	(.028)	(.019)	(.076)	(.032)	(.021)	(.084)
Religious diversity	.126**	.155**	-.141	.081**	.132**	.068
	(.027)	(.018)	(.080)	(.028)	(.020)	(.083)
Nr. of observations	1590	1590	1318	1590	1590	1318
R squared	.912/.913	.690/.667	.556/.558	.935/.934	.737/.718	.873/.872

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. POP, ESNA and BUDGET stand for using (the log of) population growth, employment share in non-agriculture and (the log of) townships' annual budget as dependent variable. Diversity is measured by the ethnolinguistic fractionalization (ELF) and religious fractionalization (RF) index, respectively. Exogenous controls are the same as in the baseline regression specifications. The regressions involving employment shares do not feature the lagged dependent variable on the right hand side as these are not observed for 1880.

Table 8a: Robustness results involving different development measures

	Without county dummies			With county dummies		
	POP	POPGR	TAXBASE	POP	POPGR	TAXBASE
Ethnic diversity	.203*	.262**	.341**	.131	.248**	.345**
	(.100)	(.083)	(.105)	(.109)	(.079)	(.120)
Religious diversity	.128	.151*	.188	.368**	.254**	.481**
	(.081)	(.074)	(.098)	(.089)	(.080)	(.107)
Nr. of observations	563	536	503	563	536	503
R squared	.674/.673	.719/.715	.610/.604	.767/.774	.790/.791	.732/.739

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. POP, POPGR and TAXBASE stand for restricting the sample to observations with below median initial population size, population growth and initial per capita tax base, respectively. Diversity is measured by the ethnolinguistic fractionalization (ELF) and religious fractionalization (RF) index, respectively. Dependent variable is (the log of) of per capita tax base in 1910, while the controls are the same as in the baseline regression specifications.

Table 8b: Robustness results for subsample analysis

	Without county dummies		With county dummies	
	SHARE	DIVERSITY	SHARE	DIVERSITY
A. Ethnolinguistic dimension				
Hungarians	.026	.263**	.175**	.275**
	(.039)	(.070)	(.049)	(.069)
Germans	.037	.237**	-.094	.222**
	(.048)	(.066)	(.053)	(.066)
Slovakians	-.208**	.275**	-.179**	.224**
	(.054)	(.064)	(.064)	(.066)
Romanians	.079	.255**	-.027	.204**
	(.055)	(.064)	(.063)	(.065)
Ruthenians	-.375**	.258**	-.260**	.204**
	(.098)	(.063)	(.081)	(.065)
Croatians	.221	.201**	.221	.201**
	(.287)	(.064)	(.287)	(.064)
Serbians	.397**	.161*	.093	.188**
	(.070)	(.065)	(.082)	(.068)
B. Religious dimension				
Roman Catholics	.122**	.188**	.086*	.364**
	(.042)	(.061)	(.039)	(.064)
Greek Catholics	-.340**	.169**	-.062	.314**
	(.071)	(.057)	(.077)	(.059)
Calvinists	-.214**	.175**	-.003	.313**
	(.051)	(.059)	(.058)	(.060)
Lutherans	-.076	.120*	-.168**	.343**
	(.053)	(.056)	(.055)	(.060)
Greek Orthodox	.212**	.131*	-.078	.322**
	(.048)	(.056)	(.061)	(.060)
Unitarians	.991*	.106	1.436	.305**
	(.437)	(.056)	(1.002)	(.060)
Jews	-.165	.130*	1.038**	234**
	(.220)	(.063)	(.253)	(.062)

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. Diversity is measured by the ethnolinguistic fractionalization (ELF) and religious fractionalization (RF) index, respectively. Dependent variable is (the log of) of per capita tax base in 1910, while the controls are the same as in the baseline regression specifications.

Table 8c: Robustness results involving specific social groups

	Without county dummies		With county dummies	
	LAND	DIVERSITY	LAND	DIVERSITY
A. Ethnolinguistic dimension				
Land quality (krone value)	.083**	.240**	.051**	.199**
	(.016)	(.063)	(.013)	(.067)
Land quality (fair value)	.019	.225**	.028*	.178**
	(.015)	(.064)	(.012)	(.066)
Land endowment (krone value)	-.003	.229**	-.043*	.166*
	(.019)	(.064)	(.021)	(.067)
Land endowment (fair value)	-.002	.228*	-.007	.182**
	(.006)	(.064)	(.009)	(.066)
B. Religious dimension				
Land quality (krone value)	.085**	.098	.052**	.270**
	(.016)	(.053)	(.013)	(.057)
Land quality (fair value)	.020	.070	.029*	.276**
	(.015)	(.056)	(.012)	(.058)
Land endowment (krone value)	-.006	.045	-.044*	.242**
	(.019)	(.057)	(.021)	(.058)
Land endowment (fair value)	-.004	.071	-.006	.277**
	(.006)	(.056)	(.009)	(.059)

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. Diversity is measured by the ethnolinguistic fractionalization (ELF) and religious fractionalization (RF) index, respectively. Dependent variable is (the log of) of per capita tax base in 1910, while the controls are the same as in the baseline regression specifications. Land quality and land endowment are measured in relative standard deviation from their respective means. Number of observations is 900 for yield measures and 929 for property value measures.

Table 8d: Robustness results involving land quality and endowment

	Without county dummies		With county dummies	
	25 kms band	50 kms band	25 kms band	50 kms band
A. Ethnolinguistic dimension				
Ethnic diversity	.109	.138	.196**	.236**
	(.073)	(.070)	(.070)	(.068)
Surrounding population	-.000	.126**	-.017	.042
	(.018)	(.033)	(.022)	(.047)
Ethnic dissimilarity	.207**	.119	.033	-.083
	(.061)	(.062)	(.066)	(.077)
B. Religious dimension				
Religious diversity	.111	.172**	.312**	.340**
	(.066)	(.065)	(.066)	(.066)
Surrounding population	.025	.167**	-.018	.037
	(.018)	(.033)	(.021)	(.045)
Religious dissimilarity	.017	-.034	.010	-.073
	(.066)	(.078)	(.067)	(.079)

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. Diversity is measured by the ethnolinguistic fractionalization (ELF) and religious fractionalization (RF) index, respectively. Dependent variable is (the log of) of per capita tax base in 1910, while the controls are the same as in the baseline regression specifications. Narrow and wide band concern 25 and 50 kms radius circles around each settlement, respectively, to add up surrounding population and calculate the oddity value.

Table 8e: Robustness results based on market potential analysis

	ALL WARS		MAJOR WARS	
	(1)	(2)	(3)	(4)
Per capita tax base (1880)	-.002	.137	.168	.256
	(.101)	(.136)	(130)	(.173)
Literacy share	.357	.254	.518	.377
	(.309)	(.430)	(.408)	(.486)
Population size	.085	.379**	.220	.433**
	(.107)	(133)	(.118)	(156)
Population density	.073	0.88*	.031	.013
	(.039)	(.043)	(.039)	(.058)
Railway dummy	.330**	.271*	.479**	.463*
	(.118)	(.130)	(.169)	(.197)
Navigable waterway dummy	-.046	.271	-0.44	.170
	(.116)	(.151)	(.147)	(.173)
Mountain dummy	-.046	-.017	-.014	.366
	(.162)	(.214)	(.205)	(.283)
Mining dummy	.202	.248	.248	.051
	(.150)	(.192)	(.186)	(.233)
Capital city	10.771**	11.230**	10.466**	11.676**
	(.880)	(1.177)	(.877)	(1.354)
City with legal autonomy	.808*	.482	.676*	.526
	(.347)	(.370)	(.334)	(.400)
Self-governed city	.699**	.791**	.496*	.702*
	(.218)	(.243)	(.243)	(.286)
County seat	.326	.194	.218	.332
	(.222)	(.261)	(.246)	(.293)
District seat	.805**	.723**	590**	.517**
	(.120)	(.129)	(.146)	(.163)
County dummies	NO	YES	NO	YES
Nr. of observations	1009	1009	1009	1009
Pseudo R squared	.157	.242	.211	.311

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. The number of observations is 979 in all specifications.

Table 9: Ordered probit results for instrument exogeneity

	Without county dummies			With county dummies		
	10kms	25kms	50kms	10kms	25kms	50kms
A. Ethnic dimension						
FIRST STAGE						
Number of war events	.003	.001	.000	.001	.001	.000
	(.002)	(.001)	(.000)	(.002)	(.001)	(.000)
Military frontier	.043	.044	.044	.044	.041	.042
	(.030)	(.030)	(.030)	(.032)	(.032)	(.031)
Founding century	-.008	-.007	-.006	-.010*	-.009	-.009
	(.004)	(.004)	(.004)	(.004)	(.005)	(.005)
Abandoned	.019	.026	.030	.016	.024	.026
	(.016)	(.017)	(.019)	(.016)	(.017)	(.020)
R squared	.222	.223	.222	.350	.351	.350
Partial R squared	.012	.013	.012	.013	.014	.013
F-statistic	2.46*	2.76*	2.50*	2.20	2.58*	2.31
Sargan test statistic	4.91	10.07*	4.85	.79	4.66	2.43
SECOND STAGE						
Diversity	1.603	.550	1.477	.816	.197	1.011
	(.943)	(.672)	(.899)	(.898)	(1.044)	(.968)
R squared	.831	.893	.842	.908	.904	.891
B. Religious dimension						
FIRST STAGE						
Number of war events	.005*	.005**	.002**	.001	.003**	.001*
	(.002)	(.001)	(.000)	(.002)	(.001)	(.000)
Military frontier	-.041	-.042	-.040	.012	.001	.006
	(.027)	(.027)	(.027)	(.030)	(.031)	(.030)
Founding century	-.021**	-.014**	-.011*	-.012**	-.008	-.008
	(.004)	(.004)	(.004)	(.004)	(.004)	(.004)
Abandoned	-.018	.021	.047*	-.011	.014	.017
	(.017)	(.018)	(.020)	(.016)	(.017)	(0.20)
R squared	.221	.247	.248	.387	.395	.390
Partial R squared	.048	.080	.081	.011	.024	.017
F-statistic	12.18**	20.03**	21.46**	2.26	5.48**	3.75**
Sargan test statistic	5.89	4.95	4.87	.29	.01	1.13
SECOND STAGE						
Diversity	.153	-.842	-.575	1.304	-2.182	3.453
	(.612)	(.451)	(.639)	(1.330)	(1.807)	(5.793)
R squared	.892	.808	.853	.871	.529	.411

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively. The number of observations is 979 in all specifications.

Table 10: First-stage and second-stage IV estimates using all war events

	Without county dummies			With county dummies		
	10kms	25kms	50kms	10kms	25kms	50kms
A. Ethnic dimension						
Diversity	**.845**	**.267**	**.718**	**.357**	**-.177**	**.126**
	(.643)	**(.511)**	**(.466)**	**(.588)**	**(.447)**	**(.461)**
Relevant tax base	.549**	.603**	.560**	.493**	.526**	.507**
	(.076)	(.064)	(.064)	(.056)	(.050)	(.052)
Literacy share	.859**	.805**	.847**	.727**	.678**	.706**
	(.102)	(.093)	(.094)	(.096)	(.092)	(.091)
Population size	.035	.039	.036	.017	.022	.019
	(.024)	(.023)	(.023)	(.025)	(.026)	(.025)
Population density	.009	.020	.012	.014	.022	.017
	(.017)	(.014)	(.014)	(.014)	(.015)	(.014)
Railway dummy	-.016	-.005	-.013	.006	.021	.013
	(.031)	(.028)	(.028)	(.032)	(.030)	(.029)
Navigable waterway dummy	.070*	.081**	.073**	.038	.047	.042
	(.029)	(.028)	(.028)	(.028)	(.028)	(.028)
Mountain dummy	-.302**	-.330**	-.308**	-.202**	-.234**	-.216**
	(.061)	(.055)	(.055)	(.075)	(.073)	(.072)
Mining dummy	.063	.066	.064	-.009	.025	.006
	(.041)	(.038)	(.040)	(.061)	(.060)	(.058)
Nr. of obs.	979	979	979	979	979	979
R squared	.664	.695	.675	.762	.752	.763
B. Religious dimension						
Diversity	**-.145**	**-.331**	**-.174**	**1.225***	**-.116**	**.165**
	(.294)	**(.300)**	**(.289)**	**(.598)**	**(.452)**	**(.447)**
Relevant tax base	.632**	.639**	.633**	.386**	.527**	.498**
	(.045)	(.045)	(.045)	(.080)	(.064)	(.067)
Literacy share	.811**	.852**	.818**	.483**	.714**	.666**
	(.104)	(.107)	(.103)	(.139)	(.112)	(.109)
Population size	.035	.028	.034	.024	.020	.021
	(.026)	(.027)	(.026)	(.027)	(.025)	(.024)
Population density	.027**	.029**	.027**	.003	.021	.017
	(.010)	(.010)	(.010)	(.018)	(.013)	(.014)
Railway dummy	.002	.006	.003	.011	.016	.015
	(.028)	(.028)	(.028)	(.030)	(.027)	(.027)
Navigable waterway dummy	.082*	.076**	.081**	.032	.045	.043
	(.028)	(.028)	(.028)	(.032)	(.028)	(.027)
Mountain dummy	-.348**	-.354**	-.349**	-.146	-.231**	-.213**
	(.050)	(.050)	(.050)	(.075)	(.072)	(.071)
Mining dummy	.064	.059	.063	.020	.013	.015
	(.039)	(.040)	(.039)	(.048)	(.049)	(.047)
Nr. of obs.	979	979	979	979	979	979
R squared	.685	.673	.684	.703	.754	.765

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively.

Table 11: Main IV estimates obtained by the 2SLS estimator

	ETHNICITY		RELIGION	
	(1)	(2)	(3)	(4)
A. Sectoral analysis				
Diversity	**.226****	**.215****	**.200****	**.157****
	(.115)	**(.022)**	**(.020)**	**(.022)**
Per capita tax base	-.006	.012	.011	.008
	(.011)	(.012)	(.009)	(.011)
Literacy share	.503**	.564**	.435**	.540**
	(.033)	(.039)	(.033)	(.040)
Population size	.050**	.064**	.050**	.067**
	(.008)	(.009)	(.008)	(.009)
Population density	-.000	-.001	.000	-.001
	(.001)	(.001)	(.002)	(.001)
Railway dummy	-.055*	-.037	-.047	-.026
	(.026)	(.026)	(.027)	(.026)
Navigable waterway dummy	-.007	-.004	.004	-.005
	(.008)	(.010)	(.008)	(.010)
Mountain dummy	.066**	.046*	.074**	.055**
	(.015)	(.019)	(.015)	(.020)
Mining dummy	.040**	.030*	.044**	.040**
	(.014)	(.015)	(.015)	(.015)
Constant	-.234**	-	-.256**	-
	(.075)		(.074)	
County dummies	NO	YES	NO	YES
Nr. of observations	1314	1314	1314	1314
R squared	.570	.945	.562	.942
B. Industry analysis				
Diversity	**.007**	**-.021**	**.028***	**.028**
	(.015)	**(.016)**	**(.012)**	**(.014)**
Per capita tax base	.024**	.026**	.023**	.022**
	(.007)	(.008)	(.007)	(.008)
Literacy share	.074*	.121**	.071*	.117**
	(.031)	(.034)	(.030)	(.034)
Population size	.009	-.004	.009	-.005
	(.007)	(.007)	(.007)	(.007)
Population density	-.001	-.001	-.001	-.001
	(.000)	(.000)	(.000)	(.000)
Railway dummy	.008	.025	.007	.023
	(.021)	(.019)	(.021)	(.019)
Navigable waterway dummy	.012**	.004	.013**	.003
	(.004)	(.004)	(.004)	(.004)
Mountain dummy	-.040**	-.005	-.040**	-.004
	(.012)	(.017)	(.012)	(.017)
Mining dummy	-.021	.012	-.020**	.011
	(.013)	(.013)	(.013)	(.013)
Constant	.686**	-	.684**	-
	(.067)		(.068)	
County dummies	NO	YES	NO	YES
Nr. of observations	1314	1314	1314	1314
R squared	.205	.991	.208	.991

Robust standard errors in parenthesis. One and two stars denotes significance at 5 and 1% probability levels, respectively.

Table 12: Regression results for economic complexity (as measured by the fractionalization index)