

Ethnic and Religious Diversity, Income Inequality and Economic Development
in the Early 20th Century Hungary

The Efficiency of Private Good Production and Public Good Provision

Az Etnikai és Vallási Diverzitás, a Jövedelemegyenlőtlenségek és a Gazdasági
Fejlettség Kapcsolata a 20. Század Eleji Magyarországon

A Magánjóságok Termelése a Közjavak Előállítására

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BSc Applied Economics, III. Year

April, 2024

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Abstract

This paper attempts to establish a connection between ethnic and religious diversity and several economic indicators using settlement-level data from early 20th century Hungary, using econometric techniques. Ethnic diversity was measured by two indicators: fractionalization and polarization. The following was tested in the paper: ethnic diversity is positively related to the production of private goods, and negatively to the provision of public goods. In the data, a positive association was found between ethnic fractionalization and both outcome variables, somewhat contradicting earlier findings. The relationship between ethnic fractionalization and polarization was also tested. Here, for a given level of fractionalization, polarization was found to have a detrimental effect on all outcomes. The effect of religious diversity was also studied in the paper, the coefficient of which was also determined to be positive and significant. When using literacy rate as the dependent variable, ethnic fractionalization had a negative effect for a given level of religious fractionalization. The results cannot be interpreted as causal, since despite efforts, migration-caused endogeneity between diversity and development could not be ruled out.

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I. Introduction

The relationship between ethnic diversity and various economic indicators is one of the most interesting questions in development economics and in economic history. Africa's high ethnic diversity has been blamed for the continent's slow growth and economic tragedy. Racial tensions in the United States have been cited as the reason why it does not have the vast welfare policies enjoyed by residents on the other side of the Atlantic (Alesina, Glaeser, and Sacerdote, 2001). It has been found to reduce redistribution if the poor are divided along ethnic lines (Houle, 2017). It has also been shown to have a positive effect, especially on the local, and city level, bringing prosperity and economic activity to diverse and vibrant areas (Montalvo, J. G., and Reynal-Querol, M. 2021). Based on this, it is clear that finding a connection between ethnic diversity and economic activity can be the key to understanding the poverty or prosperity of nations. I am going to study the connection between ethnic diversity and economic indicators¹ in one of the most diverse places in Europe to ever exist, the Hungary of the early 20th century (Menyhért, 2018). I test the hypothesis of Alesina and La Ferrara (2005) that ethnic diversity effects private good production in a positive manner, while public good provision in a negative one. I also tested whether the effect of ethnic polarization differs from ethnic fractionalization, and whether religious diversity has any additional impact. Examining this using data for over 12 thousand townships could uncover new and interesting aspects of this long-studied connection.

II. Theoretical Background

II.1 Measuring Ethnic Diversity

If we want to measure the effect of ethnic diversity on economic performance, we first must define a measure or an index for both the former and the latter. Montalvo and Raynal-Querol (2005) define the two most important measures of ethnic diversity: ethnic fractionalization and polarization. Fractionalization is used by a series of papers aiming to understand the relationship between diversity and a wide range of economic outcomes such as growth or public goods

¹ Unfortunately, the connection between ethnic diversity and income inequality could not be studied due to the lack of sufficient data, but it may be connected to the provision of public goods. Unfortunately, due to administrative reasons of the UNKP scholarship, the title could not be changed.

provision (Easterly and Levine, 1997; Campos, Saleh and Kuzeyev, 2011; Gerring et al., 2015; Alesina and La Ferrara, 2005; Alesina, Baqir, and Easterly). It is defined as the chance that if I select two random individuals from the population, they belong to two different ethnic groups (Montalvo and Raynal-Querol, 2005). Since in the used database, data is only available for the number of native speakers of each language by settlement, I will use an index of ethnolinguistic fractionalization where π_i is the proportion of native speakers of language i in the settlement, with N being the total number of ethnolinguistic groups in the respective settlement.

$$\text{Ethnolinguistic Fractionalization} = 1 - \sum_{i=1}^N \pi_i^2$$

i: Hungarians, Germans, Slovaks, Romanians, Ruthenians, Croatians, Serbians, Others

An alternative measure of ethnic diversity is polarization, which is the distance of the distribution of ethnic groups from the one which in theory causes the maximum amount of social conflict, with the country or region having two ethnic groups of equal size. It is also used widely, albeit less extensively to explain outcomes such as economic growth or the probability of civil wars (Montalvo and Raynal-Querol, 2005; Gören, 2013; Campos, Saleh, and Kuzeyev, 2011).

$$\text{Ethnolinguistic Polarization} = 1 - \sum_{i=1}^N \left(\frac{0.5 - \pi_i}{0.5} \right)^2 \pi_i$$

i: Hungarians, Germans, Slovaks, Romanians, Ruthenians, Croatians, Serbians, Others

Alternatively, we can also construct measures of religious fractionalization and polarization, in this case π_i denoting the respective shares of Roman Catholics, Greek Catholics, Calvinists, Lutherans, members of the Greek Orthodox denomination, Unitarians, Jews, and Others.

II.2. Ethnic Diversity and Economic Growth

A vast literature aims to understand the connection between ethnic diversity, as measured either by ethnic fractionalization or polarization, and economic development. Their results may vary depending on the measure used for diversity or the level of aggregation in the studies. Beyond the direction and magnitude of effect, it is also important to understand the channels and

mechanisms through which diversity affects growth, to best design policies that foster prosperity and peaceful coexistence between people of different ethnic groups. First, I am going to survey the literature that seeks to describe this relationship on a national level.

The first to point out the connection between diversity and growth were Easterly and Levine (1997). They wanted to find out why Africa performed much worse than East Asia or Latin America, and why countries on the continent enacted growth-inhibiting policies. They concluded that ethnolinguistic fractionalization has negative direct and indirect effects on growth and can lead to countries enacting growth-inhibiting policies. It was also closely associated with low schooling rates, an underdeveloped financial system (measured by depth), budget deficits, extorted foreign exchange markets, and poor infrastructure. When using income instead of growth as the dependent variable, the effect was even stronger.

Gören (2013) has studied both the direct- and indirect effects of ethnic fractionalization and polarization on economic growth in a sample of 95 countries in the period between 1960-1999. The indirect transmission channels were identified as civil wars, political instability, trade openness, human capital, market distortions, government consumption, and net fertility rate. Fractionalization had a direct, significant, and negative effect on growth. In addition, it reduced it even further through a decrease in investment (indirect channels).

The wealth and development of nations change over time, so does their ethnic make-up and diversity, and the direction and rate at which it changes will depend on many factors. Rich countries with favorable work and economic conditions will attract immigrants, and newly independent states may expulse the formerly dominant ethnic group. Campos, Saleh and Kuzeyev (2011) study the effect of ethnic diversity on the growth rate of GDP per capita from 1989 to 2007 by estimating a standard augmented Solow-model using SUR (seemingly unrelated regression). Here, they treat ethnic diversity as a time-varying, endogenous variable. In the period, the countries transitioned from a similar setting of centrally planned economies and communist rule to market economies under different systems of government. Generally, ethnic diversity declined considerably after the fall of communism, which partly can be attributed to the expulsion and emigration of previously dominant groups, such as Serbians from former Yugoslav Republics, or Russians from countries freed from Soviet rule. When treated as an exogenous variable, the effect of diversity was not significant. However, when using the lagged value of diversity and latitude as an instrumental variable, the results are clear: ethnic diversity is negatively associated with economic growth. This was robust to either using ethnic polarization and an index of ethnic, linguistic, and religious polarization. This shows,

that when diversity is used as an endogenous variable that changes over time, it has significant and negative effect on growth.

So far, we have established that in the literature there is a clear negative relationship between ethnic diversity and economic development or growth on a country level. But there is also a growing literature examining this connection at the regional or community level, which more closely resembles my study, where I use Hungarian towns and villages as units of observation.

Gerring et al. (2015) tested the effect of ethnic fractionalization on human development outcomes such as children born, child deaths, wealth, and education at a national, regional and district level. While nationally, diversity had either insignificant, or negative effect, at subnational levels the effect was generally positive. The results were similar when accounting for different public good levels, indicating that it is not due to the different quality of governance across regions. According to the authors, this may be because people who relocate to diverse areas may be more talented and ambitious than others, and coordination between groups is easier on a local level. They found polarization not to influence development any level.

These results are reinforced by Fielding (2023) who find that on a community level, there is high degree of positive association between diversity and socioeconomic development (much of it attributable to causal factors), but there is a negative relationship between regional-level diversity and community-level socioeconomic development. They also found that one channel through which local diversity fosters development is the erosion of conservative social norms that inhibit the use of new technologies. The study was only carried out in rural areas, since here endogeneity caused by migration is less likely to cause issues.

Lee (2011) stresses the importance of making the distinction between fractionalization and immigration in explaining employment growth in English cities between 1981-2001. He found that while a higher immigrant population had a positive, fractionalization had a negative effect on growth. This supports previous research, which found immigrants to be more likely, and minorities to be less likely to be employed than the general population. This highlights an important source of endogeneity: Although diversity may affect development, development may also affect diversity through the migration of people to richer areas.

Menyhért (2018) found that diverse Hungarian townships outgrew less diverse ones by 20-60% in the period between 1880-1910. The mechanism was likely comparative differences in productivity between ethnic groups, leading to faster industrialization and increased economic complexity. This is consistent with previous literature on the effects of diversity on a local level,

and with the complementarity of skills in the production of private goods, as theorized by Alesina and La Ferrara (2005). The author also claims that diversity is exogenous to growth, so reverse causality due to migration to areas with better economic opportunity is not an issue in the data.

With regards to polarization, Montalvo and Reynal-Querol (2005) propose that ethnic polarization has a positive effect on the likelihood of civil wars and social conflict, one which certainly influences economic development. They also came to the conclusion that ethnic fractionalization may even reduce the likelihood of social conflict, given a fixed level of polarization. According to Gören (2013), while no significant direct effect of polarization on growth was found, it did inhibit economic progress through decreased investment, increased political instability, and higher net fertility rate. This is consistent with the findings of Montalvo and Reynal-Querol (2005), since social conflict is one channel through which polarization can hinder growth.

On the other hand, Gerring et al. (2015) found no association between polarization and growth on either the national, regional or district level.

II.3 Ethnic Diversity Provision of Public Goods

Alesina, Baqir, and Easterly (1999) concluded that more fractionalized US counties and cities spend more and have higher levels of debt, but still allocate fewer resources to the provision of productive public goods, such as education, roads, or sewers. This suggests that heterogeneous communities have a hard time agreeing on the allocation of common resources. The higher spending may indicate increased patronage, which is the public provision of private goods along ethnic lines.

Alesina and La Ferrara (2005) propose that ethnic diversity increases the production of private goods via the complementarity of skills mechanism, while it reduces the provision of public goods due to heterogeneity in preferences. They find while examining US counties between 1970-2000, that the effect of fractionalization on growth is dependent on the development of the county. In initially less developed ones, this effect is clearly detrimental, while in initially richer ones it is definitely less negative, or even possibly beneficial. They clearly find negative association between public good provision and diversity, but its effect on private good provision was inconclusive. They also attempted to identify the mechanisms through which diversity may affect economic outcomes: People may attach positive utility to the well-being of individuals in their own group while negative utility to the well-being of others. Ethnic affiliation may

affect the strategies individuals play resulting in homogeneity being able to sustain a broader set of cooperative strategies. Also, ethnic heterogeneity may enter the production function, with broader perspectives and views leading to increased innovation.

Habyarima et al. (2007) wanted to understand the different mechanisms behind this effect by recruiting 300 subjects for an experiment from a slum in Kampala, Uganda. They identified that homogenous groups could ensure the better provision of public goods since ethnic ties and norms can ensure cooperation between individuals who would otherwise be less likely to cooperate. On the other hand, they found no evidence that different ethnic groups have different tastes or preferences for public goods, and that they would derive negative utility from the others consuming it. Also, no evidence was found that different groups are less effective when working together.

Gershman and Rivera (2018) highlight the importance of the level of aggregation of languages and ethnicities when constructing the index. They found no connection between development and diversity when using a highly disaggregated index of ethnolinguistic diversity (except for nighttime luminosity). But when the languages and ethnic groups relatedness was considered, it had a significant negative effect on educational and health outcomes. However, when measuring income per capita and household wealth, no significant effect was found, only when the outcome involved the provision of a local public good such as healthcare or education. Since our study uses ethnic groups that are largely distinct, this should not be an issue, but similarities between groups such as the Serbs and the Croats may be important.

II.4. Ethnic Diversity and Inequality

Houle (2017) shows, that although inequality increases redistribution, that is highly dependent on the ethnic make-up of the poor. It means, that if ethnic divisions are present among the lower classes of society, they will be less efficient when fighting for redistribution.

Ko (2019) argues that ethnic fractionalization has positive effect on inequality, and a negative one on public spending on education. Although it is not clear that education is the mediating variable as the effect of public education spending on inequality is not significant. Nevertheless, it highlights the importance that public spending (education, healthcare, welfare spending) might play when determining the effect of ethnic diversity on inequality in a country.

Unfortunately, our dataset, only includes a variable for inequality (ratio of big and small landowners) for the year 1865 (Demeter et al., 2017). This means that we cannot test the effect

of ethnic diversity on inequality, since our earliest variable for diversity is the year 1880 (Demeter et al., 2017). Nevertheless, the effect of ethnic fractionalization on inequality may be guessed from its effect on the provision of public goods, as these might include welfare benefits and other measures aimed at fighting income differences. For example, taking care of the poor was the responsibility of municipalities, for which they had to raise appropriate funds (Magyar Királyi Központi Statisztikai Hivatal, 1913)

III. The Kingdom of Hungary at the Dawn of the 20th Century

III.1. A brief history and ethnic relations

The political order in the Kingdom of Hungary at the beginning of the century was created during the Austro-Hungarian Compromise of 1867 (Tihany, 1969). The treaty restored constitutional monarchy in Hungary, and the nobility granted the Austrian Emperor the title of King of Hungary (Tihany, 1969). The two countries, Austria and Hungary had separate governments, except for three joint portfolios: Foreign Affairs, Defense, and Finance Ministry for the former two portfolios (Tihany, 1969). The Croatian-Hungarian compromise followed soon after in 1868, which settled relations with the Kingdom of Croatia and Slavonia, part of the Kingdom of Hungary (Tihany, 1969).

Austria-Hungary was by all definitions a multi-ethnic empire: apart from Hungarians and Germans, it was inhabited by Romanians in Transylvania and the Banat, Slovaks in Upper-Hungary, Poles in Galicia, Ruthenians and Ukrainians in Galicia and Transcarpathia, Slovenes in the area of modern-day Slovenia, Croats, and Serbs in Croatia-Slavonia and Vojvodina, Czechs in Bohemia, and Italians in Süd-Tirol and Istria (Szász, 1996).

Diversity was large across the country: significant amounts of Hungarians were present in all areas of the Hungarian part of the empire, and larger towns were mostly inhabited by Hungarians, Germans, and Jews even in areas where other nationalities dominated (Szász, 1996).

In 1910, the population of the Lands of the Holy Crown of Hungary was 20,886,487, with 18,264,533 living in the Kingdom of Hungary and 2,621,954 in the Kingdom of Croatia and Slavonia (Magyar Királyi Központi Statisztikai Hivatal, 1912, pg 17). This is a large increase

of 1,631,928 compared to 1900 (Magyar Királyi Központi Statisztikai Hivatal, 1912, pg 17). This confirms the rapid growth and improvement in sanitary conditions in the era of industrialization. Due to the large difference in governance and ethnic makeup of the Croatian areas, I will restrict my analysis to the areas of the Kingdom of Hungary (Magyar Királyi Központi Statisztikai Hivatal, 1912).

In 1910, there were only 9,944,627 native Hungarians in the Kingdom of Hungary, who made up 54% of the total population (Magyar Királyi Központi Statisztikai Hivatal, 1912, pg 21).

Largest Nationality by Settlement

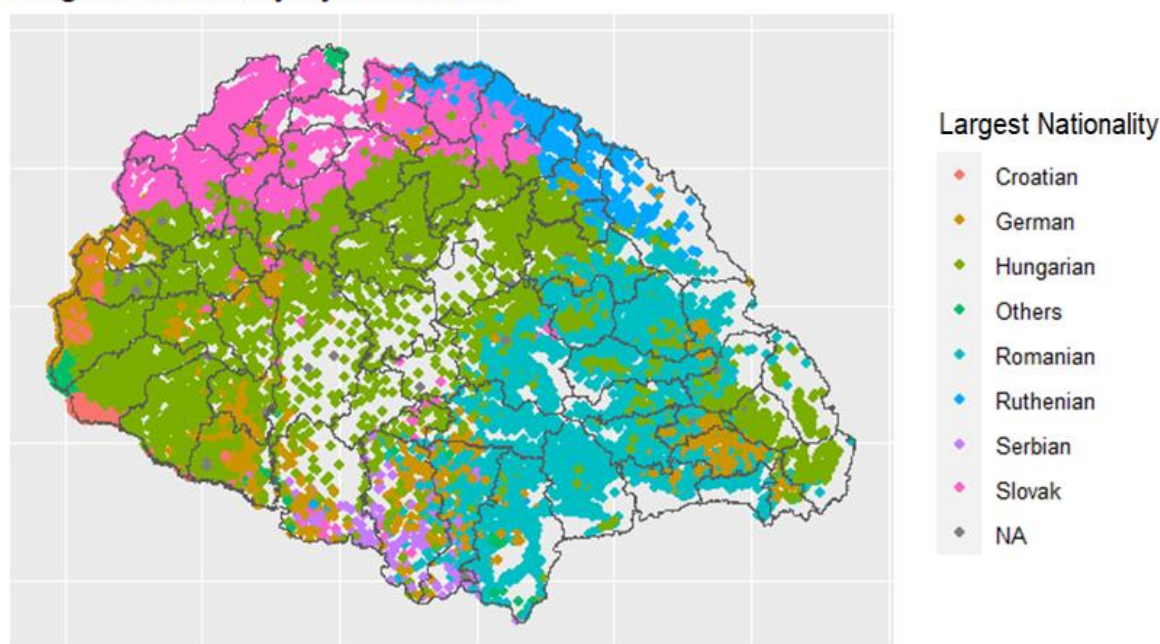


Figure 1, The largest nationality by settlement, Source: Own-making, based on data from Demeter et al., 2017

In 1868, the Hungarian Nationality Law provided certain rights for national minorities: although the language of the state remained Hungarian, it provided minorities the right to use their language in schools, courts, and granted autonomy to the Greek Orthodox Church (most members of which were Romanians or Serbs) (Szász, 1996). On the other hand, the law contained several loopholes that the Hungarian authorities could exploit in its implementation (Szász, 1996). Later Hungarian governments pursued the policy of Magyarization in a more aggressive manner (Szász, 1996). The High-School Education of Act of 1883 introduced Hungarian Language and Literature classes to be cleared by the Ministry of Religion and Education to high schools (Szász, 1996). Law 15 of 1891 mandated that Kindergarten teachers speak Hungarian. When the opposition took power in 1906, Law 27 of 1907 was passed, which

mandated Hungarian flags and emblems be placed in schools and mandated that students finishing 4th grade must be able to express themselves in Hungarian (Szász, 1996). Although the law was later abandoned by the subsequent government, it stresses the importance of education as a means by Hungarian lawmakers to spread the Hungarian language and culture (Szász, 1996).

III.2. Economic growth and rapid industrialization

The Industrial Revolution reached Hungary much later than that of the advanced western societies of France or the United Kingdom (Fónagy, 1999). In the early half of the 19th century, the country was an underdeveloped, agricultural society with feudal institutions such as serfdom or the nobility's exemption from taxation (Fónagy, 1999). The period following the Compromise was an age of rapid growth and industrialization in Hungary (Berend, 1996). With the agreement an economic treaty was also negotiated which reinforced the customs and trade union with Austria, created a common currency and established the Austro-Hungarian National Bank. Hungary underwent a demographic transition with the population increasing from 13.8 million in 1850 to 20.9 million inhabitants by 1910 (Berend, 1996, pg. 268). As with other industrialising societies, the death rate plummeted significantly, from 35-46 per 1000 in the 1820's to 25.7 by the dawn of the 20th century (Berend, 1996, pg. 268). Hundreds of thousands moved to the newly unified capital, Budapest, which, including the suburbs, surpassed 1 million inhabitants by 1913 (Berend, 1996, pg. 269). The state funded extensive public works and education programs, such as the establishment of rural elementary schools or construction of dams and river control. In 1868, only 48% of school-age children attended school, while by 1910, this rose to 89% (Berend, 1996, pg. 271). With the help of foreign (In a large part Austrian) capital, the country industrialized rapidly. Foreign-invested capital grew from a value of 6 billion dollars in 1870 to 46 billion by 1913, much of which came from French, Austrian or German sources, and the Banking system expanded at a fast pace (Berend, 1996, pg. 272). Railways were built utilizing foreign capital, and the Danube was transformed into one of world's largest navigable waterways following the Treaty of Berlin in 1878 (Berend, 1996, pg. 272).

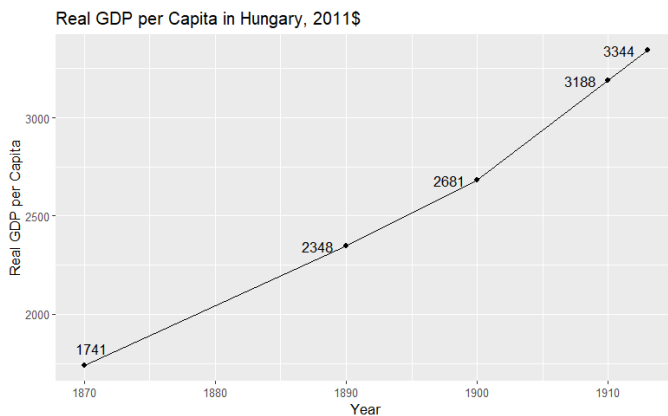


Figure 2, Estimated Real GDP per Capita in Hungary, 2011\$, 1870-1913, Source: Madison Project

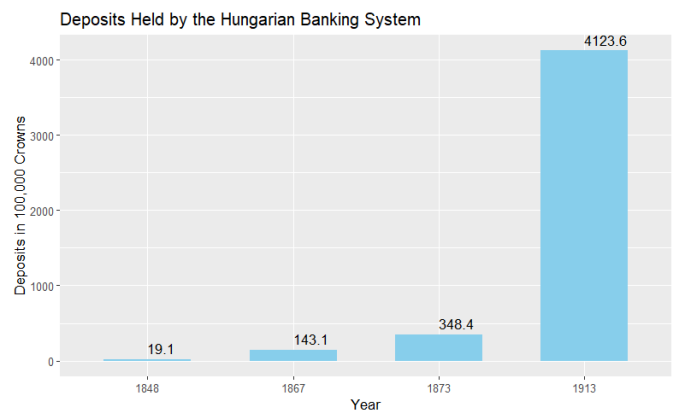


Figure 3, Development of the Hungarian banking system, Deposits held, 100,000 crowns, 1848-1913, Source: Berend, 1996, pg. 275

IV. Description of Variables

IV.1. Data Used

I used data from the GISTa Hungarorum (OTKA K 111766 projekt) database to conduct the empirical analysis, which is a digitalized collection of census data conducted by the Royal Hungarian Central Statistical Office between 1870 and 1910 (Demeter et al., 2017). It contains a wide range of county, district, and settlement level data on population, industry, economy, and social development (Demeter et al., 2017). To gain a better understanding of the variables and for national-level data, I also studied the original 1910 Census of the Lands of the Holy Crown of Hungary (1912) and the 1908 Survey of Hungarian Villages (1913) as published by the Royal Hungarian Statistical Service (Magyar Királyi Központi Statisztikai Hivatal, 1912; Magyar Királyi Központi Statisztikai Hivatal, 1913).

IV.2. About the 1910 census

The 1910 Hungarian census was carried out on the first days of January 1910. The survey had taken place both in the Kingdom of Hungary, and the Kingdom of Croatia and Slavonia (Magyar Királyi Központi Statisztikai Hivatal, 1920). It contains compared to its age high-quality statistical data covering the ethnicity, religion, occupation, native language, place of birth, and residency of the population (Magyar Királyi Központi Statisztikai Hivatal, 1920). It also collected information about the dwelling the citizen lived in, or their land-owning or

immigration status. The tables present these data aggregated for 12542 Hungarian Settlements, which will be the subjects of my statistical analysis (Demeter et al., 2017).

IV.3. Description of Variables Used

As measures ethnic and religious diversity, two primary indicators were utilized: fractionalization and polarization. For the latter, only the 1910 value was used, as opposed to both 1910 and 1880 values for the former. The dependent variables for private goods were: the ratio of industrial and tertiary earners compared to agricultural earners, and tax paid to the state per capita. The measures for public good levels included the amount of village tax per capita, the literacy rate, and the share of the dead treated by a doctor. Continuous controls were the distance to the nearest railway station, distance from Budapest and Vienna respectively, population size, and the percentage speaking Hungarian. For certain public good variables (share of the dead treated by a doctor and village tax per capita), the per capita wealth of the settlement was also included, since the settlements can use this to finance public expenditures, limiting the need to issue taxes, and many times comes from sources exogenous to diversity such as natural endowments (Magyar Királyi Központi Statisztikai Hivatal, 1913). In addition, I also included the following categorical controls: the presence of mining and a dummy for cities.

	Mean	Std.Dev	Min	Median	Max
Outcome variables used to measure private goods					
Industrial + Tertiary Earners / Agricultural Earners, 1910	0.71	4.3	0	0.2	169
Industrial + Tertiary Earners / Agricultural Earners, 1900	0.64	3.83	-0.91	0.16	98
Migration (compared to 1910 population, thousandths)	0.03	0.1	-0.69	0.03	0.82
Outcome variables used to measure public goods					
Literacy rate, 1910	0.52	0.2	0	0.58	0.89
Literacy rate, 1880	0.3	0.2	0	0.29	0.99
Share of the dead treated by a doctor	0.33	0.27	0	0.29	1
State Tax (Crown per capita)	5.6	7	0	4.8	171
Village Tax 1910 (Crown per person)	2.7	1.9	0.000	2.4	23
Explanatory variables used to measure diversity					
Ethnic Fractionalization, 1910	0.15	0.17	0	0.08	0.79
Ethnic Fractionalization, 1880	0.2	0.16	0	0.14	0.8
Ethnic polarization	0.27	0.29	0	0.16	1
Religious Fractionalization, 1910	0.24	0.21	0	0.17	0.83
Religious Fractionalization, 1880	0.24	0.21	0	0.16	0.82
Religious Polarization	0.4	0.33	0	0.32	1
Control variables					
Railway distance, 1880	25168	21695	157	19110	176417
Railway distance, 1900	10234	8340	30	8187	82338
Railway distance, 1910	8473	6901	15	6872	58459
Distance from Budapest	2.80	1.43	0.00	2.62	7.34
Distance from Vienna	4.41	2.39	0.14	4.26	10.13

Population, 1910	1493	8749	51	762	880371
Population, 1900	1356	7254	48	726	732322
Percentage speaking Hungarian	0.51	0.41	0	0.41	1

Table 1 Descriptive statistics of the variables, Source: Own-making, based on Demeter et al, 2017

In the following, I am going to discuss the variables used in the empirical analysis and provide a spatial visualization to better understand their distribution.

Ethnic Diversity in Hungary

As Measured by Ethnic Fractionalization, Settlement-level Data

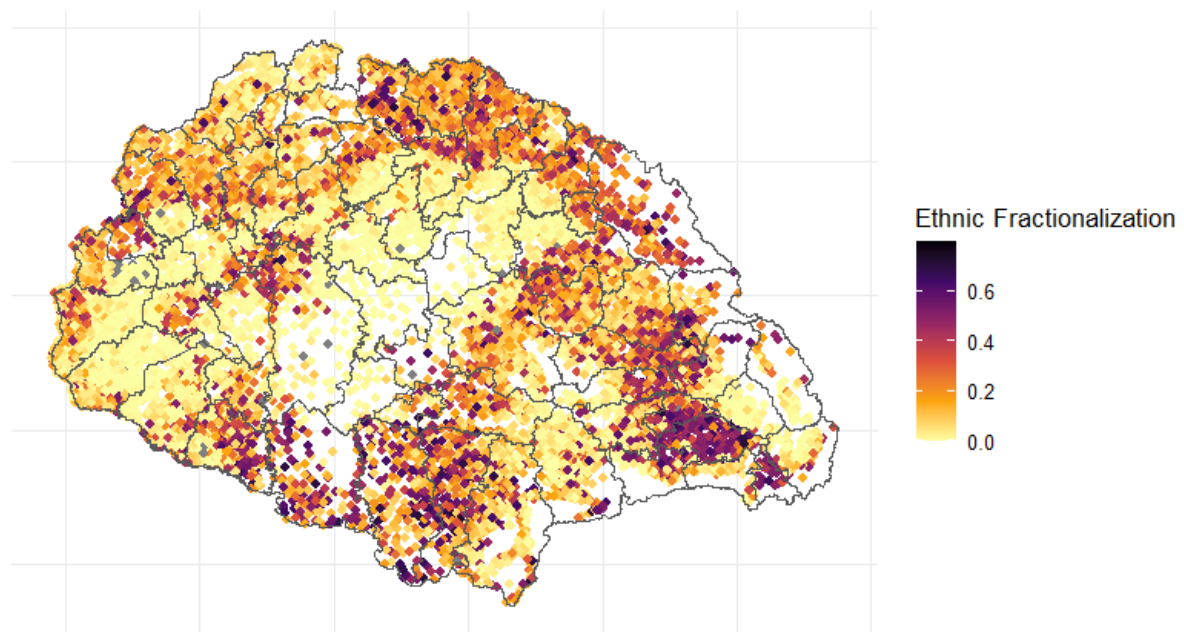


Figure 4 Map of ethnic fractionalization in Hungary, 1910, Source: Own-making, based on Demeter et al, 2017

As one can see, ethnic fractionalization in Hungary tends to be the smallest in Hungarian-majority areas, and the highest being areas in Vojvodina, Southern Transylvania, and the areas of modern-day Slovakia where there is a transition between Slovak and Hungarian majority areas. In addition, ethnic fractionalization is also high in and around the capital, Budapest (Figure 4).

Ethnic Diversity in Hungary, 1880
as measured by ethnic fractionalization

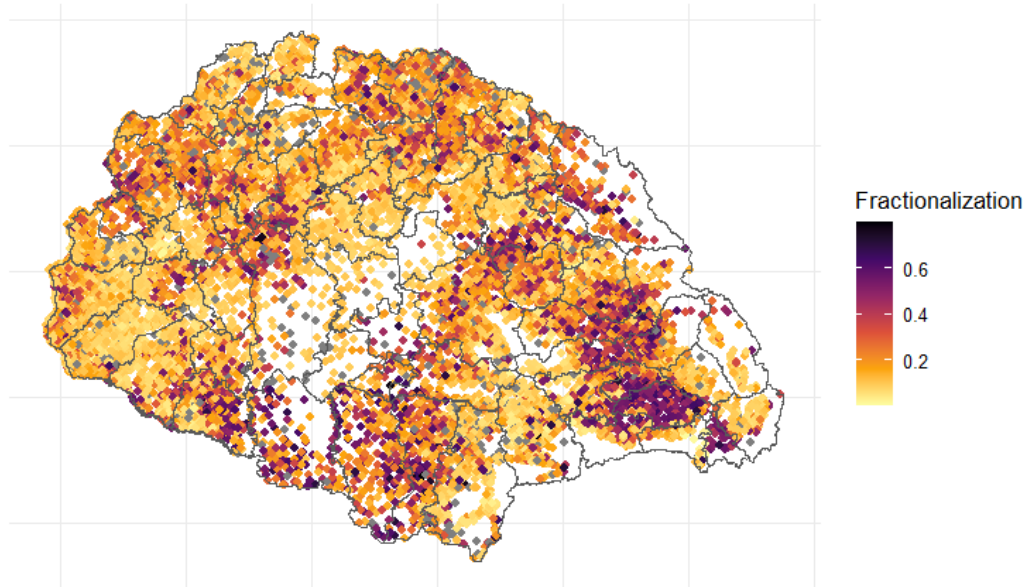


Figure 5 Map of ethnic fractionalization in Hungary, 1880, Source: Own-making, based on Demeter et al, 2017

We can also deduce that on average, in 1910 settlements had a lower level of fractionalization than in 1910, even though the earlier survey contains only 7 as opposed to 8 ethnic groups (with croats and serbs being surveyed as one) (Demeter et al, 2017).

Distribution of Hungarian-majority Areas
Settlement-level Data

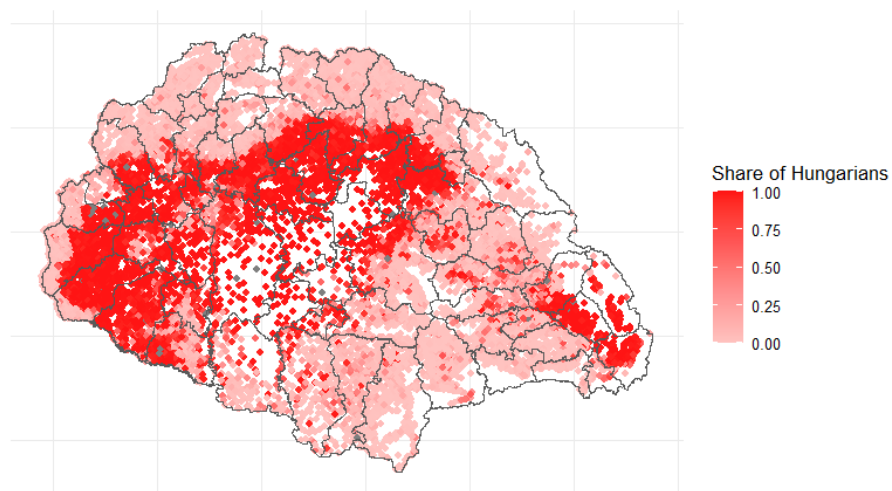


Figure 6, Map of Hungarian-majority areas, 1910, Source: Own-making, based on Demeter et al, 2017

If we also plot the Hungarian-majority areas, it is almost indistinguishable (except for some Romanian majority-areas in Central Transylvania, and Slovak-majority areas in the very north) from the map of ethnic diversity. This means I will have to control for the share of those speaking Hungarian, since this is correlated with diversity but can affect economic development through different channels.

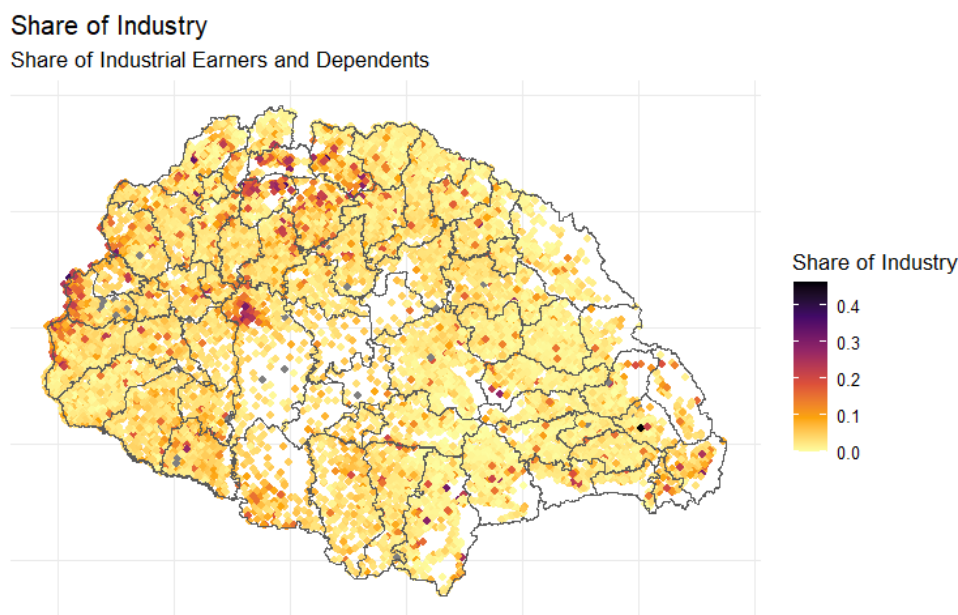


Figure 7, Map of Industrialisation in Hungary, 1910, Source: Own-making, based on Demeter et al, 2017

If I plot industrialization (share of industrial earners over agricultural earners), one can see it is higher in bigger cities, mining areas in modern-day Slovakia, areas in Burgenland, and around the capital, Budapest. In the analysis, I also added tertiary workers to industrial workers when determining this ratio, to better capture the added value from the services sector.

After examining private goods, we must turn our attention to what measures could we use to reflect public goods provision. This may not be as straightforward, since pure public goods are hard to find in this age, with most services being jointly offered by the state, local authorities, churches, and private providers.

IV.4. Education as a measure of public good levels

An obvious measure would be the literacy rate, especially in the 19th century, where the state began playing an increasingly important role in shaping public education (Nagy, 2006). The 1868 Law on Public Education set out to drastically increase literacy rates through the

establishment of public schools. Unlike the Austrian system, it did not seek to create a unified system controlled by the state but rather sought to complement already established religious or local schools with public ones (Niklai, 2017). It allowed churches to maintain their schools in accordance with rules set by authorities (separation of boys and girls, a minimum number of teachers per student, and public health regulations) (Niklai, 2017). It also allowed the establishment of municipal schools (Niklai, 2017). In places where different religious groups couldn't afford their own schools, a joint religious one could be set up (Niklai, 2017). The municipality could also support church schools, but it must do so equally in proportion to the number of members of each religious group (Niklai, 2017). These schools if needed, were complemented with state-sponsored (Hungarian-language) educational institutions, creating a mixed system (Niklai, 2017). Schools set up by the Greek-orthodox, Greek catholic, and certain evangelical churches were areas of own-language education for the ethnic minorities (Niklai, 2017). Still, most state schools were set up in Upper Hungary and Transylvania, indicating the use of public education as a tool for Magyarization (Niklai, 2017). In 1910, 13.4 percent of schools were maintained by the state, 8.7 by local municipalities, and 76% by churches (Nagy, 2006, pg. 34). Based on this, educational quality (as measured by literacy rates) is not a sufficient measure of public good provision due to the low number of state-sponsored schools. Nevertheless, as religious schools could enjoy considerable local support, and the provision of these depended on the ethnic and religious make-up of the settlement, it is still a variable worth studying.

IV.5. Public health as a measure of public good levels

Besides education, the most important public good of the era was the provision of healthcare and public health services. Although due to the increased awareness of diseases and improved living standards, the death rate fell sharply, the latter half of the nineteenth century was still characterized by the prevalence of infectious diseases and epidemics (such as measles) and compared to our age high infant mortality (Ábrám and Varga, 2023; Tamás, 2003). In this era, the state and society felt the increasing need to focus on the control, prevention, and treatment of illnesses. Although the 1876 XIV. Law (Law on Public Health) defines public health as primarily the responsibility of the state, there were several functions that were mainly carried by municipalities and villages (Magyar Királyi Központi Statisztikai Hivatal, 1913). It had to take care of the mentally ill, orphans, the deaf, and blind people. In addition, the local authorities took part in vaccination, the control and prevention of epidemics, and maintained cemeteries and mortuaries (Magyar Királyi Központi Statisztikai Hivatal, 1913).

One of the main responsibilities of villages was employing a local doctor. The law mandates all villages with greater than 6000 inhabitants to have a GP, while villages with a population less than that could team up to have a joint doctor, whose time would be split up between the respective settlements. (Magyar Királyi Központi Statisztikai Hivatal, 1913, pg 5). All related expenses had to be covered by the municipality, with the state only paying doctor's salaries after 1908 (Magyar Királyi Központi Statisztikai Hivatal, 1913). In addition, employing a midwife and maintaining public sanitation was a local responsibility (Magyar Királyi Központi Statisztikai Hivatal, 1913).

Based on this, it can clearly be seen that the quality of local healthcare provision could have significant impacts on health outcomes, by which we could make conclusions about the efficiency of local public services.

Fortunately, there is data about the share of the dead who have been treated by a doctor in the respective period. For this, I specifically checked for villages under 6000 inhabitants, as they are not required to have their own doctor, but rather a joint one with other settlements, so coverage could vary widely (Magyar Királyi Központi Statisztikai Hivatal, 1913, pg 5).

IV.6. Village tax as a measure of public good levels in Hungary

The final, and maybe most accurate indicator of public good levels will be the supplementary tax issued by villages (village tax) (Magyar Királyi Központi Statisztikai Hivatal, 1913). According to the 1908 Survey of Hungarian Villages, Hungarian law defines the rights and obligations of villages as the following: Managing the village's assets, maintaining the roads and public schools in the village, issuing and collecting village taxes, and providing police and firefighting services (Magyar Királyi Központi Statisztikai Hivatal, 1913). The body governing the village is the local council, half of which is made up of elected members, and the other half is constituted of the highest tax-paying citizens (Magyar Királyi Központi Statisztikai Hivatal, 1913). Highly educated individuals, such as doctors, teachers, lawyers, the village notary public have their taxes counted twice, meaning that the local intellectual class can get representation more easily (Magyar Királyi Központi Statisztikai Hivatal, 1913). When examining local public good levels, the village supplementary tax (községi pótdó) is of particular interest (Magyar Királyi Központi Statisztikai Hivatal, 1913). According to law, the villages expenditures must be first covered by income from the assets held by the municipality, and only if it should not suffice, can the supplementary tax be collected (Magyar Királyi Központi Statisztikai Hivatal, 1913). But according to the authors of the survey, by the beginning of the 20th century, most

villages started issuing supplementary tax as a normal way of covering their expenses and even invested the proceeds in public projects which ended up increasing their assets (Magyar Királyi Központi Statisztikai Hivatal, 1913). This means that except in villages endowed in vast natural resources, the amount of this tax can be a good measure of local willingness to pay for and undertake projects and services of the public interest (Magyar Királyi Központi Statisztikai Hivatal, 1913). When we examine diversities effects on the local village supplementary tax, we should control for the assets held by the village, as high endowment will limit the need to collect taxes (Magyar Királyi Központi Statisztikai Hivatal, 1913).

Village Tax per Person

Crowns per Person

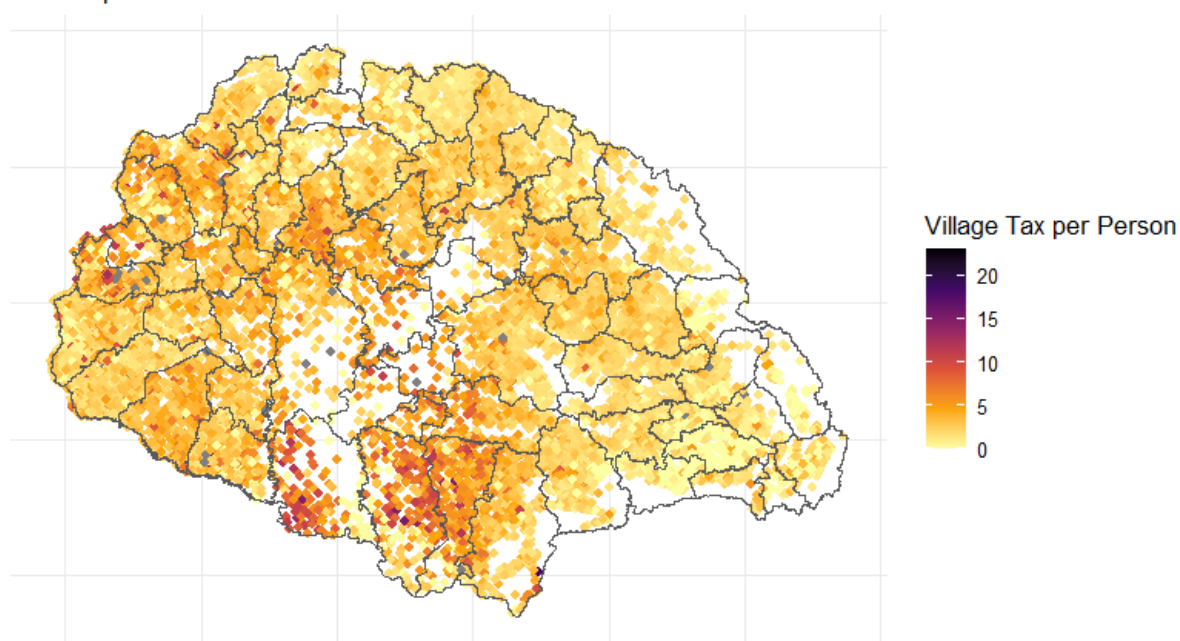


Figure 8, Map of village tax per capita in Hungary, 1910, Source: Own-making, based on Demeter et al, 2017

IV.7. Industry and the tertiary sector

In the late 19th century, Hungary was primarily an agrarian country, which was industrializing rapidly (Berend, 1996). It was primarily driven by what's called a pull effect, generated by opportunities for exports to European markets (Berend, 1996). In the years before the Great War, Hungarian exports grew at a rate of 3.6 percent per year (Berend, 1996, pg. 278). Between 1898 and 1913, the number of factories rose from 2700 to 5500, and the number of industrial workers rose from 302000 to 563000 (Berend, 1996, pg. 283). Based on this, it is not hard to see why the rate of industrial and tertiary (those employed in the services sector) earners over

agricultural ones is one of the best measures of private good provision, as this was the primary area of development around the end of the 19th century.

IV.8. Total taxes paid to the state per capita

For Hungarian villages, there is also data available for the total tax paid to the state, which will also be included as a measure of private goods, since these reflect the amount of economic activity in the respective municipalities.

V. Empirical Strategy

I use the following OLS regression to identify the link between private and public good provision:

$$Y_i = \alpha_i + \beta Diversity_i + \gamma X_i + \varepsilon_i$$

In the equation, Y_i denotes the specific measure used for either public or private good provision in settlement i , β measures effect of diversity on Y_i , and X_i is a vector of control variables, with γ denoting their respective coefficients. Finally, ε_i marks the error term.

To assess the strength of the results, several robustness checks will be employed. I am going to use county-fixed effects, and include shares of specific minorities such as Jews, Romanians, Germans, Slovaks, and Hungarians. I am also going to use the lagged value of diversity (1880) to prevent late-19th century era migration caused endogeneity from influencing the results. Finally, since diversity may be endogenous to economic development, migration and population growth will be added as control variables, and i am also going to restrict analysis to areas with below-median population growth rate. I will measure the effect using growth regressions in the following manner based on method used by Menyhért (2018):

$$\Delta Y_{i, \frac{t}{t-1}} = \alpha_i + \beta Diversity_{i, 1880} + \gamma X_{i, t-1} + \delta Y'_{i, t-1} + \varepsilon_i$$

Here, $\Delta Y_{i, t-1/t}$ denotes the change in economic development in settlement i , while β captures the effect of diversity on the rate of change in the outcome variables. In addition to γ capturing the influence of the control variables, now ρ controls for the effect of the previous level of development. t denotes 1910, while $t-1$ means the previous year where data for the specific

outcome variables is available (1880 for literacy, 1899 for village taxes, and 1900 for the number of industrial and tertiary earners compared to agricultural ones). It is unfortunate that we have few earlier data available (and in 2 out of 3 cases we can only account for growth around the turn of the century), but at least it may give us an approximation what the magnitude of effect on the rate of change may be.

I will also group all control variables into specific categories: population controls including the logarithm of population and the share of those speaking Hungarian, location controls such as distance from Budapest and Vienna, and from the nearest railway station. Finally, special status dummies will be added, such as the presence of mining or a city variable.

VI. Empirical Results

VI.1. Effect of ethnic Diversity on private and public good provision

First, I ran an OLS regression for specific measures of private good provision. In all cases, heteroskedasticity-robust error terms can be seen in the parentheses below the respective coefficients.

Rate of Industrial + Tertiary earners	(1)	(2)	(3)	(4)	(5)	(6)
Diversity	3.28*** (0.24)	2.72*** (0.10)	2.85*** (0.25)	2.05*** (0.24)	2.34*** (0.26)	1.79** (0.29)
Population controls	No	Yes	Yes	Yes	Yes	Yes
Location controls	No	No	Yes	Yes	Yes	Yes
Special status controls	No	No	No	Yes	Yes	Yes
County-fixed effects	No	No	No	No	Yes	Yes
Specific minority shares	No	No	No	No	No	Yes
Constant	0.21*** (0.05)	-4.48*** (0.29)	-4.01*** (0.31)	-0.94*** (0.34)	-3.67*** (0.79)	-4.06*** (0.31)

Number of observations	11931	11931	11931	11931	11931	11931
Adjusted R ²	0.04	0.04	0.04	0.11	0.13	0.13

Table 2, Regression results for the rate of industrial + tertiary earners over agricultural earners,

Source: Own-making based on data from Demeter et al., 2017

As we can see, the effect of ethnic fractionalization on the rate of industrial and tertiary earners compared to agricultural earners is positive and highly significant. The results are robust to the inclusion of county-fixed effects and specific minority shares, indicating that diversity benefits are not caused by the presence of certain minorities. Moving from complete homogeneity to perfect heterogeneity would increase the target variable by 1.79, or 0.42 standard deviations. To eliminate the chance of reverse causality, I introduced 1880 fractionalization into the regression, which still shows a similar effect. To address migration related endogeneity concerns, I introduced percentage change of population between 1880 and 1910 into the regression and ran another model with areas below the median increase in population. In both cases, the results were robust. This means that even in areas which saw below-median population growth and thus were not the most likely target for migration, diversity related industrialisation benefits were present. This method cannot account for the migration related development before 1880, but since the industrial revolution reached Hungary only in the late 19th century, this is unlikely to cause endogeneity concerns in our data (Berend, 1996). Moving from complete homogeneity to perfect heterogeneity would increase the target variable by 1.79, or 0.42 standard deviations, with all else being equal. Although restricting the dataset to settlements with below median industrialization this effect diminishes to 0.055, it translates to an even greater, 1.1 standard deviations increase, meaning that gains were present for the less industrialized villages as well. This confirms our hypothesis that diversity has a positive effect on private good provision at a local level, and these gains are also present in rural and less industrialized areas.

Tax paid to the state per capita	(1)	(2)	(3)	(4)	(5)	(6)
Diversity	2.11*** (0.38)	3.78*** (0.37)	5.32*** (0.35)	5.51*** (0.35)	3.12*** (0.33)	4.05*** (0.40)
Population contols	No	Yes	Yes	Yes	Yes	Yes
Location contols	No	No	Yes	Yes	Yes	Yes
Special status controls	No	No	No	Yes	Yes	Yes
County-fixed effects	No	No	No	No	Yes	Yes
Specific minority shares	No	No	No	No	No	Yes
Constant	12.74517*** (0.09)	5.86981*** (0.49)	11.05*** (0.49)	10.93*** (0.49)	22.88*** (1.02)	21.89*** (1.07)
Number of observations	11711	11711	11711	11711	11711	11711
Adjusted R ²	0.0025	0.10	0.22	0.22	0.42	0.42

Table 3, Regression results for tax paid to the state per capita, Source: Own-making based on data from Demeter et al., 2017

I also checked the effect of ethnic fractionalization on the amount of tax paid to the state. State taxes are usually paid after private goods, meaning they also might give us an indication of their production. Again, the effect is overwhelmingly positive, with a move from the 0 to 1 value of the fractionalization variable meaning a 4.05 crowns per person (or 0.58 standard deviations) increase in state tax paid per person. Unfortunately, in this case, data is only available for villages, but this means that it is easier to exclude migration-caused endogeneity.

After finishing our analysis of private goods, we turn our attention to public ones. The first variable we are going to discuss is literacy, which although an imperfect indicator of locally distributed public goods, it might still give us an indication about the general direction of the connection.

Literacy	(1)	(2)	(3)	(4)	(5)	(6)
Diversity	−0.08*** (0.01)	0.03** (0.01)	0.10*** (0.01)	0.10*** (0.01)	0.05*** (0.01)	−0.06*** (0.01)
Population contols	No	Yes	Yes	Yes	Yes	Yes
Location contols	No	No	Yes	Yes	Yes	Yes
Special status controls	No	No	No	Yes	Yes	Yes
County-fixed effects	No	No	No	No	Yes	Yes
Specific minority shares	No	No	No	No	No	Yes
Constant	0.53*** (0.00)	0.37*** (0.01)	0.53*** (0.01)	0.55*** (0.01)	0.73*** (0.02)	0.51*** (0.02)
Number of observations	11931	11931	11931	11931	11931	11931
Adjusted R^2	0.00	0.30	0.55	0.55	0.71	0.78

Tablee 4, Regression results for literacy rate, Source: Own-making based on data from Demeter et al., 2017

When examining the effect of diversity on literacy, the results are less conclusive. Although initially, the effect is positive, this is not robust to the inclusion of specific minority shares. A move from complete homogeneity to perfect heterogeneity translates to a 6-percentage point (0.3 standard deviations) decrease in the literacy rate when the shares are added, *ceteris paribus*. This is low compared to the effect the specific minorities, as the presence of the Romanian nationality translates to a 14% decrease, that of the Slovak minority to a 15% increase, and finally, German presence means an 18% increase in literacy (moving from 0 to 100% in all cases), holding all else constant. This means that although fractionalization has a significant negative effect, it is the precise ethnic make-up of the settlement that determines literacy shares.

Village tax 1908	(1)	(2)	(3)	(4)	(5)	(6)
Diversity	0.39*** 0.10	0.60*** 0.10	0.86*** 0.10	0.90*** 0.10	0.88*** 0.10	0.88*** 0.11
Population						
contols	No	Yes	Yes	Yes	Yes	Yes
Location contols	No	No	Yes	Yes	Yes	Yes
Special status						
controls	No	No	No	Yes	Yes	Yes
County-fixed						
effects	No	No	No	No	Yes	Yes
Specific minority						
shares	No	No	No	No	No	Yes
Constant	2.73*** 0.02	2.18*** 0.14	3.68*** 0.14	3.64*** 0.14	7.78*** 0.29	7.24*** 0.31
Village wealth	-0.0013*** 0.0002	-0.0013*** 0.0002	-0.0008*** 0.0002	-0.0008*** 0.0002	-0.0018*** 0.0002	-0.0017* 0.0002
Number of						
observations	11711	11711	11711	11711	11711	11711
Adjusted R^2	0.004326	0.02136	0.11	0.1119	0.3284	0.4171

Table 5, Regression results for village tax per capita, Source: Own-making based on data from Demeter et al., 2017

As we can see, diversity has a highly significant and positive effect on the collection of village supplementary taxes in Hungary. A move from complete homogeneity to perfect heterogeneity increases village tax collection by 0.88 crowns per person (0.46 standard deviations), *ceteris paribus*. standard deviations) increase, holding all else equal. We can see, that the effect of village wealth is negative as expected in all cases, with one standard deviation increase in wealth decreasing village tax per person by 0.15 crowns or 0.08 standard deviations. Results are robust to the inclusion of population growth, exclusion of high-growth areas, and using the 1880 diversity to eliminate reverse causality. These findings challenge the results of (Alesina, Baqir, and Easterly, 1999, Alesina and La Ferrara, 2005; Gershman and Rivera, 2018) that fractionalization has clear and negative effect on public good provision. It seems, that during the early 20th century, ethnic differences still allowed for the issuance of taxes to finance local public spending. Since this variable only accounts for the taxes used to finance public goods, I

am going to try to check whether the same applies to the provision of public services. Without accounting for the latter, this could just mean that diverse settlements are simply engaging in ethnic-based patronage, as theorized by Alesina, Baqir, and Easterly (1999).

Share of the Dead						
Treated by a Doctor	0.08***	0.11***	0.17***	0.17***	0.17***	0.06***
	0.01	0.01	0.01	0.01	0.01	0.01
Population contols	No	Yes	Yes	Yes	Yes	Yes
Location contols	No	No	Yes	Yes	Yes	Yes
Special status						
controls	No	No	No	Yes	Yes	Yes
County-fixed effects	No	No	No	No	Yes	Yes
Specific minority						
shares	No	No	No	No	No	Yes
Constant	0.30***	−0.38***	−0.22***	−0.22***	0.18***	0.08***
	0.00	0.02	0.02	0.02	0.03	0.03
Village wealth	0.0004***	0.0003***	0.0003***	0.0003***	0.0001***	0.0001***
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Number of						
observations	11711	11711	11711	11711	11711	11711
Adjusted R^2	0.02	0.25	0.38	0.38	0.53	0.56

Table 6, Regression results for share of the dead treated by a doctor; Source: Own-making based on data from Demeter et al., 2017

Our previous findings regarding public good provision are confirmed when looking at the share of the dead treated by a doctor. In completely perfectly heterogenous villages, the share of those getting professional medical attention before dying increases by 6 percentage points, or 0.22 standard deviations, compared to completely heterogenous ones, ceteris paribus. The effect is robust to all previously used checks and is almost identical in magnitude (0.07 increase) in villages below 6000, where having an own village doctor is not mandatory (Magyar Királyi Központi Statisztikai Hivatal, 1913). I also ran a regression including village tax, which shows that it is indeed a positive contributor to healthcare provision. The inclusion of specific minority shares further confirms the underdevelopment of Romanian-majority areas compared to the rest

of the empire. I also check for two other healthcare measures, infant mortality and the rate of infectious diseases, and the effect is not significant in the former, and is not robust to the inclusion of specific minority shares in the latter. Nevertheless, as these are not entirely a local responsibility and may depend on other factors as opposed to doctor provision, so they do not contradict our findings. With this, we can come to the conclusion that ethnic fractionalisation positively effected both the financing and the provision of public goods in the early 20th century Hungary.

VI.2. Ethnic Fractionalization and Polarization

It is also important to check polarization, as according to Gören (2015) the ethnic composition of an area compared to the state which can in theory cause the maximum amount of social conflict can have a vastly different effect than fractionalization.

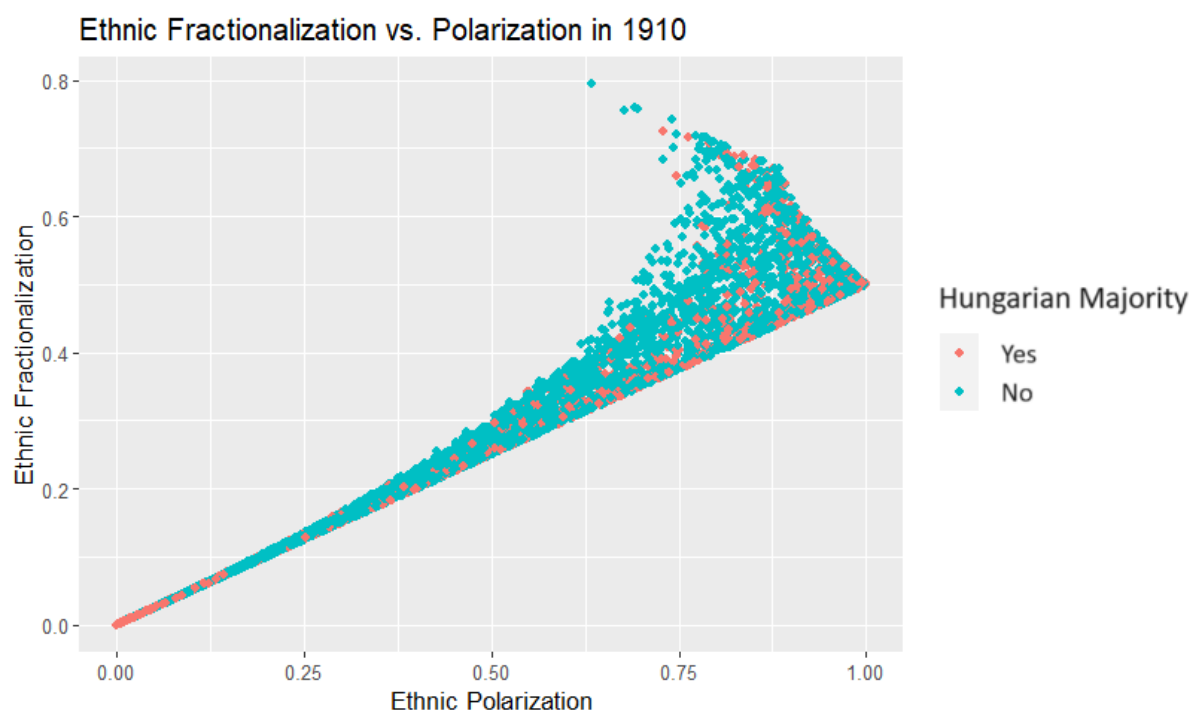


Figure 9, Correlation between ethnic fractionalization and polarization, 1910, Source: Own-making based on data from Demeter et al., 2017

As we can see, the two are almost identical except for very high levels of fractionalization, meaning that the impact may also be similar. Nevertheless, it will be interesting to find out the effect of polarization will be for a given level of fractionalization. When putting polarization into the regression separately, coefficients are somewhat diminished but identical in direction.

Only when looking at polarization and fractionalization together in the same regression, can we have interesting conclusions.

Dependent Variable	Industrial + Tertiary	Village		
	Earners	State Tax	Tax	Share Treated
Ethnic Fractionalization	9.455*** (-1.28)	11.432*** (-1.709)	2.188*** (-0.495)	0.311*** (-0.055)
Ethnic Polarization	-4.636*** (-0.751)	-4.434*** (-0.997)	-0.784** (-0.289)	-0.148*** (-0.032)
Constant	-4.203*** (-0.84)	22.085*** (-1.071)	7.277*** (-0.31)	0.097*** (-0.034)
Observations	11931	11711	11711	11711
Adjusted R ²	0.135	0.423	0.336	0.564

Table 7, Regression results where both ethnic polarization and fractionalization is included Source:

Own-making based on data from Demeter et al., 2017

As we can see, for a given level of fractionalizations, polarization impacts all target variables in a negative manner. This suggests that despite the positive diversity effects, social conflict due to ethnic differences can impede both private and public good provision. It means that in villages with high diversity, several small ethnic groups are preferred as opposed to two of equal size. The results are similar to what Montalvo and Raynal-Querol (2005) found regarding civil wars, that for a given level of polarization, more fractionalization will lead to better outcomes. But overall, the effect of the latter outweighs that of the former, with greater prosperity seen in diverse municipalities.

VI.3. Religious Diversity

Along with its diverse ethnic make-up, the Austro-Hungarian Empire was also home to followers of many religious denominations. I also wanted to examine the effect of religious diversity, both alone and when compared to ethnic fractionalization.

	Industrial and Tertiary Earners			Literacy		
Religious Fractionalization	0.637***	0.585**	-0.11	0.101***	0.075***	0.097***
Ethnic Fractionalization			2.385***			0.012*
Percent Orthodox		-0.562***			-0.111***	
Percent Calvinist		-1.118***			0.131***	
Percent Jewish		5.999***			-0.007	
Constant	-3.922***	-3.592***	-3.669***	0.716***	0.707***	0.718***

Table 8, Effect of ethnic and religious fractionalization on industrial + tertiary earners over agricultural earners and literacy, Source: Own-making based on data from Demeter et al., 2017

First, I ran three regressions, one with only religious fractionalization, one with specific religion shares added, and one without the shares but controlling for ethnic fractionalization variable to determine which was more important. If in the third regression, either religious or ethnic diversity was significant, I added specific religion or ethnicity shares to see if the results are robust to their inclusion. In the case of industrial and tertiary earners compared to agricultural ones, the effect of religious fractionalization, although initially positive and significant disappears when ethnic diversity is added. The latter still has a positive impact and is still robust to the inclusion of specific minority shares. In the case of literacy, ethnic diversity was more important, and is robust to the inclusion of specific denominations. If I add both religious and ethnic shares, religious fractionalization has a significant positive, while ethnic has a significant negative impact, confirming the results from (Table 4). These results are not surprising, since at the time 76% of schools in the county were maintained by churches, meaning more religious groups present necessitates additional school construction (Nagy, 2006, pg. 34).

	State Tax			Village Tax		
Religious Fractionalization	3.975***	3.368***	3.444***	0.359***	0.18**	0.101
Ethnic Fractionalization			1.712***			0.833***
Percent Orthodox		-0.84***			-0.32***	
Percent Calvinist		0.90***			-0.14***	
Percent Jewish		10.45***			4.896***	
Constant	22.56***	22.99***	22.75***	7.63***	7.85***	7.72***

Table 9, Effect of ethnic and religious fractionalization on tax paid tot he state per capita and village tax per capita, Source: Own-making based on data from Demeter et al., 2017

Both contribute to the amount of state tax paid per person in Hungarian villages, and this effect is robust to the previously used checks (inclusion of specific minority and religious shares.

	Treated		
Religious Fractionalization	0.19***	0.15***	0.158***
Ethnic Fractionalization			−0.115***
Percent Orthodox		0.051***	
Percent Calvinist		0.689***	
Percent Jewish			0.102***
Constant	0.17***	0.2***	0.181***

Table 2, Figure 3, Figure 4, Effect of ethnic and religious fractionalization on the share of the dead treated by a doctor, Source: Own-making based on data from Demeter et al., 2017

For the share of the dead treated by a doctor, ethnic fractionalization has a negative and religious fractionalization has a positive effect when examined together. This is and intresting finding, which might suggest that religious diversity is more important than ethnic diverstiy for certain types of publix good provision.

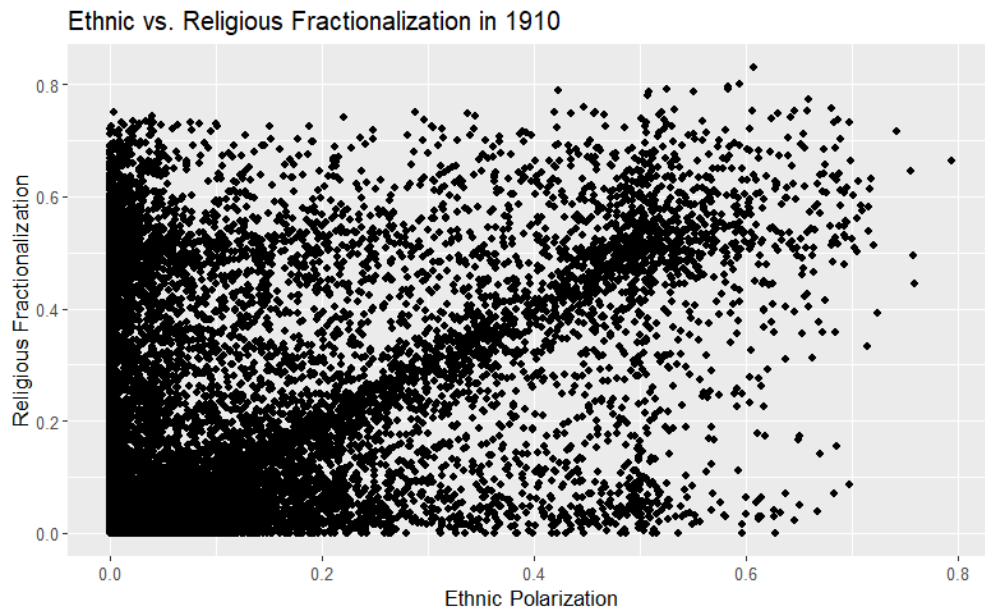


Figure 10, Association between ethnic and religious fractionalization in 1910, source: Own-making based on Demeter et al., 2017

We can see, that despite the correlation, there are significant differences between ethnic and religious diversity. Much of this can be attributed to the ethno-religious differences of the Austro-Hungarian Monarchy. Hungarians were predominantly catholic and Calvinist, Germans and Croats were mostly roman catholic, while the numerous followings of the orthodox church could be attributed to the Serbian, Romanian, and Ruthenian minorities (Pap, 2020; Jenő, 2008). The coexistence of Germans and Hungarians meant low religious but high ethnic diversity, while in Transylvanian villages inhabited by Germans and Hungarians, the two were virtually the same (Pap, 2020; Jenő, 2008).

VI.4. Effect of ethnic fractionalization on the growth rate of target variables

I also wanted test what effect does ethnic fractionalization has on the growth rate of the target variables. Unfortunately, the only variables for which I could calculate growth rates were village tax per capita and share of agricultural and tertiary earners between 1900 and 1910, and the literacy rate between 1880 and 1910. In all cases, the coefficient of ethnic fractionalization was negative and significant. This might suggest endogeneity between ethnic diversity and economic development, as suggested by Menyhért (2018). Unfortunately, no other growth variables could be calculated from the data. As previously mentioned, I tried controlling for migration, the rate of population growth between 1880 and 1910, to which the positive estimates found previously were robust. I also restricted the examined dataset to low growth areas, but

diversity gains were also present there. Unfortunately, this question cannot be answered from the available data. One would need observations ranging from several previous censuses, in order to better understand what affects the growth rate of private and public good provision. This definitely cannot be answered by looking at the growth rate over a ten-year period. Although the thirty-year timeframe of literacy might be sufficient, the positive coefficient was already not robust to the inclusion of specific minority shares for that variable even in the cross-sectional OLS analysis.

VII. Discussion

VII.1. Why is diversity positively related to the production of public goods

Alesina, Baqir and Easterly (1999), Alesina and La Ferrara (2005), and Gershman and Rivera (2018) established a clear negative association between ethnic diversity and local public good provision. These findings are not echoed in our data, and we establish a positive connection between the explanatory variable and both the financing and provision of public goods. Lee, Lee, and Borchering (2016) found that ethnic diversity only decreases the provision of relatively price-elastic public goods: those with viable private substitutes. Hopkins (2009) establishes that it is the change, rather than the level of ethnic diversity that influences taxes and public services. This encourages us to test the effect of the change in diversity between 1880 and 1910 on the surveyed outcomes. Gisselquist, Leiderer, and Nino-Zarazua (2016) also challenged the previous findings using data from Zambia. Although they concluded that ethnic diversity has a negative effect on central government budget allocation for local public goods, the effect when it comes to locally determined outcomes is positive and significant. They also theorize that small communities can coordinate public projects more easily, and thus can better overcome ethnic boundaries. This may explain the positive effect in our data, as the average population of a municipality in the sample is 1493. I regressed the change in diversity on all surveyed outcomes (both private and public goods) as set out by Lee, Lee, and Borchering (2016), but this can hardly be the explanation for the findings. The coefficient is negative for literacy and positive for tax paid to the state per capita, just as in the case where we have the level of diversity as the dependent variable. For all other outcomes (industrial + tertiary earners over agricultural earners, village tax per capita, the share of the dead treated by a doctor), the effect is not significant. Price elasticity of demand is also unlikely to be the explanation behind

our findings, as the only provision variable examined, share of the dead treated by a doctor, has a clear alternative: private healthcare provision (though it may not be easily affordable for the poor masses). Probably the effect we find has much to do with the special conditions of Hungary in the late 19th and early 20th century. Only half of the local council constituted of elected members, while the other half being filled up with the top taxpayers (Magyar Királyi Központi Statisztikai Hivatal, 1913). Maybe they had the incentive to build coalitions across ethnic lines, provide public goods, and ensure the continuation of their business activities. Also, the role of the state was much lower than in modern society. Maybe, the quantity of public services was so slow and so universally desired (e.g. healthcare in the age of infectious diseases), that ethnic differences did not cause coordination problems and there was no heterogeneity of preferences. Maybe diverse municipalities provided more public goods simply because they were richer, and there were more private goods to issue taxes on and finance communal services. Also, it may be the case, that richer residents of diverse areas demanded higher quality services.

VII.2. Limitations of my Research

My research has several limitations. First, none of the measures I used are perfect for either public or private good provision. Second, when measuring the effect of fractionalization on the growth rate of certain variables, we found negative coefficients. Although the OLS results were robust to the inclusion of migration rate and rate of population growth between 1880 and 1910, we still cannot rule out the possibility of endogeneity. It may be possible that migration also effected poor areas, just in a reverse way: certain people migrated from disadvantaged areas, reducing diversity in these towns and villages, and leading us to think that those areas are poor because they are less diverse. Also, I did not take into effect the possible spatial autocorrelation of the error term, which causes an issue in all cases where location of the observation matters, something which is definitely the case in our situation (Dubin, 1988). Also, one measure of public good provision used was village tax per capita paid in 1908. The problem is, that this variable can show strong volatility, with villages sometimes issuing high tax one year and living from the proceeds for several (Magyar Királyi Központi Statisztikai Hivatal, 1913). As a result, the 1908 value may not be representative for all villages. Also, not all public spending will go towards productive public services, as according to Alesina, Baqir, and Easterly (1999) there is also the possibility of ethnic based patronage, where a certain group uses public money to support its members with private goods, something which nobody could consider as productive public spending, though these are somewhat contradicted by the findings in (Table 6) regarding the positive effect of diversity on healthcare provision.

VIII. Conclusions

In my research, I have established a positive association between ethnic fractionalization and both private and public good provision. The measures used for private goods were the rate of industrial and tertiary earners over agricultural ones and tax paid to the state per capita. The measures used for public good provision were village tax per capita, the share of the dead treated by a doctor, and the literacy rate. A series of robustness checks were used to test the findings, including county-fixed effects, using the 1880 value of diversity, and the inclusion of specific minority shares. I also controlled for migration rates, the percentage population increase between 1880 and 1910, and have also restricted the analysis to below-median population growth areas to try to exclude the effect of migration-caused endogeneity between development and ethnic diversity. Except for literacy rate, in which case the coefficient became negative following the inclusion of specific minority shares, the results were robust to these measures. These findings confirm those of Menyhért (2018) that diversity is positively related to economic development in the early 20th century Hungary and shows that this is the case not only in towns, but also in smaller villages. On the other hand, the proposal of Alesina and La Ferrara (2005) could only partially be confirmed. Indeed, ethnic diversity had impacted private good production in a positive manner, but in my data this effect on public goods was similar to that on private ones, contrary to the mentioned authors findings. I also found, consistent with Montalvo and Raynal-Querol (2005) that for a given level of polarization, fractionalization improves outcomes. I also concluded that religious fractionalization is also positively associated with public and private good provision. What was also interesting, that in the case of the share of the dead treated by a doctor and literacy, the inclusion of religious fractionalization turned the coefficient of the ethnic one negative. The results for literacy are not surprising, since in 1910, 76% of schools were maintained by churches (Nagy, 2006, pg. 34). The results cannot be interpreted as causal however, due to several factors discussed in the limitations section. There are several ways in which further research could be permed on the topic. First, one could look at whether the results are robust to controlling for the spatial autocorrelation of the error term. Second, as suggested by Campos, Saleh and Kuzeyev (2011), it would be interesting to repeat the same research, but treating diversity as a time-varying variable, if more data were available from earlier censuses.

IX. Citations:

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