Cultural, Historical and Geo-Climatic Background of Socio-Economic Progress (with Focus on Family Structure and Corruption)

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CHAPTER 1

General Introduction

Why are some societies rich, democratic, non-violent and have well-functioning bureaucracies, while others are less well off, often authoritarian and mired in corruption or violent conflicts? This research is an attempt to trace the most distant roots of current day institutions. The first part focuses on the most ancient and basic societal institution – namely the preindustrial family. We refer to the determinants of historical family structure and investigate its effect on current day levels of interpersonal trust and liberal voting. The last chapter of the manuscript is devoted to the corruption that may take different shapes and is shown to be embedded in social values, religion, history and social networks. These seemingly different topics can be aligned in a clear path dependence that sheds light on the evolutionary trajectories of societies. To begin with, we investigate the foremost geo-climatic exogenous factors that determined historical family structure, then we refer to the social values associated with particular family features, and finally, we demonstrate that current day institutions e.g. corruption are embedded in these longstanding social values.

1.1 Historical family structure

1.1.1 Main concepts

J. Hajnal (1965) was one of the first scholars to suggest a clear distinction between two family structures and, moreover, he argued that these differences predetermined the further developmental paths of European societies. The first family structure, the 'extended family' /'joint household', was characterised by early marriage (especially of women), the rare use of servants' labour in domestic and agricultural work, widespread co-residence of parents with adult and married sons, and, as a result, a relatively large household size consisting mostly of kin. This family structure prevailed around the globe and was actually a continuation of the ancient family organisation. The second one, the 'nuclear family' structure, which was dominant mainly in North-Western Europe, was characterised by late marriage (also among women), the widespread use of servants, the relatively early leaving of adult children from the parental household, separate residence of the elderly, and a relatively small family size consisting of the married couple and their small children (Gruber & Szoltysek, 2016; Hajnal, 1965; Hartman, 2004; Todd, 1990; among many others). According to Hajnal (1965), the nuclear family structure is associated with more advanced social institutions and better developmental outcomes, while the extended family is responsible for the backwardness of societies.

Several scholars took up this idea showing that family structure and age at first marriage are important predictors of the variation of economic indicators across European regions (Todd, 1990; Duranton et al., 2009; Bertocchi & Bozzano, 2016; Foreman-Peck, 2011), the organisation of social security systems (Galasso & Profeta, 2011; Costa-Font, 2010), demand for market regulation (Alesina, Algan, Cahuc & Giuliano, 2015), and entrepreneurship (Percoco, 2015). A part of our manuscript contributes to this literature and concentrates on the determinants and consequences of historical family structure.

1.1.2 Causes

In Chapter 2 we investigate the geo-climatic and socio-economic determinants of historical family structure in the Russian Empire at the end of the 19th Century. First, we show that extended families are more likely to prevail over nuclear families in regions with better geo-climatic conditions for agriculture. The literature suggests that the extended family is an inherent feature of an agricultural society. It flourished with the onset of the Neolithic revolution, while nuclear families prevailed in hunter-gatherer societies (Nimkoff, Middleton, 1960; Welzel et al., 2021). Agriculture provided high incentives for the formation of extended families, creating, on the one hand, unprecedented population pressure and labour demand, and, on the other hand, the possibility to sustain large families. During the subsequent industrialisation process households ceased to be the main productive units, leading to the declining number of extended families in urban and industrial regions while agricultural regions were much less affected.

Second, we find that extended families are more widespread in regions where the level of economic and physical insecurity is high. The extended family structure allows households to minimise their economic risks. The death of the only adult male worker is definitely more detrimental to the economy of a nuclear family, than it is for an extended household where there are several adult workers. Moreover, an extended family benefits from economies of scale, for instance, sharing the use of agricultural tools.

Third, extended families are more likely to prevail in regions populated by ethnicities with strong local identities like Armenians or “Polishchuks” (settlers of the historical Polesie region on the border between Belarus, Ukraine, Russia and Poland). Because of the need to protect the integrity of their ethnicity from outgroups, they prefer to form more self-sufficient extended families in terms of agricultural production and child or elderly care.

In Chapter 3 we continue to focus on the Russian Empire, considering one particular geo-climatic determinant of historical family structure – the Cool Water (CW)-condition. The CW

index combines information about temperature and precipitation. Regions scoring high on the CW index are expected to have cool summers, mild winters and abundant precipitation throughout the year. We hypothesise that the CW-condition triggers lower fertility rates and is conducive to particular family features that result in fewer child births e.g., a higher age at first marriage for women. We highlight two mechanisms that explain the association between the CW-condition and lower fertility pressures on women. The first mechanism implies that Cool Water regions have less pathogen stress due to their low temperatures and fresh water abundance. The second mechanism rests on the lower labour intensity of farming in Cool Water regions where the most suitable cereals are rye, wheat and barley that do not require high labour input. Our expectations are confirmed by the econometric analysis: we do find that the CW-condition leads to a higher age at first marriage for women and lower fertility rates in the 19th Century, though the Russian case study has its own peculiarities. We proceed to draw a line between the past and the present and trace the path dependence from the CW-condition to the historical age at first marriage for women (fertility rates) and then to contemporary indicators of cultural and economic modernisation i.e., gross regional product per capita, emancipative values and liberal voting. Our analysis suggests that current day modernisation is rooted in the CW-condition and historical family arrangements.

1.1.3 Consequences

The contemporary consequences of historical family structure are discussed in Chapters 4 and 5. Chapter 4 discusses sub-national regions of several West and East European countries. We look at the correlation between historical family structure and current day levels of social trust. In this project we examine separately the effect of family extendedness in terms of the number of relatives, and the effect of hierarchical relations within the family, by which we mean the gender hierarchy i.e., the power of men over women, and the generational hierarchy i.e., the power of older generations over younger.

One of the intriguing findings of this study is that family extendedness does not affect social trust. Hence, the theory that links the limited capacity of extended families to stimulate interpersonal trust with their self-sufficiency and multifunctionality (Greif, 2006; Fukuyama, 1995; Hartman, 2004) is not confirmed by our empirical analysis. Our results challenge the common explanation that extended families are less interested in contacts beyond the kin groups because they can perform by themselves many functions that otherwise are accomplished by societal institutions (e.g., child and elderly care, labour intensive agricultural works etc.).

We come to the conclusion that it is not the number of relatives that matters, but the power relations within the family. Generational hierarchy was shown to be especially detrimental for trust formation. This echoes Putnam's (1993) ideas that vertical networks cannot produce trust because individuals in power are not motivated to take the interests of their subordinates into account because they cannot be punished for the betrayal of these interests.

Chapter 5 focuses on the effect of historical family structure on liberal voting across a century of Russian history. We consider the first free and competitive elections held in Russia in 1917 - to the Constituent Assembly - and the presidential elections of post-Soviet Russia of 1996 and 2000. In the course of these elections people had to choose between the communists, implying an interventionist state, the implementation of large-scale redistribution policies and authoritarian government, and the liberal parties or candidates arguing in favour of democracy and liberal reforms. Psychological studies highlight that nuclear families nurture individualism and intolerance towards authoritarian relations (Rosen, 1961; Elder & Bowerman, 1963; Triandis et al., 1990) which points to the positive effect of the nuclear family on liberal voting.

The story, however, is more complicated than it seems at first glance. Extended families (being actually relicts of clan society) resisted any sort of state intervention into their functioning. For precisely this reason, strong kin communities and tight kinship ties were from the beginning the main targets of the communist ideologists who promoted a strong interventionalist state (Engels, 1933). Hence, we could expect that in regions dominated by extended families, communist voting may be less popular than voting for alternative candidates, e.g., liberals.

We perform a thorough econometric analysis that answers which of the two conflicting hypotheses better fits the reality. We find that it is the nuclear family and not the extended one that supports liberal values reflected in voting behaviour.

1.2 Overview of network and market corruption study

Chapter 6 is devoted to the comparative study of two different forms of corruption – network and market corruption. Market corruption is impersonal bribery when the bureaucrat provides favours to any person or firm who pays a bribe. Monetary payment is a necessary precondition for market corruption because it is the only way to reciprocate the informal favour in a case when the two counteragents do not have any personal relations. Network corruption is different: *only* those persons (or firms) who have some kinship, friendship or business ties with the bureaucrat may get a service. Network corruption often does not require immediate monetary payments as the participants of network corruption are involved in longstanding relations with

mutual obligations. Market corruption in most countries is persecuted by the law, while network corruption is often associated with a societal tradition of gift giving and perceived as tolerable or "grey" corruption (Heidenheimer, 2002). Most international corruption indices (CPI from Transparency International, World Bank Control of Corruption index) disproportionally consider market corruption while network corruption remains very much in the shadows.

We decided to make network corruption visible and to compare the causes and consequences of network and market corruption. We find that network corruption is more strongly correlated with historical and cultural variables like legal origin, Protestant religion, Ottoman and Habsburger rule. Indeed, market corruption is more sensitive to the GDP fluctuations.

Finally, we pose a natural question: which form of corruption is more harmful to the investment rate? The answer is not obvious. Market corruption provides equal access to informal services to everyone who can pay a bribe, and it is less harmful to market competition. Simultaneously however, it creates uncertainty for investors because it undermines the rule of law, hampers the enforcement of contracts and makes it impossible to calculate the total expenditure for bribes in advance. Network corruption, by contrast, provokes less uncertainty as in this case contract enforcement is guaranteed by mutual informal obligations instead of the rule of law while the monetary corruption rent is lower and more predictable. However, network corruption is available only to a limited number of people who are members of particular social networks. Therefore, network corruption is highly restrictive for competition. In the course of our econometric analysis we come to the conclusion that network corruption lowers the investment rate to a larger extent than market corruption.

1.3 Structure of the dissertation

This dissertation is paper-based; it is comprised of five research articles, some of them written with co-authors. Chapters 2-6 are entirely based on these articles. Table 1 presents a general overview of the research questions and the methodological aspects of each of the research articles. For more detailed descriptions of methods and data, please see the respective Chapters.

Table 1: Overview of research questions, data and methods used in our dissertation.

	Chapter 2	Chapter 3
Based on research article	The Determinants of Historical Family Structure in the Russian Empire	The Effect of Cool Water-Condition on Reproductive Autonomy and Modernization: Evidence from Russia.
Research question	Which geo-climatic and socio-economic factors determined pre-industrial family structure?	To trace the path dependence between Cool Water-Condition to preindustrial female reproductive autonomy to contemporary emancipative outcome.
Time frame	1897	Two waves of observation. Historical data: 1897; 1903-1905. Contemporary data: 2000, 2019, 2020.
Type of data	Aggregated printed statistics from the official Russian census and census-like materials, grid celled geo-climatic data.	Aggregated printed statistics from official census of the Russian Empire and census-like materials, grid celled geo-climatic data.
Sample of countries	Russian Empire	Russian Empire
Unit of analysis	Administrative district (uezd)	Administrative region (gubernia)
Data sources	1) Russian census 1897; 2) Statisticheskiy vremennik Rossiyskoy imperii, serie 3. Edition 10. Pozemelnaya sobstvennost Evropeyskoy Rossii 1877 and 1878. (1886); 3) Vestnik zentralnogo statisticheskogo komiteta MVD, N41 Umershie nasilstvenno I vnezapno v 1988-1893, ed. 1897; 4) Statisticheskiy ezhegodnik Rossii, otdel 3, Sankt	**Historical data:** 1) Russian census 1897; 2) Central Statistical committee of the Ministry of Internal Affairs; 3) http://ristat.org/; 4) Statisticheskiy vremennik Rossiyskoy imperii, Serie 3, issue 10. Posemelnaya sobstvennost Evropeyskoy Rossii 1877-1878 (1886). 5) Vishnevskyi, Volkov, 1977

	Peterburg, 1912; 5) Gangal el al., 2014; 6) www.meteoblue.com; 7) Global suitability of soil project; 8) Pongratz et al., 2008; 9) The Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010); 10) Global Self-consistent, Hierarchical, High-resolution Geography Database (GSHHG).	**Contemporary data:** 1) Russian Federal Statistical Bureau; 2) "Survey of Russian Regions, 2020" provided by the Laboratory of Comparative Social Research (HSE); 3) Russian Federal Central Electoral Commission **Geo-climatic data**: 1) www.meteoblue.com
Dependent variable	Mean number of relatives in household	**Historical:** 1) Proportion of married women aged 15-19; 2) Fertility rates. **Contemporary:** 1) GRP per capita; 2) Emancipative values; 3) Liberal voting
Main independent variables	Mean temperature in the hottest month of the year; mean precipitation in the driest month of the year; distance to the Fertile Crescent; soil quality; share of land covered with forest in premedieval times; mean elevation; distance to the nearest river; religion; ethnicity; literacy; urbanisation; population density; land ownership; % of people killed; % of people suffering from infectious diseases.	Cool Water-condition
Modelling	Multivariate regression analysis (OLS)	Structural Equations Modelling (SEM)

Chapter 4 **Chapter 5**

Based on research article	The Shadow of the Family: Historical Roots of Social Trust in Europe.	Historical Family Structure as a Predictor for Liberal Voting: Evidence from a century of Russian History.
Research question	Does the preindustrial family structure affect the current day level of interpersonal trust?	Does the nuclear family foster liberal values reflected in liberal voting?
Time frame	Historical data: 1747-1923. Contemporary data: 2010	**Historical data:** 1897, 1917. **Contemporary data:** 1996, 2000.
Type of data	Individual data from official European censuses; aggregated printed statistics from official censuses; contemporary survey of the representative population sample	Aggregated printed statistics from the official Russian census and census-like materials, grid celled geo-climatic data, electoral statistics 1917, 1996, 2000.
Sample of countries	1) **Core sample based on individual data**. Western Europe: France, Great Britain, Sweden. Eastern Europe: Albania, Croatia, Hungary, Romania, Slovakia. 2**) Extended sample based on aggregated statistical sources.** Western Europe: France, Germany, Great Britain, Italy, Sweden. Eastern Europe: Albania, Armenia, Azerbaijan, Belarus, Croatia, Czech Republic, Estonia, Georgia, Hungary, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Ukraine, Uzbekistan.	Russian Empire
Unit of analysis	Sub-national regions	Administrative districts
Data sources	**Historical data:** IPUMS International, https://censusmosaic.demog.berkeley.edu/ ; printed census sources for single countries. **Contemporary data:** Life in Transition Survey (2010), EBRD.	**Historical data:** 1) census of the Russian Empire 1897; 2) Protasov, L. (2014) Vserossiyskoe uchreditel'noe sobranie: Entsiklopediya. Rosspen; 3) Moon, 2013; 4) Galor and Özak, 2016; 5) Global Self-consistent, Hierarchical, High-resolution Geography Database

		(GSHHG); **6)** The Global Multi-resolution Terrain Elevation Data 2010. **Contemporary data:** 1) Rosstat 2) Lankina and Libman, 2021.
Dependent variable	Outgroup trust	1) Liberal voting; 2) voting for the communists
Main independent variables	Family extendedness, gender hierarchy index, generational hierarchy index.	Mean family size
Modelling	Multivariate regression analysis (OLS)	Multivariate regression analysis (OLS)

Chapter 6

Based on research article	Market and Network Corruption: Theory and Evidence.
Research question	Do market and network corruption have different causes and consequences?
Time frame	2007-2016
Type of data	Survey data
Sample of countries	World's population
Unit of analysis	Country
Data sources	1) Global Corruption Barometer, Transparency International; 2) Executive Opinion Survey, World Economic Forum; 3) La Porta et al., 1999; 4) Alesina and Giuliano, 2014; 5) Dimitrova-Grazl, 2007; 6) Uberti, 2018; 7) World Economic Outlook, IMF; 8) Human Development

	Index; 9) World Development Indicators, WB; 10) Life in Transition Survey.
Dependent variable	1) Network and market corruption; 2) Investment rate
Main independent variables	**Causes of network and market corruption**: legal origins; share of Protestants; strong family ties index; Habsburger duration; Ottoman duration; EU membership. **Consequences of market and network corruption:** Investment rate
Modelling	1) OLS regression analysis; 2) Seemingly unrelated regressions models; 3) Fixed effects models.

1.4 Theoretical and empirical contribution

1. One of the main contributions of this dissertation is that we collected a unique dataset based on official historical censuses, which makes it possible to form theoretical conclusions about the causes and consequences of historical family structure relying on a rigorous econometric approach instead of qualitative data and several non-representative case studies. J. Hajnal (1965) suggested his notorious distinction between the extended family along with early marriage, and the nuclear family along with late marriage by analysing the data for a few settlements in Western and South-Eastern Europe. Nowadays the most widely used quantitative data on historical family structure in Europe is Todd's (1990) dataset that originates from modern family patterns observed after World War II and traces back to the past using more than 200 historical monographs. The basis for these historical extrapolations are primarily qualitative sources, accounting for numerous imprecisions in his classification (e.g., most of Eastern Europe belongs to one family class). An alternative and less well-known dataset on family structure (Dennison, Ogilvie, 2014) suffers from a similar degree of imprecision as it relies on qualitative evidence, data for single small localities and indefinite time periods.

Our dataset has numerous advantages over these existing data collections. First, it builds on the most reliable quantitative data derived from official historical censuses. Second, we collected data at the sub-national level (regions for Europe and smaller districts for the Russian Empire). Sub-national data are more precise and meaningful, given the large variation in family structure within countries due to the constant change of state borders over history. Third, we managed to collect individual data for a sample of historical countries that enables us to create specific family indicators measuring gender and generational hierarchy. Printed census sources, indeed, offer only a limited number of indicators i.e., mean household size, and the proportion of married (or single) women in different age groups. Fourth, our dataset has a clear time point in the past which is not the case in the existing datasets. We can, therefore, compare the effects of historical and contemporary family structure and shed light on the mechanism of historical legacy. We can answer the question of how the historical family affects contemporary socio-economic outcomes: whether it is because family arrangements are themselves highly persistent, or because social values outlive the past family structures that brought them into existence. Fifth, the historical data are supplied with tools to match them with contemporary data (read more about these tools in the corresponding chapters), elaborated particularly for this study using GIS software.

2. The new data collection allowed us to draw several theoretical conclusions. We show that family extendedness is positively correlated with favourable agricultural conditions, existential and economic insecurity as well as with a strong group identity. Early marriage and high fertility rates are indeed rooted in the Cool Water-condition. These findings add to the literature on the determinants of historical family structure, a rapidly developing research field (Schulz et al., 2019; Greif, 2006; Mitterauer, 2003; Kaser, 2002).
3. The nuclear family promotes liberal values reflected in liberal voting, while the extended family is conducive to voting for communists. Additionally, we find that generational hierarchy in the past is detrimental to current day interpersonal trust. Our results provide new insights that contribute to the literature linking the nuclear family with modernisation (Todd, 1990; Duranton et al., 2009; Fukuyama, 1995).
4. We bring network corruption based on social connections to the forefront and compare it with market corruption which relies on informal monetary payments. Until now network corruption has been left in the shadows as it does not necessarily imply informal payments

and, hence, can be hardly persecuted by the law. Our analysis suggests that network corruption is deeply embedded in history and culture, less responsive to economic fluctuations, and, as it turns out, more harmful to investment. This study may give way to further investigations of network corruption and stimulate new international data collections measuring this phenomenon.

CHAPTER 2

The Predictors of Historical Family Structure: Evidence from the Russian Empire

Recent work has shown that historical family structure is of great importance because it affects current day levels of institutional development and wealth. Using data from the Russian Empire, in our paper we look at the determinants of historical family structure. Our analysis rests on the first Russian census in 1897, together with other census-like materials and global geographical databases. In total the collected dataset contains 630 observations at the district level. We show that the extended family is more likely to prevail over the nuclear family in areas 1) with better agricultural conditions where agriculture is the prevalent type of economy; 2) where the level of insecurity and threat is higher; 3) which are populated by ethnicities with strong local identity that tend to protect their integrity from strangers. Indeed, land ownership, population density and religion are revealed to be insignificant.

2.1 Introduction

It has been argued in recent studies that historical family structure predicts current day institutions and social processes. It has affected economic development (Todd, 1990; Duranton et al., 2009), political participation (Alesina, Giuliano, 2011), psychological indicators like generalised trust, fairness, obedience and individualism (Schulz et al., 2019; Alesina, Giuliano, 2011; Kravtsova et al., 2018), female and youth labour force participation (Alesina, Giuliano, 2014), educational attainment and inequality (Duranton et al., 2009), as well as the welfare state (Galasso, Profeta, 2012; Costa, Font, 2010).

In this paper we focus on the determinants of the pre-industrial family structure that allow us to trace the most ancient roots of the developmental trajectories of societies. We consider the historical family instead of the contemporary one, firstly, because we are interested in explaining longstanding institutional processes. Secondly, the previous heterogeneity in family structure in Europe is nowadays gradually converging to the nuclear family type with one or two children.

We rely on one of the main distinctions between the nuclear and the extended family, first suggested by Hajnal (1965). In order to examine what factors predict extended and nuclear families we use district level data from the Russian Empire. Among the data sources is the 1897 Russian

census and other census-like materials complemented by global geographical grid celled datasets that provide information about the natural conditions. In total our data collection comprises 630 observations for the Russian historical districts. Russia is an excellent laboratory for such research because on the one hand it includes regions with very different geographic, climatic and cultural conditions and on the other hand it allows us to control for the institutions that were in place across all the territories of the empire. Additionally, it is an advantageous strategy to focus on regions within one state because it creates more chances to collect as many historical indicators as possible. Dealing with different countries makes the collection of historical data particularly difficult and sometimes even impossible as each country has its own statistical bureau and its own statistical standards.

Based on the multivariate regression analysis we find that the main explanation for the prevalence of extended families are natural conditions favouring agriculture and the size of the agricultural sector. Agricultural societies provided optimal conditions for the increase of family size, firstly, because agricultural production was very labour intensive and, secondly, because this production occurred mostly within the family. In addition, we show that the representatives of ethnic or territorial units with a strong local identity prefer to live in extended families that are quite self-sufficient and require less contact with outsiders. Finally, people who feel constant threat and existential insecurity are more likely to form extended families because this household type ensures more stability in case of the death of any adult workers.

We proceed as follows: in section II we summarise the existing literature on the possible determinants of historical family structure and formulate our hypotheses; section III is devoted to our data and methodology; in section IV we present our results; and section V concludes.

2.2 Determinants of extended and nuclear family

In this section we formulate all the possible determinants of historical family structure. Among the exogenous factors we examine geographical location, climate, soil quality and landscape. According to historical and ethnographic sources, the extended family was an invention of an agricultural society that on the one hand faced high population pressure and on the other hand had more need of larger labour units (ex.: Nimkoff, Middleton, 1960). In hunter-gatherer societies nuclear families prevailed. Foragers neither had enough food to provide subsistence for the members of their extended family, nor could they advantageously use their labour. Later on,

with the transition from an agricultural to an industrial society, the extended family lost its relevance as the household ceased to be a production unit.

In light of these arguments one could expect that early adopters of agriculture and societies depending more on agricultural production are more likely to live in extended families. Archeological studies have shown that agriculture spread across Europe from the Fertile Crescent in the Near East (Gangal el al., 2014), even specifying the speed of the Neolithic revolution as 1km/year. Therefore, the geographical location of a territory, namely its distance from the Fertile Crescent, might point to the time of agricultural adoption there. Climatic conditions like temperature and precipitation are also important predictors of agriculture. Eventually, agricultural production is more successful in areas with mild summer temperatures and abundant precipitation. Furthermore, good soil quality may enhance agricultural production in the region.

River valleys were the first oases where the Neolithic revolution took place (Childe, 1935), and simultaneously provided the irrigation required for further agricultural development. Consequently, these areas are more likely to be dominated by extended families. From these arguments, we derive the following hypotheses:

H1. Distance to the Fertile Crescent is negatively related to family extendedness.

H2. Summer temperature is negatively related to family extendedness.

H3. Precipitation is positively related to family extendedness.

H4. Soil quality is positively related to family extendedness.

H5. Distance to the nearest river is negatively related to family extendedness.

A forest landscape could have a twofold effect on the household size. On the one hand forest areas are rather unfavourable for agricultural production because it takes a great deal of effort to remove the trees. On the other hand, forests being rich in different plants and animals create optimal conditions for hunters and gatherers in nuclear families. Abundant foraging resources result in less pressure for agricultural adoption and might have led to the delayed onset of agriculture (Welzel et al., 2018). These arguments suggest that nuclear families should prevail in regions covered with forests.

However, we could also formulate the opposite hypothesis. In some forest areas of the Russian Empire slash-and-burn agriculture has been practised since ancient times. It was a very

labour intensive technology whereby the forest was firstly cut down and then burned in order to clear the fields for agriculture. This much work could not be done by a nuclear family, and so slash-and-burn agriculture might have favoured the spread of extended families (Mitterauer, 1996). Therefore, we hypothesise:

H6.1. Land covered with forest is negatively related to family extendedness.

H6.2. Land covered with forest is positively related to family extendedness.

It has been argued that extended families are more likely to prevail in mountainous regions (Kaser, 2001; Todorova, 1989). Some scholars explain this fact by a particular agricultural organisation that implies working of spatially separated resources (Webster, 1973), or by the specific demand of pastoralism (Mitterauer, 1996) which calls for the cooperation of the agnates. A further very important reason for complex household formation in mountainous areas is lack of security. For instance in the Balkan mountains where the Ottoman Empire could not fulfill its monopoly on violence, "herding was tied to weapon carrying and fighting animal thieves" (Kaser 2001). In such conditions manpower was highly desirable, so people preferred to live in joint families (Brunnbauer, 2003). The hypothesis is:

H7. A mountainous location is positively related to family extendedness.

Besides exogenous natural conditions, family structure may be impacted by longstanding cultural factors such as religion and ethnicity. Protestantism as an individualistic religion (Jha, Panda, 2017) is expectedly more compatible with the nuclear family than hierarchical religions like Orthodox Christianity, Islam, Judaism and even Catholicism. Hence:

H8. Protestantism is negatively related to family extendedness.

Ethnicities or other coherent social groups may also affect family structure. In particular, ethnicities or social groups that were dominated by different states over history, were subject to violence or intrusive homogenisation policies, or were dispersed among the territory of the Russian Empire without being concentrated in one particular region might have a strong local identity (Dehdari, Gehring, 2019; Fouka, 2016; Rohner et al., 2013). The desire to retain their local identity makes the more self-sufficient extended family more appealing and, correspondingly, limits contacts going beyond the kin group, and most likely beyond the ethnic or social group.

In this study we are going to look at two ethnic groups with a strong local identity, Armenians and Jews, and one population located at the border line between Belarus, Ukraine and Russia, namely the "Polischuks". Due to its strategic location between the two continents, Armenia was invaded by many people from Greeks and Romans to different dynasties of Iran and finally the Russians. Periods of independence succeeded by periods of dominance. Today Armenia is an independent state but Armenians are dispersed all over the world. They are well known for their strong diaspora ties (Tölölyan, 2000) that reflect their strong ethnic identity. Jews constitute a further example of an ethnicity with a well pronounced local identity. Despite forming the minority in different societies they manage to retain their ethnic traits and to keep their traditions. Polesie, the homeland of the "Polischuks", was a polyethnic cultural zone with a strong local identity incorporating Russians, Belorussians and Ukrainians (Bondarchik et al., 1988). This identity originates from the 14th Century when the territories of Polesie were part of the Grand Duchy of Lithuania and enjoyed a certain autonomy. Later in the 16th Century a part of Polesie joined the Grand Duchy of Moscow and later the Russian Empire. Despite the fact that for most of their history Polesie was divided between different states, Polesian people continue to maintain their customs and traditions.

We hypothesise the following:

H9. Ethnicities or social groups with strong local identities are positively related to family extendedness.

The last group of predictors are socio-economic conditions observed at the end of the 19th Century. First, we look at the proportion of agriculture in the economy, and at the level of modernisation as measured by urbanisation and literacy rates. We expect that a larger agricultural sector and a lower level of modernisation will foster the extended family. One of the reasons is that non-agricultural occupations are usually less labour intensive and they do not require the family to be a working unit.

H10.1. The agricultural economy is positively related to family extendedness.

H10.2. Modernisation is negatively related to family extendedness

Second, we consider population density as a possible predictor of family structure. When population pressure is high and land is in short supply, people might decide to live together with their extended kin forming extended households (Kaser, 2002).

H11. Population density is positively related to family extendedness.

Third, it has been suggested that the extendedness of peasants' families might be associated with land ownership (Wall, 1983). According to Wall, the households of land owners were larger than those of tenant farmers. The reason was that the heirs of landowners often lived with their parents until they died. By contrast, the offspring of tenant farmers could choose their moment to leave home whether for marriage or a period of service. We expect to observe the same pattern in Russia. However, only a small part of land in the Russian Empire was privately owned. A large amount of land belonged to village communities that could redistribute it according to the number of adult men in the household. The rest of the land was owned by the state or by the church. Eventually, extended families were more likely to be located in areas where land was privately owned or where it belonged to village communities which favoured extended families by their redistribution policies.

H12.1. The proportion of privately owned land is positively related to family extendedness.

H12.2. The proportion of land owned by village communities is positively related to family extendedness.

The fourth important factor associated with the extended family is existential insecurity. The loss of labourers from the household due to high mortality rates or military service is less destructive when this household contains a large number of adult members (Kaser, 2012). Hence, extended households are more appropriate for regions with high parasite stress or violence.

H13. Existential insecurity is positively related to family extendedness.

2.3 Data and methodology

Data

Our dependent variable is the mean family size, derived from the 1897 Russian census. We count only those household members who belong to the kin group, excluding all the non-kin members. Unfortunately, we cannot clearly distinguish between a nuclear household with a large

number of children and an extended household. To solve this problem we control for the number of children (0-4) per woman of fertile age (15-44).

The main independent variables of interest are the following:

1. Distance to the Fertile Crescent
2. Mean temperature in the hottest month of the year
3. Mean precipitation in the driest month of the year
4. Soil suitability for agriculture
5. Share of territory covered with forest
6. Terrain elevation
7. Distance to the nearest river
8. Religion
9. Ethnicities
10. Modernisation (first principal component from literacy rates and urbanisation)
11. Population density
12. Land ownership
13. Existential security (% of people killed; % of people suffering from infectious diseases).

A more thorough description of the main independent variables together with the data sources can be found in the Appendix Table CH2-A1.

Methodology

Our analysis is restricted to the Russian Empire. Such a research design enables us to collect and examine a larger number of determinants and to reduce the number of omitted variables that often emerge in cross-country research. As the unit of analysis we use historical districts (uezd). The maximum number of observations is 630, but some variables are not available for all the districts. Generally speaking, our data base can be divided into two samples: the full sample containing all the regions, and the restricted sample that focuses only on the European part of the Russian Empire. Variables reflecting existential security are available only at the gubernia level (% of killed people – 86 obs.; % of people suffering from infectious diseases – 91 obs.).

To examine the determinants of historical family structure we use multivariate OLS regression analysis. The potential determinants are likely to be correlated. Including all the

variables simultaneously may not yield enough variation to clearly distinguish the effects of particular predictors, but including them one by one could create an even more serious problem. Omitting some important controls, we risk getting biased results and thus drawing inappropriate conclusions. Following Treisman (2000), who had similar concerns, we prefer to take the first risk. We include in our model as many controls as possible, checking that variance inflation factor (VIF) does not exceed the rule of thumb of 5. We start with exogenous factors associated with natural conditions, then we add cultural factors such as religion or ethnicity, and finally we include socio-economic indicators of the 19th Century. Ethnicities are highly correlated with religion and distance to the first Neolithic origin, Gesher, therefore we include them separately.

2.4 Results

The results for all the hypotheses except one (H9) are presented in Table 2-1, while the analysis of the impact of ethnicities can be found in Table 2-2. Our findings suggest that extended families are more likely to be found in areas with abundant precipitation (H3) and close to rivers (H5). Distance to the first Neolithic origin (Gesher) is as expected negatively correlated with family extendedness (H1) but this result does not hold in all the specifications. Crop suitability of the soil has a significant positive effect on household size until we control for modernisation (Table 2-1, (1), (2)), (H4). Evidently modernisation mediates the relationship between soil quality and household size: better soil quality leads to a larger agricultural sector that slows down modernisation; a lower modernisation pace results in larger families.

Table 2-1: Predictors of historical family extendedness (OLS results)

	(1)	(2)	(3)	(4)	(5)
Terrain elevation	0.200***	0.169***	0.133**	0.103*	-0.010
	0.063	0.066	0.062	0.061	0.311
Crop suitability	0.137***	0.116**	0.003	-0.017	-0.136**
	0.056	0.060	0.062	0.070	0.091
Mean temperature in the hottest month	0.003	-0.066	-0.063*	-0.046	-0.058**
	0.014	0.017	0.010	0.010	0.009
Mean precipitation in the driest month	0.102	0.142*	0.111*	0.160**	0.141***
	0.007	0.008	0.007	0.008	0.010

Share of land covered with pre-medieval forest	-0.151***	-0.168***	-0.196***	-0.202***	-0.234***
	0.044	0.046	0.043	0.043	0.063
Less than 50 km from the nearest river	0.121***	0.114***	0.133***	0.135***	0.116**
	0.039	0.040	0.041	0.043	0.050
Distance to Gesher	0.028	-0.000	-0.117**	-0.116*	-0.104
	0.000	0.000	0.000	0.000	0.000
Children per woman of fertile age	0.355***	0.329***	0.202***	0.189***	0.165**
	0.050	0.050	0.057	0.058	0.065
Protestants		-0.147***	0.052**	0.064**	0.029
		0.023	0.022	0.025	0.031
Muslims		0.087	-0.018	0.009	-0.048
		0.067	0.067	0.069	0.089
Population density			-0.012	-0.015	
			0.048	0.050	
Modernisation			-0.438***	-0.441***	-0.471***
			0.043	0.044	0.051
% people employed in agriculture			-0.016	-0.017	-0.060
			0.265	0.271	0.323
% people killed				0.065*	0.035
				0.043	0.105
% people with infectious diseases				0.083**	-0.007
				0.643	1.028
% of land in private property					0.047
					0.003
% of land owned by village communities					0.054
					0.003
_cons	-0.420	0.069	0.638	0.220	0.347
	0.539	0.642	0.464	0.478	0.727

N	630	588	526	518	388
R2	25%	27%	37%	37%	37%

Note: entries are standardised coefficients. Robust standard errors are in parentheses.

One of the strongest predictors of family size according to the standardised β-coefficient is the percentage of land covered by pre-industrial forest. Families are revealed to be smaller in forested areas. This may constitute evidence that a longer period of foraging and poor conditions for agriculture (H6.1) are more powerful predictors of family structure than labour intensive slash-and-burn agriculture that would suggest the opposite correlation (H6.2).

Our analysis shows that households in mountainous regions are larger (H7). According to the theory this might be explained by specific mountainous pastoralism or the lower penetration of the state that ensures a monopoly on violence (Webster, 1973; Mitterauer, 1996).

As regards the socio-economic determinants of historical family structure we find the expected negative effect of modernisation on family extendedness (H10.2), while the effect of agricultural sector size is, accordingly, positive (H10.1). This finding is a further confirmation that the extended family is an inherent feature of an agricultural society and loses its significance in the course of the industrialisation process.

The hypothesised positive association between existential insecurity and more stable extended families is partially confirmed (H13). A higher percentage of people suffering from infectious diseases leads to an increase of the mean family size. The percentage of people killed from those who died suddenly also has a positive effect on family extendedness, but it is insignificant. We believe that the first indicator is more reliable because the average share of people suffering from infectious diseases even in the non-epidemic year of 1909 is much larger (12%) than the mean share of people who died suddenly (0.05%). Thus, infectious diseases might constitute a more essential threat and cause more insecurity than the homicide rate. We do not get significant results on the restricted sample limited to the European part of Russia, which may be explained by the low variation in existential security between districts.

The "local identity" hypothesis (H9) gets only partial support (Table 2-2). First, we find an impressive positive effect of the Belorussian ethnicity on family extendedness (compared to Russians who are considered as the reference group). Looking more closely at the data we see that the Mogilevskaya gubernia populated mostly by Belorussians and located on the territory of the historical Polesie region is to a large extent responsible for this effect. Second, our analysis

suggests that Armenians preferred to live in larger households. Standardised coefficients for Belorussians and Armenians show that these two effects are the largest ethnic effects in our model. However, the coefficients for Jews do not fall in line with our hypothesis.

The Jewish family does not fit well into this "local identity" explanation. Before we control for modernisation the percentage of Jews is negatively correlated with family extendedness, but this correlation vanishes once economic development is controlled for. We could suppose that Jews enhanced education, trade and crafts that favoured the industrialisation of these territories which ultimately resulted in the decrease in family size (Ivleva, 2017).

Nevertheless, controlling for economic development, we do not see a positive correlation between the percentage of Jews and household size. One of the possible explanations may be that there is no district where Jews are in the majority: their proportion never exceeds 30%, and only in 17% of districts is it higher than 5%. Such a small share of educated Jews might be sufficient to indirectly affect the mean household size through promoting development of crafts and trade among the non-Jewish population but it may be too small to have a direct effect on the mean family size within the district. To get more precise results we would need to conduct an analysis at the ethnicity level instead of focusing on the territories. Unfortunately, data on family extendedness for ethnicities are not available from the1897 Russian census.

Table 2-2. The effect of ethnicities on household extendedness (OLS results)

Languages	β-coefficient
Polish	0.037
	(1.160)
Slavonic	0.001
	(7.304)
German	0.068***
	(0.566)
Jewish	-0.076
	(1.230)
Armenian	0.226***
	(0.476)
Tajik	0.055

	(1.553)
Ossetian	0.058***
	(1.145)
Ukrain	-0.057
	(0.132)
Beloruss	0.347***
	(0.413)
Turkish-Tatar	-0.028
	(0.176)
Lithuanian	-0.012
	(0.186)
Zhmudskiy	-0.035***
	(0.213)
Latvian	0.049**
	(0.174)
Kartvelian	-0.078**
	(0.390)
Caucasien	-0.036
	(0.657)
Finnish	0.019
	(0.150)
Moldavian-Romanian	-0.048***
	(1.406)
Northern	0.067**
	(0.711)
Germanic	0.010
	(4.721)
Mongolian	-0.025
	(20.161)
Far East	-0.007
	(2.381)

Other Indo-European	0.067
	(1.928)
Other Roman	0.027**
	(14.843)
Other	0.005
	(18.772)
N	489.000
R	53%

Note: entries are standardised coefficients. Robust standard errors are in parentheses. The model includes the full list of controls (see Table 1, specification 3) except of religion and distance to Gesher. The percentage of Russians is taken as the base group.

In other respects, the effects of ethnicities on household extendedness show a predictable pattern. Ethnicities speaking Romanian or Moldavian languages have smaller families than Russians. In Moldavia and Romania (former Roman provinces), land plots were usually equally divided between the heirs in the lifetime of the father whereby the younger son stayed with his parents and the other heirs formed their own households (Kaser, 2009). Consequently, in these countries we can observe a mixture of nuclear and stem families that tend to be somewhat smaller than the extended families widespread among Russians.

German families were surprisingly larger than Russian ones though in Germany nuclear and stem families prevailed (Duranton et al., 2009). This might be explained by the politics of Ekaterina II who stimulated the resettlement of Germans in the Russian Empire in order to modernise agriculture. As an incentive, Germans were allotted large land plots and released from taxes. Predominantly agricultural lifestyles together with large land plots might be a possible cause of larger families among Germans compared to Russian families, on average.

The analysis of the Baltic ethnicities enables us to observe the border line between the partible and impartible inheritance area that detaches Latvia from Lithuania (Wetherell, Plakans, 1999). Our model suggests that Latvians who practised partible inheritance had larger households than Russians. In contrast, the households of Lithuanians (who spoke the Zhmudskiy language) who followed the norm of unigeniture (impartible inheritance) were smaller than those of Russians. Northern indigenous tribes had larger families than the Russians, probably associated with their nomadic lifestyle and clan-based societal order. The families of Ossetians are revealed

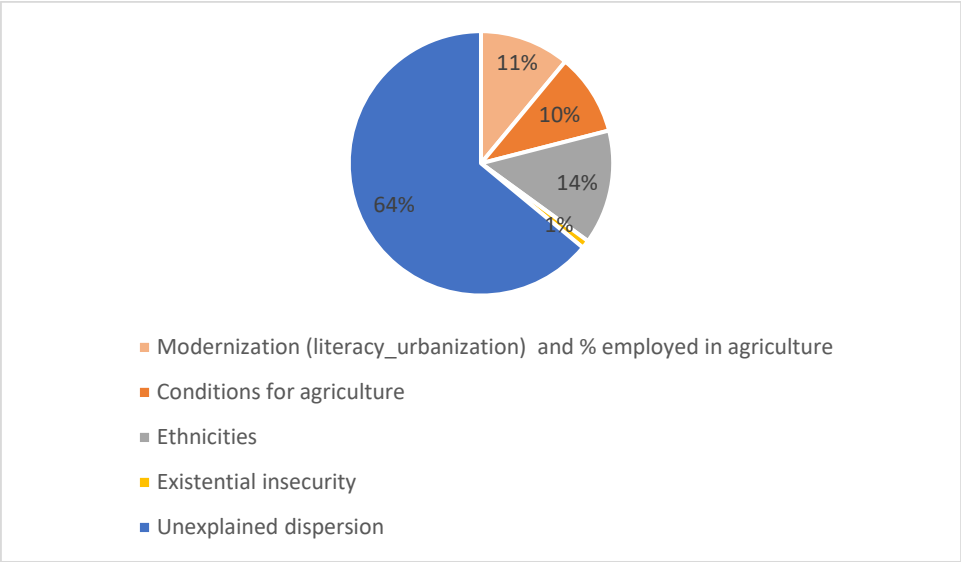
to be relatively large, in line with the literature (Bleych, 2015), while Kartvelian families were smaller in size.

Now we proceed to the hypotheses that do not get support in the course of our analysis. The expected negative effect of Protestants (H8) turns positive once we control for modernisation. On the one hand the positive effect might be associated with the particular characteristics of families who migrated to the Russian Empire from Protestant countries. For example, many of above mentioned Germans in the Russian Empire who lived in extended households were Protestants. On the other hand, Russian peasants who converted to Protestantism were often wealthier compared to Orthodox peasants (Argudiaeva, 2007) and could afford to maintain a large family. Besides this, we fail to find any positive effect of Islam as a hierarchical religion on family extendedness. Consequently, we should conclude that the hypothesis H8 is not verified.

Hypotheses H12.1 and H12.2 concerning the property rights over land also do not find support. We could not show that land owners had larger households. Likewise, our data do not suggest that peasants living in village communities preferred to live in extended households despite the fact that village communities redistributed the land plots according to the number of adult men in the household.

Finally, our analysis shows that population density is not correlated with household extendedness (H11). It might be the case that due to abundant territory in Russia the population pressure was never large enough to shape the family structure.

Figure 2-1. Percentage of the explained variation in family size by the main determinants



The percentage of the explained variation in family structure due to the different determinants is visualised in Figure 2-1. Modernisation and the conditions for agriculture shown in dark and light orange explain 21% of variation. All the ethnic variables explain 14% of variation, while insecurity is responsible only for 1%. We can conclude from this, that the extended household was primarily a response to the challenges of agricultural society.

2.5 Discussion

In our paper we examine the predictors of historical cleavage between the extended and nuclear family. We find that extended families are more likely to prevail in areas with better natural conditions for agriculture which are less affected by modernisation processes. The "agricultural explanation" seems to be the most significant one. In addition, we show that a strong local identity that requires partitioning from out-groups favours the formation of more self-sufficient extended families. Existential insecurity also enhances family extendedness because large households benefit from economies of scale and are less economically vulnerable to the death of adult workers. Property rights in land, religion and population density did not yield interpretable results. Our study is limited to Russia and its findings can be extended to wider territories only with caution. Nonetheless, it provides inspiring hypotheses that may be further tested on samples with a larger number of countries.

CHAPTER 3

The Effect of Cool Water-Condition on Reproductive Autonomy and Modernization: Evidence from Russia.

In this chapter we trace the historical roots of modernization using the Russian sub-national regional data stemming from historical censuses and census like materials of the 19th century. We show the path dependency between Cool Water-condition, lower reproductive pressure on women in the past and the higher level of democracy, prosperity and emancipative values nowadays. The effect of Cool Water-condition on reproductive autonomy operates through two mechanisms. According to the first one Cool Water regions are best suitable for less labor-intensive crops that leads to the lower labor demand, and, respectively, to the lower fertility pressure. The second mechanism implies that lower child mortality associated with quite favorable Cool Water climate results in lower fertility. At the further stage, lower historical fertility rates leave more space for women's emancipation and for building of their own human capital and that of their children which fuels a more rapid modernization.

3.1 Introduction

This study presents evidence for the CW-condition's effects on early developmental outcomes, zooming into the sub-national level of the by far largest territorial state on the globe: Russia. We examine region-level data from the Czarist Empire's roughly hundred gubernatorial districts, called "gubernia," based on archival records from several censuses in the 19th century, most notably in 1897. We concentrate our attention on the link between the CW-condition and female reproductive autonomy. In our understanding, reproductive autonomy increases in direct proportion to diminished fertility pressures, that is, lower pressures on women to produce as many children as possible to proliferate cheap mass labor in the households and on farms. When women are pressured to produce as many children as possible, they have less time left to build their own human capital, that of their children and to help their patriarchal husbands to improve their own quality by the challenge of demanding spouses and kids (Van Zanden et al., 2019).

We highlight two mechanisms that explain the association between the CW-condition and reproductive autonomy. First, CW-areas embody less disease stress, because (*a*) their low temperatures are home to fewer pathogens and (*b*) because freshwater is more abundant and less

infested in CW-areas (Cashdan, 2014). Lower disease stress diminishes child mortality, which means reduced pressures to maximize the number of births in order to get the desired number of offspring who survive into adulthood.

Second, the labor input required for farming tends to be lower in agrarian CW-territories because the most suitable cereals in these territories—rye, wheat and barley—are less labor intensive than most of the crops grown in hotter areas, like cotton, rice, sugar cane, tobacco and tropical fruits (Santos Silva et al., 2017). Moreover, CW-areas have no need for the otherwise labor-intense forms of hierarchically coordinated irrigation practiced in drier agrarian settings. Finally, large and lush pastures in CW-areas allow to combine grain cultivation with livestock farming, which is even less labor-intense than any form of crop cultivation. Lower labor intensity means a reduced demand for cheap mass labor, including a lower need of child labor and collectivized methods of cultivation. In an economy with such reduced labor demands, pressures on women to reproduce early and to raise as many children as possible are naturally lower.

So far, reproductive autonomy was measured inversely by female fertility rates, female ages at first marriage, consensual marriage rules as well as nuclear family features that reflect women's control over their own sexuality (Welzel et al., 2021).

The Russian data do not include a measure of consensual marriage rules, while the indicators of nuclear family features appear to be problematic for various reasons (Durante, 2010). In Northwestern Europe, nuclear families have been linked with "unigeniture" as the dominant inheritance practice: the oldest child (preferably the son) inherits the entire family farm and lives there with his closer family, while all the siblings leave to found their own households, often far away from their kin. This pattern was conducive to the independence of the nuclear family from their extended kin in many aspects, including a freer choice of when to have children and how many.

By contrast, in the Russian Empire unigeniture was—as in other agrarian empires—uncommon. Instead, apart from outright confiscation, "partible (male) inheritance" prevailed, such that all the sons inherited an equally sized plot of land and divided the parental farm among them. In this case, the core families live surrounded by their kin and experience much less autonomy.

We concentrate on female fertility rates and ages at first marriage. We find that *gubernia* in Russia with a more pronounced CW-condition show higher ages at first marriage and lower numbers of births per woman. Not surprisingly, fertility rates and ages at first marriage among women are closely correlated: women who marry later give birth to fewer children. This is logical

but not inevitable because marital fertility rates might be the same in two opposite situations: in one scenario, women marry late but their birth intervals are short; in the other scenario, women marry early but the birth intervals are long. Consequently, ages at first marriage address more directly the capacity of women to build their own skills and savings, which strengthens their bargaining power in marital relations. Low marital fertility rates, for their part, mirror more closely a mother's investment in her individual children's qualities, assuming that children with fewer siblings receive more attention and care.

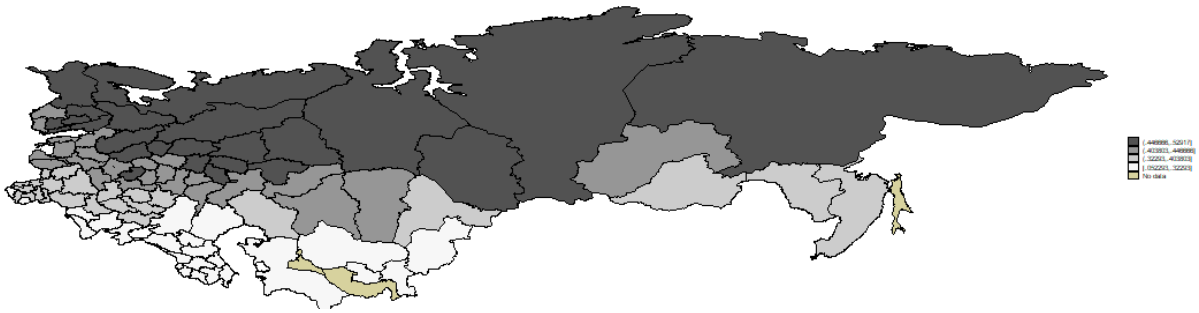
Because of the absence of *im*partible inheritance, features typical of nuclear family households are not necessarily an indication of autonomy in the case of the Russian empire. Another specificity of Russia is the early abandonment of breastfeeding among Christian-Orthodox/Caucasian women. This peculiarity is likely to alter the otherwise positive effect of the CW-condition on child mortality. Indeed, Christian-Orthodox/Caucasian women (who largely prevailed in Russia's CW-regions) denied breastfeeding already several days after giving birth, instead feeding their babies early on with bread, cereals and cow milk (Natkhov, Vasilenok, 2019). Why this distaste for breastfeeding existed is a conundrum but as a matter of fact it considerably increased child mortality especially in the lowest age group, between zero and one year, turning diarrhea into a main cause of infant death (Natkhov, Vasilenok, 2019). By contrast, the Muslim/non-Caucasian population, which prevailed outside Russia's CW-areas, practiced breastfeeding into higher infant ages. The Quran, for instance, prescribes this feeding practice for Muslim women. Consequently, as we will see, child mortality in the age group from zero to one has been significantly lower outside than inside Russia's CW-regions.

However, once children survived the period in which breastfeeding would have been healthier, the otherwise negative mortality effect of the CW-condition now kicks in, such that children in the age group between three and four years of age have a lower mortality inside than outside Russia's CW-areas—due to the CW-areas' naturally lower pathogen load. In other words, because of the Russian peculiarity with breastfeeding practices, the correlation between the CW-condition and infant mortality points in diametrically opposite directions, depending on the age group of infants one focuses on. Specifically, the CW-condition in Russia correlates positively with historic infant mortality in the age group from zero to one, while the same condition correlates negatively with child mortality in the age group from three to four.

3.2 Data and Methodology

Appendix Table CH3-A1 documents our historic data and their sources. To calculate *gubernia*-specific scores of the CW-Index (CWI), we use temperature and precipitation data for the biggest cities of the Russian *gubernia.*[1] Figure 3-1 presents the distribution of the CWI-scores across the *gubernia* of Czarist Russia. Using the Prussian Agricultural census from 1886, Vasiliki Fouka and Alain Schlaepfer (2014) estimate the labor intensity of a variety of crops. We document their calculation in Appendix Table CH3-A2 and use their formula to obtain *gubernia*-specific measures of labor intensity. In total, fifty-eight of our ninety-eight *gubernia* obtain a score on the labor intensity index[2]. Besides, we operationalize female reproductive autonomy, using (*a*) marital fertility rates and (*b*) the percentage of married women in the age group from fifteen to nineteen years of age as inverse indications of female reproductive autonomy.

Figure 3-1: Map of CW condition in the Russian Empire, 1897



3.3 Results

The correlations in Appendix Table CH3-A3 illustrate that the CW-regions of the Russian Empire, like countries with a more pronounced CW-condition on the world map, are economically

[1] The website www.meteoblue.com provides climatic indicators averaged over the last 30 years to avoid data to be driven by yearly fluctuations. We merged data collected at the city level with historical regions. If we had information for more than one city in a region, we calculated the average. To calculate CW-index scores, we combine temperature and precipitation data in a manner equivalent to the country level. Hence, index scores increase alongside (a) lower seasonal temperatures, (b) less extreme summer-winter differences, (c) a higher base level of minimum rainfall combined with less seasonal fluctuation and (d) more abundant freshwater sources.

[2] This is a weighted average of labor intensity for each crop presented in the region. The data on percentages of territory sowed with a particular crop derive from the Russian agricultural census presented on http://ristat.org/. Labor intensity$_i$ = labor share 1 * % territory with crop 1$_i$ + labor share 2 * % territory with crop 2$_i$.

more advanced. They are more densely populated and their populations are more literate and more frequently employed in industrial manufacturing occupations.

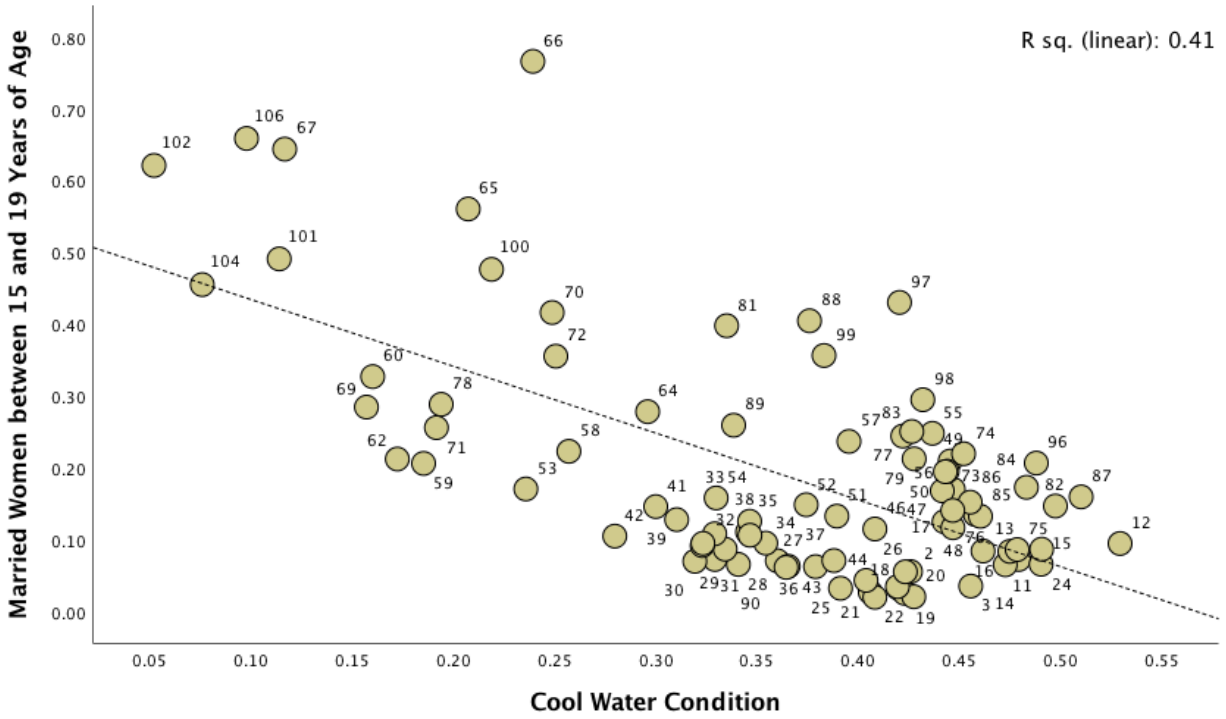
Appendix Table CH3-A4 presents correlations between the CWI, on the one hand, and natural as well as historic agricultural conditions, on the other. The correlations reveal that the CW-areas in Russia are to a large degree covered with forest. This evidence goes in line with our proposition that extensive forest belts in CW-territories provided optimal conditions for a foraging lifestyle.

The development of agriculture in the CW-areas of Russia, measured by the share of cultivated land, does not differ from the rest of the country. This evidence supports the idea that—even though CW-regions were late adopters of agriculture—they caught up with other territories very rapidly. The main crop cultivated in the CW-areas of the Russian Empire is rye. Since rye cultivation requires a low number of workers per unit of land, as evidenced in the Appendix Table CH3-A2, agriculture in CW-territories is indeed less labor intensive. Consistent with this evidence, Appendix Table CH3-A5 shows that relatively large land plots (i.e., 4-6 hectares) prevail in CW-regions because large pieces of land could be cultivated with the effort of a single household. To keep them large under partible inheritance puts the breaks on fertility. The negative correlation between the CW-condition and agricultural labor intensity confirms our proposition that lower fertility pressures and stronger female reproductive autonomy in CW-areas reflect lower demands for cheap mass labor, including the work of children.

As expected, Appendix Table CH3-A6 shows no significant correlation between the CWI and signature features of nuclear households, such as a small household size. The supposed reason is that, in the case of Russia where nuclear families do not exist in combination with "unigeniture," smaller household size does not indicate a higher degree of individual autonomy.

Most importantly, Appendix Table CH3-A6 documents a strong correlation between the CWI and the proportion of women marrying at a very young age: with a correlation coefficient of $r = -.80$, this is the strongest association in our data. Figure 3-2 visualizes the strongly negative effect of the CWI on the proportion of women being married at ages fifteen to nineteen.

Figure 3-2: The CW-Condition and Young Married Women across Historic Russian Gubernias



Unexpectedly at first glance, the link between the CWI and fertility rates is insignificant. But the adversarial correlations between the CWI and child mortalities in different age groups resolve this issue: child mortality at ages zero to one and child mortality at ages three to four both correlate positively with female fertility; and since the CWI affects these two mortalities adversely, it shows no overall correlation with fertility. So, on the one hand, a stronger CW-condition increases child mortality at ages zero to one, which should incentivize a higher female fertility. On the other hand, however, a stronger CW-condition decreases child mortality at ages three to four, which should incentivize a lower female fertility. In sum, these adversarial effects cancel each other out, establishing a non-correlation between the CWI and female fertilities under the peculiarities of the Russian case.

The path model in Figure 3-3 summarizes the correlational findings in a bigger picture with an underlying causal narrative. The calculations indeed suggest that (*1*) the CW-condition embodies lower agrarian labor intensity, which then (*2*) diminishes fertility pressures. Moreover, we see (*3*) a negative effect of the CWI on child mortality at ages three to four and (*4*) a positive effect of child mortality in this age group on fertility rates. Simultaneously, we observe (*5*) a positive effect of the CWI on infant mortality at ages zero to one. Finally, the two child mortalities each exert (*6*) a positive effect on female fertilities. The oppositeness of the CWI's indirect effects

on the two child mortalities is so exhaustive that no room is left for an additional direct effect of the CWI on female fertility. In terms of the effects size the largest indirect effect runs from CWI to fertility through infant mortality (standardized effect size is 0.428), the indirect effect mediated by labor intensity equals to -0.328 (standardized), and the smallest indirect effect mediated through child mortality aged 3-4 is -0.189 (standardized).

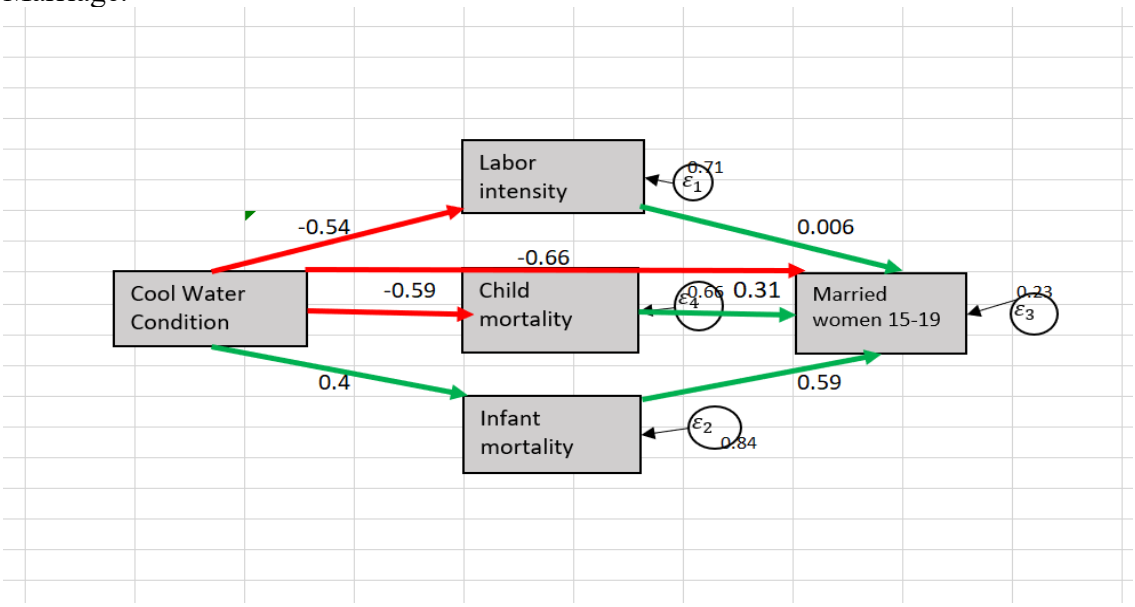
As a robustness check we run the same model with control variables in order to cope with endogeneity due to omitted variables. We add the principal component of historical urbanization and historical literacy rates as a proxy for economic development as well as the proportions of people practicing the main religions in the Russian Empire which were Orthodox Christianity and Islam. All these variables may have an effect on two of our regressors, namely on infant and child mortality rates, as well as on our dependent variable that is the fertility rate. After controlling for these confounding effects our results do not change[3].

Figure 3-3: The Effect of CW-Condition on Historic Labor Intensity, Mortalities and Fertility

Notes: Entries are standardized coefficients. All the coefficients are significant at 1 % level (the effect of CWI on child mortality 3-4 is significant at 5%), N with FIML = 98. Model fit: Chi-square 5.88; CFI 0.97; TLI 0.92. We omit the direct effect of CWI on fertility because it is insignificant and results in worse model fit. We do not compute RMSEA because it is not recommended for the models with small sample size (N = 88).

[3] These results are available upon request.

Figure 3-4: The Effect of CW-Condition on Historic Labor Intensity, Mortalities and Marriage.



Notes: Entries are standardized coefficients. The most coefficients are significant at 1 % level, the effect of CWI on child mortality 3-4 is significant at 5%, the effect of labor intensity on women's age at first marriage is insignificant, N with FIML =98. Model fit: Chi-Square 1.56*; CFI 1.000; TLI 1.065. We do not compute RMSEA because it is not recommended for the models with small sample size (N = 88).

The path model in Figure 3-4 uses the percentage of women married at ages fifteen to nineteen as the final outcome variable. The adversarial effects of the CWI on infant mortality at ages zero to one and child mortality at ages three to four remain significant. Logically, higher child mortalities in both age groups go hand in hand with a larger proportion of married teenage girls. Labor intensity, however, turns insignificant in this model. In its place, the CWI here shows a powerfully direct and negative effect on the percentage of married teenage girls, in addition to its two adversarial mortality effects. This direct effect is the largest one in quantitative terms (standardized effect size is -0.660) while the indirect effects running through child and infant mortality rates equal to -0.183 and 0.236. The results remain robust to the inclusion of the same set of control variables like in the previous path model[4].

3.4 Discussion

Despite their nuanced differences, both models strongly support the idea of a causal role of the CW-condition in the making of autonomous agrarian households and families. The question is whether we see more credibility in a model in which the CW-effect is entirely absorbed by its

[4] These results are available upon request.

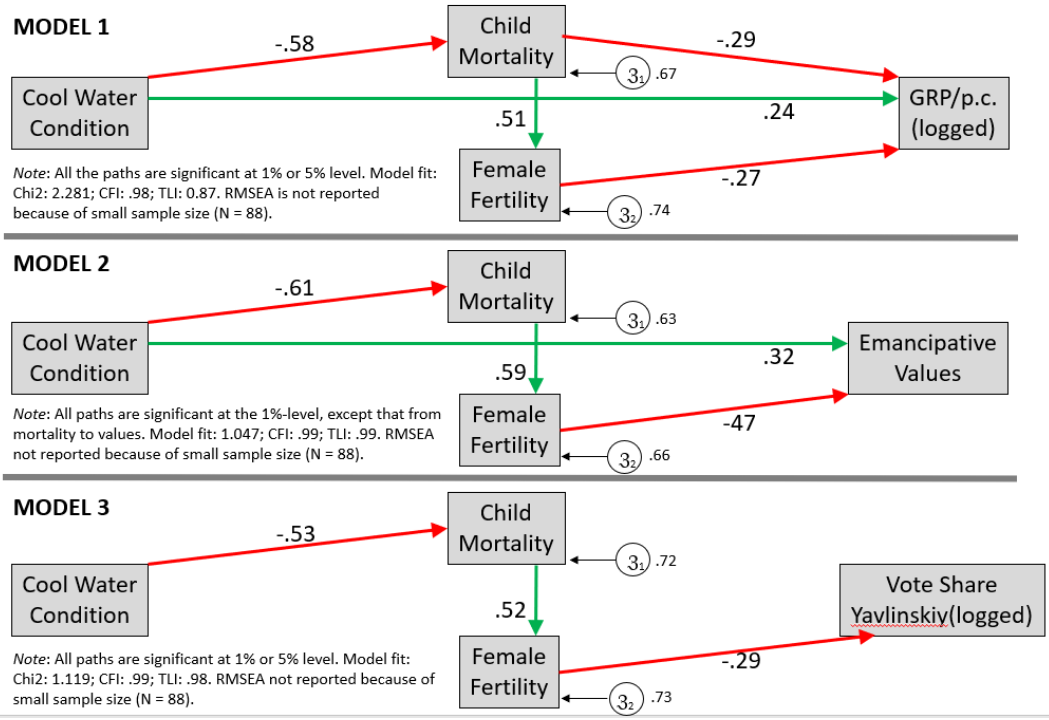
impact on labor intensity and child mortalities, or in a model in which—in addition to these indirect effects—there is still a direct effect. Obviously, this depends on the choice of the final outcome variable, which raises the question of whether there are good reasons to consider one of them preferable over the other.

Relying on model fit statistics as the criterion, the evidence speaks in favor of the proportion of married teenage girls, rather than fertility rates. This would also be plausible if one recognizes that historic church records are—for obvious reasons—more reliable when it comes to marriages than fertilities: practically all marriages have been professed by the church but not every birth might have been registered. For this reason, the second path model in Figure 10-18 seems preferable. This would imply to place less emphasis on the CWI's lowering effect on labor intensity as the mechanism through which the CWI contributes to female reproductive autonomy. But we believe that this conclusion would be premature because our labor intensity index only captures differences in labor intensity related to crops. This is a limitation because the lush pastures typical of CW-areas also lend themselves to animal husbandry, which is even less labor-intense than the crops suitable to the CW-condition. Therefore, we should wait to see how an improved version of the labor intensity index works (including the role of livestock farming) before we dismiss it as a possible mechanism through which the CW-condition enhances female reproductive autonomy.

Is the CW-condition's emancipatory effect within Russia limited to historic developmental outcomes or is it also visible among current outcomes? The latter is the correct answer. To demonstrate this point, we focus on three developmental outcomes with an emancipatory signature: the per capita Gross Regional Product (GRP) in 2019 across today's governmental districts, the district populations' aggregate emancipative values in 2020, and the vote share per district for the liberal candidate Grigoriy Yavlinskiy ("Yabloko" party) in Russia's 2000 presidential elections.[5] In all three instances, it is clear that the CW-condition's emancipatory effect on historic child mortalities continues to positively affect current emancipatory outcomes, visible in higher per capita GRPs, stronger aggregate emancipative values and larger liberal vote shares for Yavlinskiy in regions with a stronger CW-condition. The three diagrams in Figure 3-5 visualize the evidence, showing that the emancipatory CW-effects are both indirect and direct.

[5] For data sources and measurement details see Table 1.

Figure 3-5: The effect of CW-condition on Current Emancipatory Outcomes.



Our results from the Russian Empire's historic *gubernia* confirm that the CW-condition is conducive to female reproductive autonomy. We uncover two mechanisms behind this link. First, lower labor intensity for the staple agricultural products suited to the CW-condition (especially rye) emits lower fertility pressures on women, thus favoring diminished fertility rates. Second, lower child mortality in the age group three to four in CW-regions results in lower fertility and higher ages of women at first marriage. Depending on the specification of the final dependent variable, the CW-effect on female reproductive autonomy is either fully indirect, operating entirely over the two specified mechanisms (when historic female fertility is the outcome variable); or the CW-effect is indirect but shows a direct effect in addition (when historic proportions of married teenage girls is the outcome variable). The jury is still out there to examine which of these two scenarios is more accurate. But whichever it is, the evidence underlines a causal role of the CW-condition in the making of autonomous family households. And this is a key element of the CW-Theory of human emancipation writ large.

Despite Russia's geo-climatic diversity, the CW-condition among the historically most populated districts of this vast country vary only in a limited range, compared to the global CW-variation across countries. To be specific, the inner-Russian variation in the CW-condition remains within a range of 0.05 to 0.52 score points (see Appendix Figure CH3-A1). This variation is less

than ten percent of the entire global variation in the CW-condition among the earth's populated areas (Welzel et al., 2021), despite the fact that Russia's share in the inhabited world's surface area is almost twenty percent. Hence, for the CW-mechanisms to become visible within Russia, they have to work within a much narrower margin, that is, on a finer resolution of variance. But this makes it more likely that the mechanisms—even if they exist—get buried under measurement imprecision. If they nevertheless surface against these odds, as they do, the CW-Theory has another grain of credibility. Given the outlined peculiarities of the Russian case, this conclusion seems to be all the more forceful.

CHAPTER 4

The Shadow of the Family: Historical Roots of Social Trust in Europe.

This study provides new evidence on how historical patterns of household formation shape the present-day level of trust. We test two distinct features of historical family arrangements that might be harmful for trust towards out-groups: (a) family extendedness in terms of the number of household members, and (b) generational hierarchy and gender relations within the household. To conduct our study, we collected a historical database that reflect family structure and socioeconomic development, mostly in the 19th century. The analysis was performed on a sample of 94 historical sub-national units within eight contemporary West and East European countries that participated in the Life in Transition Survey in 2010. We find that cohabitation of several generations within the historical family and power of older generations over younger are detrimental for out-group trust today. In contrast, family extendedness *per se* was revealed to have no impact on trust.

"Family is the crystal of a society"

Victor Hugo (1802-1885)

4.1 Introduction

In this chapter, we investigate the historical predictors of one of the most essential ingredients of the entire modernization complex - social trust. Trust is an asset of particular importance because it facilitates cooperation among individuals, thus elevating their collective action capacity, and the number and quality of proliferated common goods (Portes, 1998; Putnam, 1993). To the extent to which interpersonal trust extends to people in general, the collective action/common good effects of trust transgress across specific networks, all the way into society as a whole (Delhey & Newton, 2005; La Porta et al., 1997).

In our paper we consider the most beneficial form of social trust – trust towards the out-groups. While in-group trust fosters, first of all, in-group solidarity and mutual loyalty, out-group trust is the decisive lubricant for a myriad of inter-human transactions that drive modernization, prosperity, democracy, and impartial government (Coffe & Geys, 2005; Delhey, Newton & Welzel, 2011; Knack & Kiefer, 1997; Paxton, 2002; Putnam, 1993; Welzel & Delhey, 2015).

Given the centrality of out-group trust for development and well-being, the question is where does it come from? We search for its deep historical roots, contributing to the literature that links the countries' economic, political, and cultural traits of today to household organization principles that prevailed already in pre-industrial times (e.g., Duranton, Rodríguez-Pose & Sandall, 2009; Galasso & Profeta, 2012; Greif, 2006; Reher, 1998; Todd, 1990). Inspired by the pioneering work of Hajnal (1983), many scholars consider pre-industrial patterns of family as a significant factor of present-day societal functioning, from prosperity to democracy to good government (e.g., Duranton, Rodríguez-Pose & Sandall, 2009; Greif, 2006; Hartman, 2004; Todd, 1990). We extend this literature by looking at historical family effects on out-group trust as the common source of prosperity, democracy and government quality.

Our study focuses on Europe for three reasons. One is the better availability of comparable historic family data. Second, Europe offers rich comparative contrasts because it is one of the culturally most diverse regions of the world: on the Schwartz-, Minkov- and Inglehart-Welzel cultural maps of the world, distances between European countries cover two thirds of the global cross-cultural variation. The third reason is that Europe offers nevertheless, a controlled environment in which there is no potentially confounding influence of European colonialism, as is found in most other parts of the world.

The main explanatory variables come from historical censuses of the 19th century or earlier, and they are designed to capture two important dimensions in pre-industrial family arrangements:

family extendedness and hierarchical relations within the family. These dimensions define different family types that occurred across historical Europe.[6] By family extendedness we mean all possible extensions beyond the nuclear family unit, consisting of a married couple and their children under the age of 20 (e.g. adult children, (grand)parents, grandchildren, siblings, aunts, uncles, cousins, etc.). We measure family extendedness using a battery of indicators based on the number of people within the household.[7] By the in-family hierarchy we consider the power of older generations over younger, i.e. the patriarchal seniority principle, and the power of men over women, which are measured through the composite indices based on individual census sheets. The outcome variable is the contemporary out-group trust index derived from the 2010 Life in Transition Survey (LiTS) conducted by the European Bank of Reconstruction and Development (EBRD).

Existing literature (e.g. Greif, 2006; Fukuyama, 1995; Hartman, 2004) does not draw a clear distinction between the nuclearity/extendedness and power dimensions. In fact, these two dimensions overlap to some extent. The nuclear family is by definition less hierarchical as younger generations live separately from older generations, considerably reducing parents' authority over their adult offspring. In the case of the extended family the situation is more ambiguous. Extended families may imply adult children remaining in their parental household upon marriage, as well as a number of lateral relatives (siblings, aunts, uncles, nephews, nieces, cousins) and their families, forming an extended household. In the former case we could speak about generational hierarchy,

[6] Our family types should be disentangled from the related concept of "family ties" (Alesina & Giuliano, 2014). Family ties imply that individuals attach great importance to the family and are ready to sacrifice their personal interests for it. The theory is not unambiguous about the relationship between extendedness/nuclearity and family ties. Alesina and Giuliano (2014) suggest that extended families are correlated with strong family ties, however Banfield's "amoral familism" (Banfield, 1958) refers to nuclear families in Southern Italy. This question deserves a level of study that is beyond the scope of the current paper.

[7] The term "extendedness" is used in its general meaning as the number of relatives in the household. It should not be confused with P. Laslet's (1983) term "extended family unit" which refers to a household with single relatives who are not included in the family nucleus. We are primarily interested in the number of adult household members, while the number of children, linked with fertility, is less valuable for our research purposes.

while the latter case implies a simple two generational household, as lateral relatives are of the same generations as the members of the family nucleus. Moreover, the co-residence of parents and their adult children does not necessarily mean the dominance of older generations over younger. Often such households are headed by representatives of the younger generations while parents have a dependent status. Obviously, these households cannot be considered as traditional patriarchal families.

In the present study we explicitly compare the effects of family extendedness and of within-family power hierarchies. We seek to determine how these two features affect the current level of out-group trust. Extended families are more self-sufficient and can perform multiple functionalities due to a large number of relatives. Therefore, they have less need for interpersonal contacts beyond the kin group or associations incorporating several families. This constitutes an isolative component of family "extendedness". The "cooperative" component relies on horizontal family extensions, i.e. on additional relatives of the same generation and the same social status as nuclear family members. According to Putnam (1993), interaction with a large number of people of an equal social status on a daily basis triggers strong reciprocity norms and trust formation.

Hierarchical relations, in contrast, hamper people's ability to trust and cooperate with each other (Putnam, 1993), because those in power can easily violate agreements without being punished. Power relations may be especially harmful for trust formation when experienced early on in childhood within the family. In the course of our empirical analysis we find that contemporary out-group trust is predicted by the generational hierarchy within the preindustrial family, while family extendedness combining "isolative and "cooperative" components does not impact trust.

Our next contribution consists of a huge data collection at the sub-national regional level, based on national censuses (some of them are available from Mosaic and IPUMS projects), which

are the most accurate and comprehensive source of information. Aggregation at the level of subnational regions makes more sense than nation-level aggregations due to historically shifting country borders. Our core database contains historical indicators available for 94 regional units within eight contemporary countries: Albania, Croatia, France, Hungary, Romania, Slovakia, Sweden, and United Kingdom (which correspond to five historical states: Albania, France, Great Britain and Wales, Hungary, Romania, Scotland, and Sweden).

The remainder of our article is organized as follows. Section one reviews previous literature, discusses the persistence of the family effect on trust and formulates our hypotheses. Section two describes the data, variables and methods. Section three demonstrates the main findings, while the final section presents our conclusions. Descriptive statistics and supportive supplementary material are placed in the appendix.

4.2.Literature and hypotheses

4.2.1Literature

The acknowledgement of the distinctive persistence of social trust stimulated a body of research looking for its historical roots. The contemporary level of trust was linked to many historical factors including, for instance, the experience of free communes in medieval Italy (Guiso et al., 2008; Putnam, 1993), to the slave trade in West Africa 400 years ago (Nunn & Wantchekon, 2011), and the cross-country variation in non-despotic political institutions in the distant past (Tabellini, 2008).

We admit that contemporary levels of trust might be predicted not only by the societal level historical institutions, but also by the grass root institutions, namely, the family. There are several papers relating historical family arrangements to social trust today. Schulz et al., (2019), exploring variation in cousin-marriage across counties, European regions and ethnicities, finds that these practices in the past and present are detrimental for generalized trust as well as for political

participation and democracy. In contrast, cousin-marriage tradition is beneficial for corruption (Akbari et al., 2019). Schulz et al. (2019) come to the general conclusion that the dissolution of extended kin networks due to the prohibition of cousin-marriage by the Western Church, explains why only a small number of societies could today be characterized as West, Educated, Industrialized, Rich, and Democratic (WEIRD). Alesina and Giuliano (2011) point to the same direction, suggesting that strong family ties, as measured using the World Values Survey (WVS) questions, have a negative effect on generalized trust and political participation. Duranton, Rodríguez-Pose and Sandall (2009) show that the nuclear family, based on unigeniture, is the most beneficial family type for trust formation and socio-economic development in general. Enke (2019) finds a significant association between Kinship Tightness Index coming from Murdoc's Ethnographic Atlas and the contemporary level of out-group trust as measured by World Values Survey (WVS). In their most recent paper, Gutmann and Voigt (2022) show that communitarian (extended) families have a positive effect on racist and xenophobic attitudes which indicate a lack of out-group trust.

This literature might be placed in a more general context that explores the effect of the historical family on socio-economic outcomes. We could divide this research into two groups: one of them devoted to family extendedness/nuclearity, and the other to gender inequality. Todd (1985, 1990) made an important contribution, firstly providing a classification of family structures based on such features as extendedness of the family and inheritance type and, secondly, linking the historical family with economic development. More recently, there has been a spread of literature emphasizing the advantages of the nuclear family over extended family. The nuclear family was shown to be positively associated with economic performance, industrialization, rule of law, educational attainment, social equality, democracy, and the formation of corporations and large business groups (Duranton et al., 2009; Fukuyama, 1995; Greif, 2006; Gutmann & Voigt, 2022;

Schulz et al., 2019). Other researchers are in opposition to these and cast doubts on the positive outcome of the nuclear family (Bertocchi & Bozano, 2016; Dennison & Ogilvie, 2014).

The second group of studies focuses on the contemporary consequences of historical gender inequality. As a starting point we could consider the seminal work by Hajnal (1965), who argued that the European Marriage Pattern - late marriage and high rate of celibacy – played a positive role in the economic and institutional development of North-Western Europe. Historical gender equality stimulated economic development, human capital accumulation, smarter political regulation and reduced corruption, as well as a higher level of democracy (Carmichael et al., 2016; Dilly, 2016; Dollar et al., 2001; Foreman-Peck, 2011; Pleijt et al., 2016).

We contribute to the existing literature by disentangling the effects of family extendedness and within-family hierarchies on out-group trust. Our unique data collection based on historical census microdata allows us to create the most nuanced family indicators. By doing so we provide a valuable contribution to the existing data collections (Dennison, Ogilvie, 2014; Todd, 1985, 1990) that comprise more general family indicators (i.e. family complexity, inheritance rule, age at first marriage, lifetime celibacy) readily available from printed historical statistical records or qualitative sources. Therefore, we can answer an additional question that has not been tackled in the previous literature: why are nuclear family arrangements beneficial for out-group trust? Is the effect of small family size and the objective need to cooperate with people beyond the kin group what matters, or is it the lack of strong hierarchical relations preventing trust formation?

4.2.2. Persistence of family effect

In this section we are going to unmask the "miracle" of how it is possible to find the correlation between the family characteristics in the past and social trust, more than 100 years later. Bisin and Verdier (2011) suggest a transmission mechanism of cultural traits among several generations where family plays a central role. Initially, people may consider particular cultural

traits when choosing their marital partner. Once the family unit is established, for some period of time the parents are the main agents responsible for the socialization of the child. After that, parents are also able to intervene in a child's identity formation by shaping his external environment, for example, by choosing the "right" neighborhood in which to reside, the "right" school in which to learn, the "right" peers, and so on. Bisin and Verdier (2011) mention among others, Catalans, Corsicans, and Irish Catholics in Europe, and Quebecois in Canada, as examples of ethnicities that remained strongly attached to their cultural traits despite being located in the political states that neglect their ethnic diversity.

The family pattern itself also has a longstanding tradition. It was shown that there is a path dependence in cousin-marriage practices for centuries (Giuliano & Nunn, 2017), and that cousin-marriage in the past and in present, have a similar impact on contemporary incidence of democracy and political activity (Schulz et al., 2019). Thus, it could be the case that the link between historical family and trust today is mediated through the contemporary family pattern. Meanwhile, family characteristics in the past might not necessarily be correlated with the same characteristics at present. Some family features that were significant in the past might be not indicative any more. For instance, the possibility for a young woman to live neither with her father nor with her husband, and working as a servant in another family, in the 19th century was considered as a move away from patriarchy towards modernization. Nowadays, this indicator does not give any substantial information. Indeed, family forms such as cohabitation before marriage or same sex marriages, could be seen as progressive. Consequently, the level of trust today might be explained by the path dependence between family progressiveness in the past and in present.

Another mechanism which helps to trace the correlation between the past and the present, rests on the evidence that out-group trust associated with the pre-industrial family may still exist today, in spite of the discontinuity between the past and the present family features. This scenario

is plausible seeing as trust and social capital in general display very long-standing characteristics (Bisin & Verdier, 2011; Putnam, 1993). Social institutions in turn, might support the persistence of trust.

4.2.3 Hypotheses

We reveal different mechanisms of the effect of family structure on out-group trust, linked to a) family extendedness, and b) its internal hierarchy on the basis of gender and seniority.

Family extendedness and out-group trust

There is an influential branch of research that associates family extendedness with less social contacts beyond the kin group (Duranton et al., 2009; Greif, 2006; Hartman, 2004; Todd, 1990). They point to the evidence that extended families often represented self-sufficient "production units" and, at the same time, "social cells" that tended to fulfill all needs of their members, including caring for their children and their elderly using their own internal capacities (Hartman, 2004). In contrast, nuclear families had to cooperate with unrelated outsiders to satisfy their economic and physical needs and to ensure care for their elderly and children. A greater need for voluntary cooperation with non-kin may have stimulated the education of children for out-group trust. Through generational value transmission, this educatory thrust could have been passed on from the past until the present.

Extended families served as substitutes for corporations such as monasteries, fraternities or insurance guilds that emerged as social safety nets against famine, unemployment, and disability in areas dominated by nuclear families (Greif, 2006). As a result, these corporations extending beyond the kin-group and stimulating intensive out-group contacts, were nearly absent in territories dominated by extended families. Likewise, extended families prevented the formation of inclusive political institutions in which people broadly participate in the governing process (Schulz et al., 2019) and the building of large business corporations (Fukuyama, 1995). In sum,

family extendedness that imply a larger number of family members should lead to worse institutional quality and lower level of out-group trust.

H1: Family extendedness is negatively associated with out-group trust today.

A different logic may complicate this negative association. Family extensions can be both vertical (intergenerational extensions) and horizontal (relatives belonging to the same generation as nuclear family members). Horizontal family extensions imply an enlargement of the relatives' group of the same generation as the nuclear family members and, accordingly of the same social status within the family. These relatives have to communicate with each other and to reconcile their interests on a daily basis. Putnam argues that interactions between individuals of equal social status foster robust norms of reciprocity and of mutually acceptable behavior. In such settings people are more likely to perceive their counterparts as trustworthy (Putnam, 1993). The propensity to trust each other emerging within the horizontally extended family may be an important ingredient of trust formation between people who are not related by blood, extending to people of other religions and nationalities or just to unknown people. Therefore, it is plausible that the "isolative" effect of family extendedness due to their higher "self-sufficiency" will be counterbalanced by the "cooperative" effect due to horizontal family extensions. In case when these two opposite effects have similar magnitudes and thus cancel each other out, a statistically significant association between family extendedness and out-group trust may be missing.

Family hierarchy and out-group trust

Power relations within the family, based on gender and seniority, might be detrimental for trust formation. According to Putnam (1993), vertical networks cannot sustain trust. On the one hand, sanctions protecting from opportunism are not likely to be imposed upwards. Consequently, as Farrell (2004) points out, when a person has a full power over the other person there is no reason for him to take the interests of this person into account. Thus, the more powerful one of the

counteragents, the less he can be trusted. On the other hand, the subordinate person often tries to hide the true information in order to avoid exploitation or punishment (Putnam, 1993). As an expected result, the person in power exhibits more distrust. In such a way, a "vicious circle" of mutual distrust becomes an inherent feature of unequal relations. A good illustration for this is the relations between the parents and their adolescent children. It was proposed that parental trust is based on the knowledge of children's feelings and concerns, as well as of their daily activities (Kerr et al., 1999). When children perceive their parents as not trustworthy and are not sincere with them, the parents become even more distrustful.

Lack of trust within the family could lead to a lower level of out-group trust because people are not able to trust everyone before they learn to trust someone (Welzel, Delhey, 2015). Bearing in mind that trust is acquired mostly during the formative years (Uslaner, 2000), we might expect that adults raised in vertically ordered families would have lower trust scores. A large amount of people with low out-group trust within a particular territory might lead to the less effective formal and informal institutions sustaining a low trust level. This rationale generates two logically intertwined hypotheses:

H2a. Generational hierarchy within the family is negatively associated with out-group trust today.

H2b. Gender hierarchy within the family is negatively associated with out-group trust today.

4.3 Data, variables, methods

4.3.1 Contemporary data and main dependent variable

As the primary source of contemporary data, we use the LiTS, conducted by EBRD in all post-communist countries in 2006 and 2010. This survey covers 17 countries of Central, Eastern

and South-Eastern Europe, and 13 countries from the Community of Independent States (CIS). We use data from the 2010 round as it contains different questions that allow us to measure out-group trust. The 2010 round also includes, for comparative purposes, 5 Western European countries: France, Germany, Great Britain, Italy, and Sweden. The total LiTS sample numbers about 38,000 individuals. All microdata are freely available at the official web-site of the survey.[8] The samples for each country are representative of the adult national residential population.

To measure out-group trust, we replicate the out-group trust index proposed by Delhey, Newton and Welzel (2011), summing up the trust scores across three items: 1) trust people you meet for the first time; 2) trust people of another religion; 3) trust people of another nationality. In our regressions we also use the standard set of individual socio-demographic controls provided by LiTS (age, gender, education, income level, and the type of settlement).

4.3.2 Historical data

The primary source of information on historical family organization are national historical censuses. First of all, we use microdata coming from the Integrated Public Use Microdata Series, International (IPUMS, International) and the Mosaic project.[9] These data provide information on age, gender, marital status, and relationship to the household head for each member of the household, which allow measuring family extendedness and family hierarchies. Most data refer to the 19th century, while some refer as far back as the 17th-18th centuries. Potentially, these data cover 170 subnational units of 8 contemporary countries (7 historical states) covered by LiTS: Albania, Croatia, France, Great Britain, Hungary, Romania, Slovakia, and Sweden. However, not all of these subnational units can be matched with localities covered by LiTS (see the description

[8] (http://www.ebrd.com/news/publications/special-reports/life-in-transition-survey-ii.html)
[9] IPUMS International data are accessible under: https://international.ipums.org/international/. Mosaic project: www.censusmosaic.demog. berkeley.edu

of matching procedure below), therefore we calculate historical family indicators only for 94 subnational units. This dataset constitutes our core sample.

Additionally, we use published statistics from the aggregated results of historical censuses. These data are available for a maximum 526 sub-national units (289 of them may be matched with the LiTS 2010 sample) in 26 contemporary countries (14 historical states) covered by LiTS, including Belarus, Czech Republic, France, Germany, Hungary, Italy, Russia, Serbia, and Ukraine. However, the aggregated census data allow to construct only a limited list of family indicators - mean household size, the percentage of single households, the percentage of households with servants, and the percentage of never married women aged 20-29 - and do not allow to differentiate between family extendedness and generational hierarchy. Therefore, these data are not suitable for testing Hypotheses H1 and H2a, while Hypothesis H2b is partially testable (by using the percentage of never married women 20-29). These data constitute our extended sample, used for robustness check when testing the Hypothesis H2b and also for descriptive purposes (e.g., to trace the famous Hajnal line).

Table 4-1 provides the geographical composition of the core and extended samples, while the Appendix Table CH4-A1 presents a detailed description of the sources of historical family data.

Table 4-1. The geographical composition and the number of subnational units in the core and extended samples.

		Extended sample	Core sample
	Contemporary countries	**Historical regions/subnational units**	
	France	56	14
	Germany	33	
	Great Britain	41	41
	Italy	16	
	Sweden	18	18
Total Western Europe	5	164	73
	Albania	3	3
	Armenia	1	
	Azerbaijan	2	
	Belarus	4	
	Croatia	3	1
	Czech Republic	3	
	Estonia	1	
	Georgia	3	
	Hungary	4	4
	Kazakhstan	5	
	Kyrgyzstan	2	
	Latvia	2	
	Lithuania	3	
	Moldova	1	
	Poland	18	
	Romania	5	5
	Russia	29	
	Serbia	16	
	Slovakia	8	8
	Slovenia	2	
	Ukraine	11	
	Uzbekistan	2	
Total Eastern Europe	22	128	21
TOTAL	26	292	94

All historical family indicators we collected fall into five large groups. (The detailed description of each variable, as well as the number of observations and its assignment to the composite indices, can be found in Table 4-2. Table CH4-A2 in Appendix shows the availability of historical family variables for different countries and time periods).

Group 1: Family extendedness. This group contains different indicators measuring mean household size at the regional level. These indicators may include all the people living in the dwelling or exclude (a) certain types of households (e.g., one person households), (b) certain categories of people (e.g., persons who live in the dwelling but are not related by blood ties, such as servants or lodgers).

Group 2: Household composition. This group includes two indicators reflecting the composition of households: 1) the proportion of children and adults in a household and 2) the proportion of households that have servants.

Group 3: Horizontal extensions. This group accounts for the horizontal (lateral) household extensions. Lateral relatives are family members of the same generation as the nuclear family members (e.g. brothers, sisters, aunts, uncles, cousins, nieces, nephews). Households with horizontal extensions are two generational households, like nuclear families. We calculate the proportions of households with horizontal extensions in a historical region *in*cluding or *ex*cluding vertical extensions.

Group 4: Vertical extensions. This group contains indicators related to the households comprising more than two generations. We assign to this group generational hierarchy index (see more about the index construction in Section 2.3) and the percentage of families having vertical extensions (adult or married children, children in law, grandchildren, grandparents, grandparents and grandchildren in law etc.).

Group 5: G*ender hierarchy*. We include to this group all variables associated with gender (in)equality that are part of the gender hierarchy index (e.g., percentage of female household heads in the region, percentage of wives who are older than their husbands, etc. See more about the gender hierarchy index in Section 2.3.).

Table 4-2. Historical family indicators and their description

Indicator	Description	Max. N of subnational units for which this indictor is available	Way of inclusion in regression model
Group 1: Family extendedness (number of relatives)			
Mean HH	**Mean household size.** The household comprises all persons who live in the same dwelling. Besides of the kin group servants, lodgers and other non-relatives might belong to the household. This measure counts all the persons living in the household.	178	Independent explanatory variable
MeanHH no one person HH (Ext)*	**Mean household size no one person households**. We exclude from this measure one person households in order to distinguish the situation 1) when a large number of extended families is followed by a large number of one person households; and the situation 2) when nuclear families are prevailing but the number of one person households is very small.	447	Independent explanatory variable
Mean HH no children	**Mean household size excluding children 0-14.** This measure is needed to capture self-sufficiency of the household. Therefore, we single out adult household members from children who cannot be full value workers.	170	Independent explanatory variable
Mean kin group size no one person HH	**Mean kin group size**. Household members that are not related by blood ties are excluded from this measure. One person households are excluded.	170	Independent explanatory variable
one person HH (Ext)	**One person households** The proportion of households comprising of one person	447	Independent explanatory variable
Household composition			

Children/adults	**The number of children 0-14 divided by the number of adults**. This variable measures self-sufficiency of the household. The larger is this ratio the less self-sufficient should be the household as additional adults are needed to provide food and child care for the large number of children. This variable could be also used as control for the number of children within the household.	170	Independent explanatory variable, control variable
Servants (Ext)	**Percentage of households having servants**	266	Independent explanatory variable
Horizontal family extensions			
Lateral	**Lateral household extension.** Lateral relatives are family members of the same generation as the nuclear family members: brothers, sisters, aunts, uncles, cousins, nieces, nephews. We measure the percentage of households that have lateral extensions.	170	Independent explanatory variable
Lateral no vertical	**Lateral relatives as the only household extension.** We measure the percentage of households which have lateral extensions but do not have vertical linear extensions as measured by *vertical extensions*. It is a measure which enables us to distinguish households with horizontal extensions from multi-generational households.	170	Independent explanatory variable
Vertical family extensions			
Vertical hh, all	**All possible vertical household extensions.** The percentage of households that have any type of vertical extensions: parents, parents in law, adult (aged 20+) or married children, children in law, grandchildren, great grandchildren.	170	Generational hierarchy index

Vertical hh, father head	**Vertically extended households headed by father.** The percentage of households headed by the oldest man in the household that have lineal (vertical) family extensions associated with patriarchal family. We count adult children (20+), married sons, grandchildren and great grandchildren. We exclude from this measure grandparents, because if they are mentioned in the census list as grandparents it means that they live in the household headed by their child. This case contradicts the patriarchal family rule when the household head should be the oldest men in the family. Likewise, married daughters are not counted because according to patriarchy principle women should move to her husband upon marriage.	170	Independent explanatory variable, part of the generational hierarchy index
Vertical hh, son head	**Vertically extended households headed by son** The percentage of vertically extended households comprising "father" of the household head. Correspondingly, these households are headed by the son.	170	Generational hierarchy index
Prevalence of vertical households headed by son	**Prevalence of vertically extended households headed by son over households headed by father** Vertical hh, son head/ Vertical hh, father head	170	Generational hierarchy index
Gender hierarchy			
women20_29 (Ext)	**Percentage of single women in the age group 20-29.** It is an alternative measure of age at first marriage and it is a proxy for women's emancipation. The older is the women when she gets married the more independent she might be from her husband (Gruber, Szoltysek, 2016).	449	Gender hiearchy index

female hh heads (G)**	**Percentage of female household heads among all the adult (20+) household heads.** Rescaled variable so that higher score means less female household heads.	224	
young brides (G)	**Percentage of married women 15-19**. It is also a proxy for age at first marriage.	224	
wives older (G)	**Percentage of wives who are older than their husbands**. Rescaled variable so that higher score means less old wives.	224	
female non kin (G)	**Proportion of young women living as non kin.** Proportion of women aged 20-34 years who live as non-kin, usually as lodgers or servants. These women are not controlled by their relatives or by their husband's relatives. Rescaled variable so that higher score means less women living as non kin.	224	

Note: *Variables available for the extended sample have the sign (Ext). **Variables borrowed from Gruber and Szoltysek's (2016) patriarchy index are marked with (*G)*. All variables marked with (G) are rescaled by the authors of patriarchy index to a range from 0-10 so that higher values mean more gender inequality. In this table is given the maximum number of observations available for each indicator. We matched with LiTS dataset only 94 regions for the core sample and 292 regions for the extended sample.

4.3.3 Main explanatory variables

Family extendedness is captured by different measures of mean household size listed in Table 4-2. Family extendedness points to horizontal family extensions in a model when it is controlled for gender- and generational hierarchies. Alternatively, we construct a special measure that includes only horizontal (lateral) family extensions (Lateral no vertical).

Our indices of generational and gender hierarchies are constructed by means of drawing the first principal component from several family structure indicators. The generational hierarchy index captures vertical family extensions and the roles distribution between father and son in vertically extended households. We assume that the younger generations are more influenced by the older generations when they live together in an extended household compared to the nuclear

family. Therefore, one component of the generational hierarchy index is the percentage of households in a region comprising any sort of vertical extensions like parents, parents in law, adult or married children, children in law and (great) grandchildren (vertical hh, all). The second component accounts for the distribution of power between father and son in vertically extended households. We calculate the percentage of households where *son is the household* head while his father is listed as "parent" (vertical hh, son head). Then we calculate the proportion of vertically extended households *headed by the father* and comprising adult children, married sons and grandchildren (vertical hh, father head). The ratio vertical hh, son head / vertical hh, father head shows which type of multigenerational households prevails in a given region. It is the second component of the generational hierarchy index (prevalence of vertical hh headed by son). To combine these two items into an index we draw the first principal component. The first item (vertical hh, all) is positively associated with generational hierarchy while the second item (prevalence of vertical hh headed by son) is negatively linked with this concept.

The gender hierarchy index combines all items associated with gender inequality and the obedient status of women. First, we consider the proportion of female household heads among all the adult household heads, which would indicate the independent status of women. The next two items are proxies for age at first marriage for women. The idea behind these items is that an adolescent wife is more likely to obey her husband and his relatives than an adult woman who has had time to accumulate some wealth before marriage. We use the proportion of married women 15-19 and the proportion of never married women 20-29. Following the similar logic that older wives are less obedient we include an additional item that measures the percentage of wives who are older than their husbands. We also add to our index the proportion of young women 20-34 who live in non kin families as lodgers or servants. This is a measure of women's emancipation, as in a patriarchal society a young woman should live either with her father or with her husband.

Similarly to the generational hierarchy index we draw the first principal component from all these items. Four gender hierarchy items (% of female household heads, % of married women 15-19, % of wives who are older than their husbands, % of young women 20-34 who live in non kin families) coming from Gruber and Szoltysek's (2016) patriarchy index were originally rescaled so that higher scores mean more gender inequality. These items positively affect the factor score of gender hierarchy. The percentage of never married women aged 20-29 which is the proxy for higher age at first marriage negatively affects the factor score.

The correlation between gender hierarchy and generational hierarchy indices is r= -0.6*** but it vanishes when we control for the country fixed effects (r=-0.02)[10]. A possible explanation might be that gender hierarchy is revealed to be more sensitive towards the modernisation and industrialisation processes of the 19th century than the more rigid generational hierarchy rooted in the clan society. Therefore, a relative gender equality driven to a large extent by societal factors could temporally coexist with the traditional family arrangements like the co-residence of adult children with their parents or households headed by the oldest man. The relationship between gender equality and generational hierarchy deserves a special study; nevertheless, they are clearly two different indicators that should be studied separately.

4.3.4 Matching of historical and contemporary data

The essential problem with linking regional historical indicators with contemporary variables is that the borders of countries, and especially the borders of regions within countries, have been changing over time. To solve this problem, we use the shapefile of historical regions of Europe for the year 1900 available from the official Mosaic project website, and create the map using R software. As the next step, we compile a data file with geographical coordinates for each

[10] This correlation refers to a more comprehensive sample of 170 regions. For the core sample (94 regions matched with LiTS) the correlations are 0.6*** without country FE and 0.02 with country FE.

contemporary locality from LiTS (the lowest level of aggregation available in LiTS) and place these localities as points on a historical map of Europe. Finally, we assign to each contemporary locality the set of our historical indicators.

4.3.5 Econometric Modeling

We estimate the following equation:

(1) $\text{Trust}_{irc} = \beta_0 + \beta_1 * \text{Generational hierarchy}_{rc} + \beta_2 * \text{Gender hierarchy}_{rc} + \beta_3 * \text{Family extendedness}_{rc} + \text{Individual controls}_{irc} + \text{Regional controls}_{rc} + \alpha_c + u_{irc}$

where *i* refers to individuals, *r* to historical regions, *c* to historical countries, α_c accounts for the historical countries fixed effects (FE) and u_{irc} is the conventional error term. We include historical country FE instead of FE for the contemporary countries to better control for omitted variables which may affect both historical family structures and out-group trust. Obviously, contemporary societal characteristics do not affect historical family structures but rather may be influenced by them. Historical country FE account for various unobserved country-level characteristics, including historical institutional quality and state capacity and different pace of Industrial Revolution, plus the year of the observation of historical variables. Equation 1 is estimated using OLS taking into account possible correlation of errors within historical regions (OLS-CRSE).[11]

We use different measures of family extendedness at the sub-national (regional) level listed at Table 4-2: (a) all people in a dwelling/number of households *(Mean HH*); (b) all people in a

[11] While LiTS is not representative at the subnational level, it is not a crucial issue in our case as we don't use LiTS data to construct any indicators at the subnational level. Rather, we assign historical indicators taken from external data sources to all individuals living within the same primary sampling units (PSU). In this case, a two-stage quasi-random sampling procedure used in LiTS (first, for each country 50-75 PSUs are chosen from a larger country-specific list of PSUs with probability of selection proportional to the PSU size, and, second, households are randomly chosen within each PSU) should prevent any systematic bias in the composition of PSU samples and thus should guarantee that our estimated coefficients are free of sample-selection bias. The literature contains plenty examples which follow a similar procedure (e.g, see Ajzenman et al., 2022 using LiTS data and Schulz et al., 2019 using European Social Survey data).

dwelling/number of households excl. one person households (*Mean HH no one person HH*); (c) all people related by blood ties living in a dwelling /number of households excl. one person households (*Mean kin group size no one person HH*); (d) all adults in a dwelling/number of households (*Mean HH no children*); (e) percentage of households which have lateral and no vertical extensions (*Lateral no vertical*). If one person households or servants are excluded from the measure, we include them in the model as separate predictors. We are mainly interested in adult household members as the self-sufficiency of an extended household (Hypothesis H1) relies on adult labour. When we include in our regressions indicators that do not explicitly exclude children, we add children/adults ratio among controls.

Individual level controls include age, gender, higher education, income level, and urban (rural) settlement.

In our core specification at the level of historical regions, we use population density as a measure of urbanization because we expect that it might have an impact on family structure as well as on out-group trust. An urban environment might be associated with smaller families as there was no need for a large number of agricultural laborers (Nimkoff & Middleton, 1960). Simultaneously, people from different regions moved to the urban centers and consequently, their trust in out-groups might be higher than in rural areas.

Further, we control for geo climatic conditions. On the one hand, they are an important determinant of economic development in general (Nunn, 2009) and its main constituents, such as out-group trust, and on the other hand, they might have shaped the family structure (Welzel et al., 2021). We use the Cool Water Index, proposed by Welzel et al. (2021), which combines temperature and precipitation components to measure geo climatic conditions favorable for cultural and institutional modernization. Basically, the index measures the combination of cool summers with temporarily frosty winters but with continuous rainfall throughout all seasons.

As a robustness check we add additional regional level controls that may be correlated with the historical family indicators as well as with modernisation and its components. We control for the caloric suitability of land for agriculture (Galor, Özak, 2016), because agriculture influences people's values and attitudes (Alesina et al., 2013) and creates favourable conditions for the extended family (Enke, 2019). A further control variable is ruggedness of the terrain (Nunn and Puga, 2012), indicating remoteness of the region that may affect psychology and family structure. It is well documented in the literature that remote mountainous territories are conducive to the extended family, because of the patriarchal way of living and high insecurity due to lesser penetration of the state (Todorova, 1989; Brunnbauer, 2003). We also control in our models for the proximity to water ways (GSHHG). These indicators approximate market integration of the territory that could jointly stimulate the nuclear family and trust towards outgroups. Hunting and gathering has been demonstrated to correlate with the nuclear family (Enke, 2019) because this means of subsistence implies neither enough food to sustain an extended family, nor a high demand for labour. The hunter-gatherer lifestyle, characterised by individualism and competition (Welzel et al., 2021) may have an impact on values including trust. Therefore, we control for the prevalence of land suitability for hunting and gathering over agriculture (Beck, Sieber, 2010). Finally, we include as a control variable exposure to the medieval Catholic church that has been shown to affect kinship systems together with social trust (Schulz et al., 2019). All these control variables were included in the model one by one in order to avoid multicollinearity. The sources of all regional level controls are summarized Table CH4-A3 (in Appendix).

As a further robustness check we run the regression on the extended sample where we have a larger number of observations but a limited number of family indicators. Unfortunately, we are not able to disentangle family extendedness and power hierarchy on the extended sample. Thus,

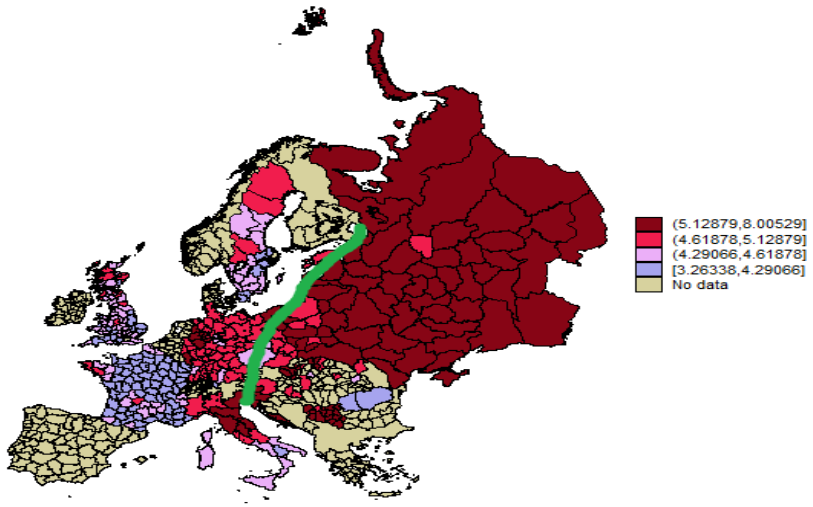
in this case, we include in our model only the percentage of never married women 20-29. In other respects, we use the same specification as shown in Equation (1).

4.4 Main findings

4.4.1 Descriptive analysis

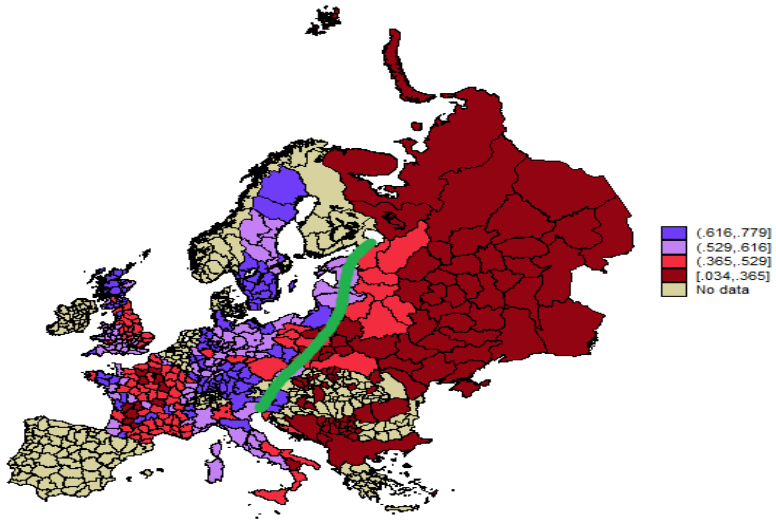
Fig. 4-1 and Fig. 4-2, which are constructed using the extended sample, illustrate Hajnal's (1965) idea about the existence of the specific West European marriage pattern and household formation system. While Hajnal's analysis was based only on a few case studies, we use data derived from national historical censuses covering almost all of Europe. Our maps show that to the East of the Hajnal's line households were larger and the share of never married women aged 20-29 was lower, mirroring lower age at first marriage. However, to the West of the Hajnal's line the picture looks more heterogeneous than to the East of the line, contradicting the idea of an uniform West European family pattern.

Fig.4-1. Mean household size in Europe divided by the Hajnal's line.



Note: On this map we plot mean household size excluding one person households for the historical Europe. The green line is the Hajnal's line that runs from Trieste (Italy) to Sankt-Petersburg (Russia) and singles out the West European marriage and household formation pattern. The data shown on the map were collected by the authors of the present article. The GIS file for the European regions 1900 is freely available from https://censusmosaic.demog.berkeley.edu/.

Fig.4-2: The percentage of never married women aged 20-29 (proxy for age at first marriage) in Europe divided by the Hajnal's line.

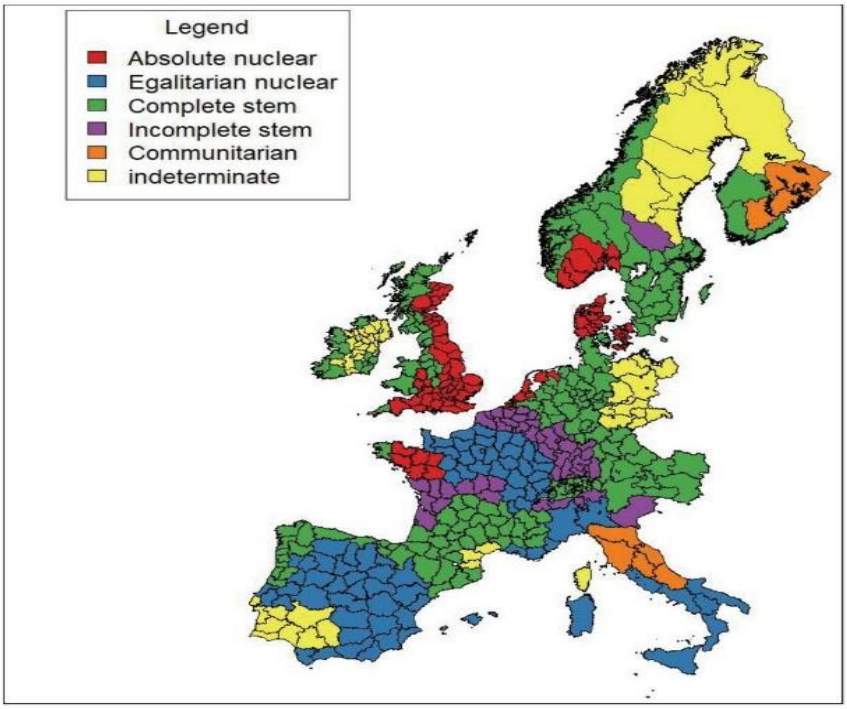


Note: On this map we plot the percentage of never married women in the age group 20-29 for the historical Europe. This indicator approximates age at first marriage. The green line is the Hajnal's line that runs from Trieste (Italy) to Sankt-Petersburg (Russia) and singles out the West European marriage and household formation pattern. The data shown on the map were collected by the authors of the present article. The GIS file for the European regions 1900 is freely available from https://censusmosaic.demog.berkeley.edu/.

For comparison, we placed the map of historical family types based on the widely used data collected by Todd (1990) and digitized by Duranton et al., (2009) (see Fig. 4-3). Our map of mean household size has numerous similarities with Todd's map. Relatively small household size in Southern Italy corresponds to "Egalitarian nuclear" family type on Todd's map. "Egalitarian nuclear" stands for nuclear family emerged as the result of land plots division among the offspring. It rests on partible male inheritance. In contrast, "Absolute nuclear" family is based on unigeniture when all children have to leave the parental farm and only one child inherits the land after parents die. Our data suggest that the Central part of Italy has considerably larger households than the Southern part. This result is replicated on Todd's map: Central Italy is dominated by "Communitarian families" when all the offspring live together with their families on the parental farm. Finally, Todd shows that in Germany, Scotland, and Wales and in Western France, "Stem" or "Incomplete stem" families prevailed. A stem family implies that the inheriting son with his

family and his unmarried adult siblings can stay on the parental farm. Therefore, a stem family should be larger than any type of nuclear family. This is exactly what we see on our map: in areas dominated by stem families, households were larger than in areas dominated by nuclear families.

Fig. 4-3: Todd's classification of family systems across Europe.



Classification of family systems, based on administrative division around 1900.
Source: Duranton, 2009.

Note: We provide this figure based on the data collected by Todd (1990) for comparison with our maps of family indicators. In Todd's classification "Absolute nuclear": nuclear family based on unigeniture; "Egalitarian nuclear": nuclear family based on partible male inheritance; "Complete stem": a stem family implies unigeniture when the inheriting son lives with his parents until they die and all the other offspring have to leave the farm upon marriage; "Incomplete stem": as above, but with more egalitarian inheritance rules; "Communitarian": all the male offspring can bring their families to the parental farm. It relies on the partible male inheritance.

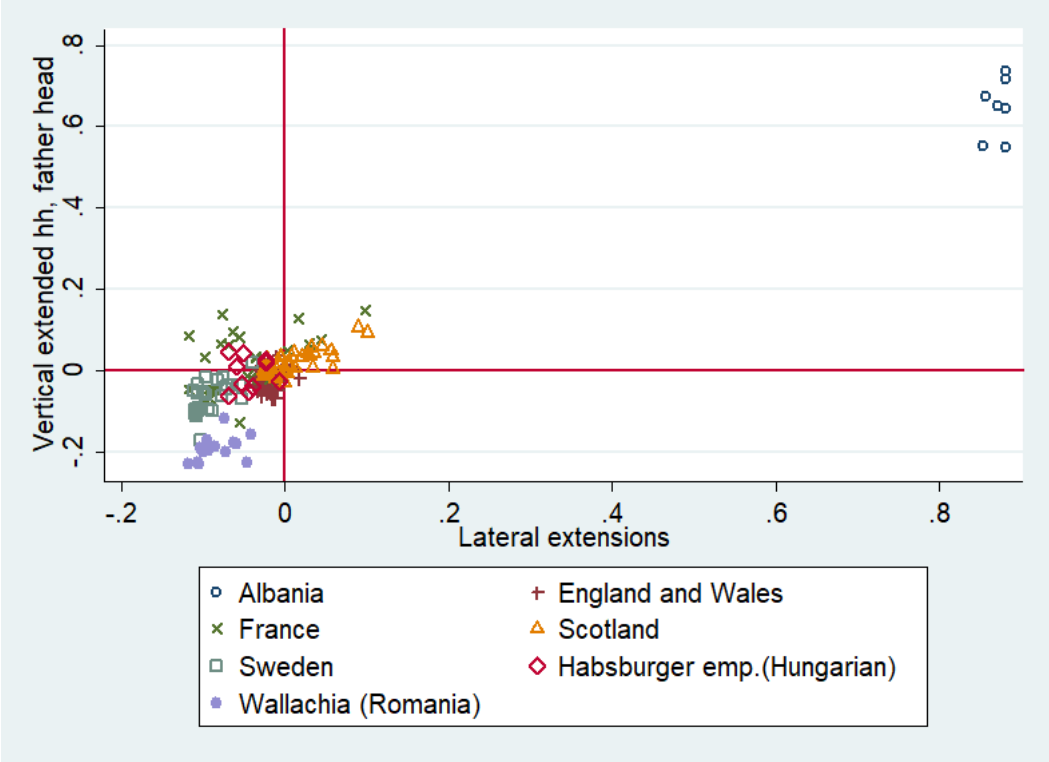
Fig. 4-4 and Fig. 4-5 present the level of vertical family extensions (% of vertically extended households headed by father and generational hierarchy index) and horizontal family extensions across 170 regions for which individual data are available[12]. Taking a rapid glance at the figures we can see that our regional observations are highly clustered at the country level. This

[12] The same figures constructed for our core sample are available in Appendix (see Fig. CH4-A1 and Fig. CH4-A2). They do not considerably differ from Fig. 4-4 and Fig. 4-5.

may partly reflect the country level situational conditions in the past as well as more deeply rooted differences. On Fig.4-4 the vertical axis represents the percentage of vertically extended households headed by the father. These are patriarchal households where older generations are in a dominant position over the younger ones. According to our theory, such power inequality may be "harmful" for trust. The x-axis reflects the percentage of households having horizontal extensions that are more favourable for trust. The reference lines shown in red are placed at the mean scores for horizontal and vertical extensions. Respectively, the scores on the x and y-axes are deviations from the mean. According to Fig. 4-4, Albanian regions are the absolute champions in vertically extended households, which is expected as the Balkans are known for their large multigenerational families called "zadruga" (Kaser, 2012). The proportion of vertically extended households headed by the father in France and Scotland is considerably lower than in Albania but higher than in other countries in our sample.

The situation is very similar in case of horizontal family extensions. Albania is far beyond the average while France and Scotland have a higher level of horizontal extensions than the other countries. Sweden, England and Wales together with Wallachia (Romania) score quite low on both family indicators. The lack of extended families in Wallachia (Romania) seems surprising at the first glance. Indeed, in Romania like in Southern Italy and many other countries of the Eastern Europe the nuclear family had a different nature. It emerged not as the consequence of unigeniture when only one offspring inherits the farm (Great Britain, Sweden, Scotland), but as the result of partible male inheritance when the parental farm is equally divided among all male heirs. Therefore, in the latter case, the households might be formally nuclear, but they could be not fully autonomous, having a common border with the farms of relatives.

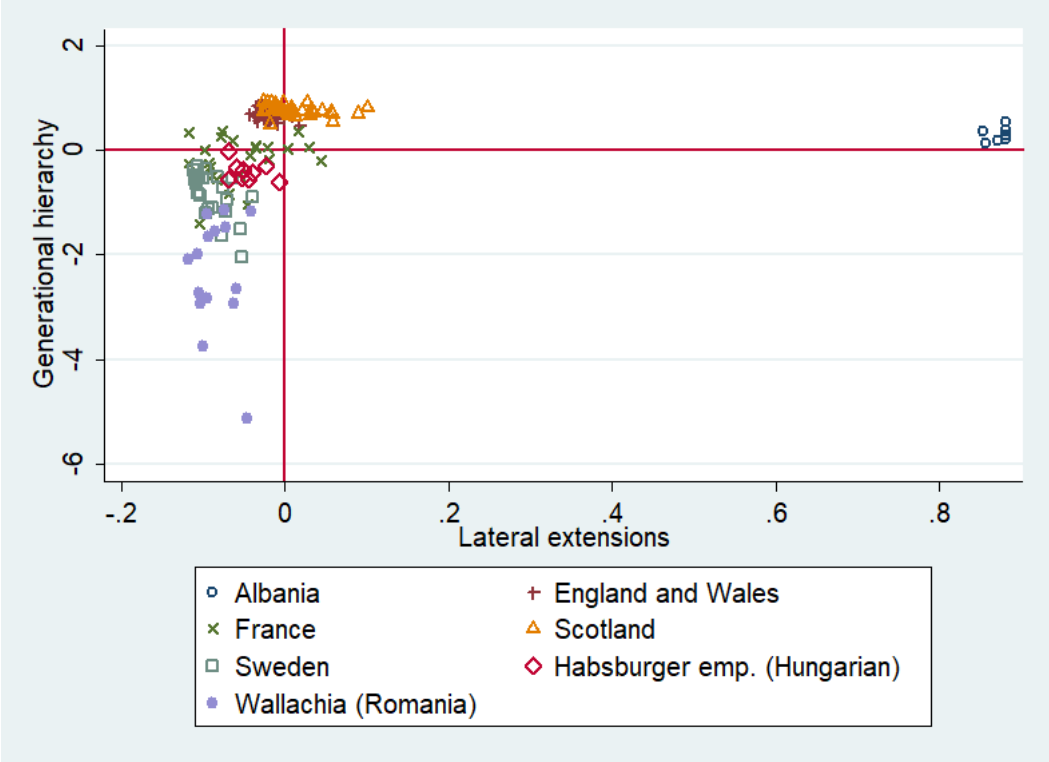
Fig. 4-4: Incidence of vertical and lateral extensions across 170 regions of Western and Eastern Europe.



Note: Both variables were rescaled so that 0 is the mean value. On the x-axis is shown the percentage of historical households that have lateral (horizontal) extensions. On the y-axis is shown the percentage of historical vertically extended households headed by the oldest man in the household. This Figure is based on the maximum number of regions for which individual census data were available (170 regions).

When we include the generational hierarchy index instead of the proportion of vertically extended households headed by the father, the picture becomes slightly different (Fig. 4-5). The regions of England and Wales, Scotland, France and Albania, have a level of generational hierarchy above the average. Albania does not considerably outperform all the other countries in generational hierarchy because England, Scotland and France have a comparable (to Albania) proportion of all vertically extended households including households headed by sons (one of the two components of the generational hierarchy index).

Fig. 4-5: Incidence of generational hierarchy and lateral extensions across 170 regions of Western and Eastern Europe.



Note: Both variables were rescaled so that 0 is the mean value. On the x-axis is shown the percentage of historical households that have lateral (horizontal) extensions. On the y-axis is shown the generational hierarchy index scores.

The correlations between family extendedness and within family power hierarchy measures are presented in Table 4-3. Family extendedness is only moderately correlated with generational hierarchy (from 0.30 to 0.56 in the extended sample and from 0.2 to 0.47 in the core sample), which illustrated the idea that not all extended households have hierarchical features. Moreover, mean household size, with or without children, is not correlated with gender hierarchy, which casts doubts on Hajnal's argument that women's obedience to men usually comes together with an extended household type.

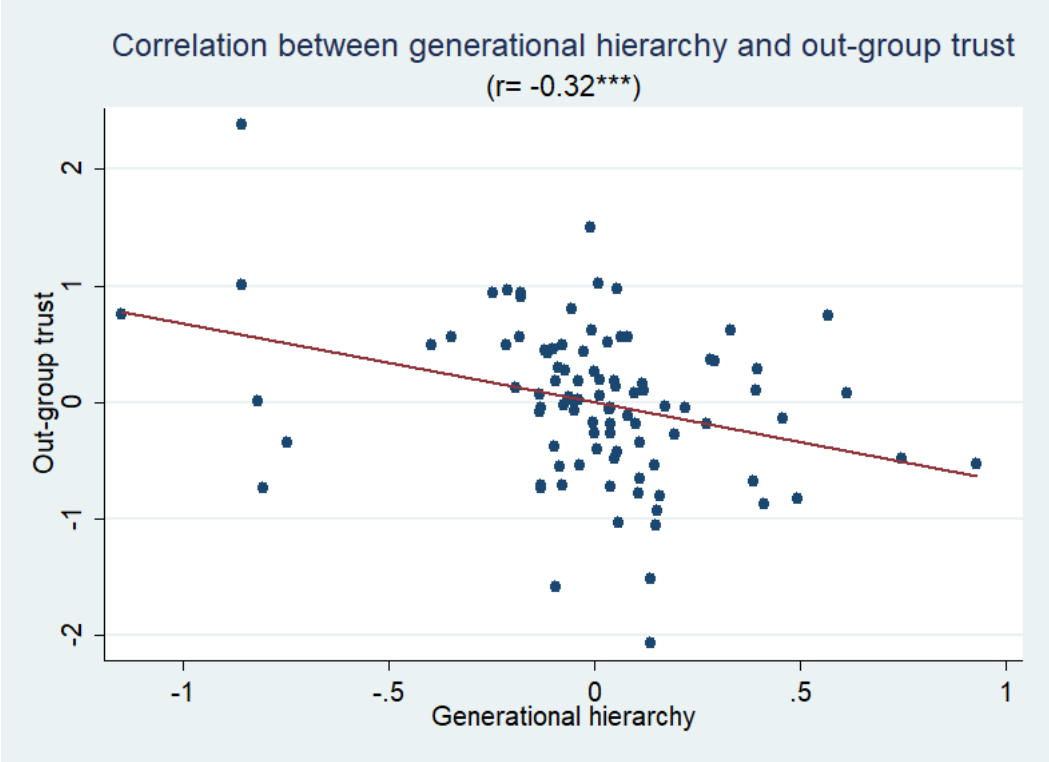
Table 4-3: Correlations between family extendedness and within family hierarchy measures.

	Extended sample		Core sample	
	Generational hierarchy	Gender hierarchy	Generational hierarchy	Gender hierarchy
Mean household size	0.302***	0.006	0.198*	0.160
Mean household size without children	0.561***	-0.066	0.473***	0.144
Lateral (horizontal) extensions	0.404***	0.592***	0.252**	0.262**
N of subnational units	170		94	

Note: *p < .05; **p < .01; ***p < .001

In addition, we link family extendedness and family hierarchies with our outcome variable of interest, i.e. the contemporary level of out-group trust. To illustrate the persistence effect between the past and the present we apply a more reliable approach focusing on within country variation in historical family structure. We consider the fact that different countries were observed at different points in time while they were undergoing different stages of modernisation and demographic transition. Country fixed effects account for these differences eliminating the "between" effect which may reflect temporal trends in the past instead of the longstanding traditions. A partial correlation between generational hierarchy and the contemporary level of out-group trust is presented in Fig. 4-6 (r=-0.32***). Partial correlations of gender hierarchy and family extendedness with contemporary out-group trust levels are revealed to be insignificant.

Fig.4-6: Partial correlation between generational hierarchy index and contemporary out-group trust.



Note: On this figure we plot residuals from the regressions where generational hierarchy index and out-group trust are controlled for the historical country fixed effects. In our case it is important to focus on the within country variation because historical countries are very different in terms of the year of observation, modernization path and the stage of demographic transition.

4.4.2 Econometric analysis

We do not find that family extendedness is linked to out-group trust (see Table 4-4). Neither of five family extendedness measures yield significant coefficients, therefore Hypothesis H1 is rejected. Evidently, we do not observe the hypothesized negative correlation as the "cooperative" component associated with horizontal family extensions counterbalances the "isolative" nature of the extended family rooted in its self-sufficiency.

Table 4-4: The effect of historical family indicators on contemporary out-group trust.

DV: out-group trust (LiTS, 2010)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Generational hierarchy	-0.684***		-0.689***	-0.730***	-0.742***	-0.738***	-0.773***	-0.720***	-0.729***
	(0.179)		(0.183)	(0.188)	(0.204)	(0.207)	(0.241)	(0.190)	(0.201)
Gender hierarchy		0.0766	0.111	0.0814	-0.00488	0.244	0.429	0.00525	0.339
		(0.217)	(0.205)	(0.278)	(0.264)	(0.329)	(0.319)	(0.298)	(0.381)
Mean HH					-0.229				
					(0.189)				
Mean HH no children								-0.152	
								(0.246)	
Mean HH no one person HH						0.107			
						(0.214)			
Mean kin group size no one person HH									0.160
									(0.224)
One person HH						3.397			3.570
						(2.346)			(2.290)
Children/ adults						-1.559	-1.969		-1.849
						(1.564)	(1.471)		(1.563)
Lateral no vertical							2.215		
							(2.874)		
Servants									1.192
									(1.843)
Population density				-8.18e-06	-6.26e-05	-0.000138	-4.09e-06	-3.50e-05	-0.000131
				(4.47e-05)	(5.96e-05)	(0.000102)	(4.41e-05)	(6.43e-05)	(0.000103)
CWI				-1.345	-1.255	-1.191	-1.069	-1.332	-1.229
					(1.119) (1.025)	(1.028)	(1.031)	(1.081)	(1.050)
Individual level controls					YES				

Historical country FE					YES				
Observations	4,042	4,042	4,042	4,042	4,042	4,042	3,801	4,042	4,042
R-squared	0.233	0.225	0.234	0.234	0.235	0.237	0.244	0.234	0.238

Note: Standard errors are clustered at the level of historical sub-national regions (94 regions). Entries are unstandardized regression coefficients with standard errors in parentheses. *p < .05; **p < .01; ***p < .00

At the same time, we establish that generational hierarchy is detrimental to out-group trust, confirming Hypothesis H2a. This result holds in all estimated specifications. The size of the effect is quite substantial. Increasing the generational hierarchy index by one standard deviation increases out-group trust by about 30% of its standard deviation. The effect of the generational hierarchy remains statistically significant after controlling for various geographical and historical indicators (Table 4-5). The magnitude of the effects remains in the same range.

Table 4-5: The effect of within family generational hierarchy on the contemporary out-group trust, controlling for additional geographical and historical factors.

DV: out-group trust (LiTS, 2010)	(1)	(2)	(3)	(4)	(5)	(6)
Generational hierarchy	-0.730***	-0.701***	-0.776***	-0.737***	-0.738***	-0.732***
	(0.194)	(0.179)	(0.205)	(0.197)	(0.198)	(0.196)
Gender hierarchy	0.106	0.225	0.158	0.0292	0.0657	0.0489
	(0.292)	(0.264)	(0.337)	(0.290)	(0.274)	(0.265)
Mean HH	-0.0522	0.0435	-0.166	-0.125	-0.125	-0.140
	(0.212)	(0.170)	(0.210)	(0.192)	(0.205)	(0.196)
Population density	-2.15e-05	1.28e-05	-1.33e-05	-1.61e-05	-2.55e-05	-2.17e-05
	(5.01e-05)	(4.16e-05)	(5.37e-05)	(4.52e-05)	(4.68e-05)	(4.69e-05)
CWI	-1.050	-1.674	-1.604	-1.518	-1.211	-1.274
	(1.161)	(1.196)	(1.260)	(1.109)	(1.203)	(1.048)
Caloric suitability index	0.000254					
	(0.000229)					
Terrain ruggedness		-0.367**				
		(0.154)				
Less than 50 km to the main river			0.194			
			(0.358)			
Less than 50 km to the coast				-0.0972		
				(0.123)		
Prevalence of land suitability for hunting and gathering over agriculture					-0.190	
					(0.942)	
Medieval Catholic church exposure						-0.0292
						(0.0315)
Individual level controls			YES			
Historical country FE			YES			
Observations	4,042	4,042	4,042	4,042	4,042	4,042
R-squared	0.235	0.238	0.235	0.235	0.235	0.235

Note: Standard errors are clustered at the level of historical sub-national regions (94 regions). Entries are unstandardized regression coefficients with standard errors in parentheses.

*p < .05; **p < .01; ***p < .001

As a robustness check, we include two components of the generational hierarchy index - vertical hh, all and prevalence of vertical hh headed by son – separately into the basic specification of our model (Table 4-6). We find that the proportion of vertically extended households has a predicted negative effect on out-group trust, while the effect of "prevalence of vertical households headed by son" positively affects out-group trust. Comparing the standardized beta coefficients suggests that the effect of the percentage of vertically extended households is considerably stronger (-0.375***) than the effect of prevalence of households headed by son (0.09*).

Table 4-6. Analysis of the effect of generational hierarchy index components on the contemporary level of out-group trust.

DV: out-group trust (LiTS, 2010)	unstd. beta	stand. beta
Prevalence of vertical hh headed by son	4.292*	0.09
	(2.269)	
% vertical hh, all	-4.208***	-0.375
	(1.314)	
Gender hierarchy	0.144	0.077
	(0.204)	
Mean HH size	0.0730	0.013
	(0.201)	
Population density	-4.18e-05	-0.023
	(4.80e-05)	
CWI	-0.532	-0.021
	(1.040)	
Individual controls	YES	
Historical country FE	YES	
Observations	4,042	
R-squared	0.233	

Note: Standard errors are clustered at the level of historical sub-national regions (94 regions). Entries are unstandardized regression coefficients with standard errors in parentheses.

Our findings are best comparable with the previous literature that builds on extended family indicators incorporating co-residence of adult children with their parents (an element of our generational hierarchy index). With our new empirical data, we validate the existing knowledge that the nuclear family which by definition lacks generational hierarchy is beneficial for out-group trust formation (Duranton et al., 2009; Enke, 2019; Gutmann & Voigt, 2022; Schulz et al., 2019). Additionally, we provide new evidence that this positive effect is due to the lack of generational hierarchy within the nuclear family. By contrast, in an extended family the dominance of older generations over younger prevents trust formation.

We do not find a significant correlation between gender hierarchy and out-group trust (Table 4-4, Table 4-5). The result remains robust to the different model specifications on the core sample. Hence, Hypothesis H2b is not confirmed. However, the proportion of never married women in the age group 20-29 (one component of the gender hierarchy index available for a larger

number of countries) has an expected, positive and statistically significant impact on out-group trust on the extended sample in a specification without additional geographic controls (see Column 1 in Table CH4-A4 in Appendix). This suggests that the effect of gender hierarchy on out-group trust should be investigated further in future studies covering a larger number of countries. It is particularly important when it is considered that the literature does imply a negative effect of gender hierarchy on the whole modernisation complex including out-group trust (Carmichael et al., 2016; Dilly, 2016; Dollar et al., 2001; Foreman-Peck, 2011; Hajnal, 1965; Pleijt et al., 2016).

The results for gender hierarchy obtained using the core sample may also have a substantive explanation. It could be the case that the effect of generational hierarchy is really stronger than that of gender hierarchy. First, the authority of older over younger generations multiplies the dependent status of a young woman because she has to obey not only her husband but also the household head and the oldest woman in the house. Thus, generational hierarchy amplifies the effect of gender hierarchy. Second, generational hierarchy might be costlier to support because it often implies obedience of a young and able-bodied man to an old physically or mentally weak parent. In this situation, adult children keep their dependent position, although their contribution to the common family wealth is much greater than that of the household head. It is evident that considerable power resources are needed to maintain such an "unfairness". A gender hierarchy could be more easily justified in a pre-industrial society as women have less physical strength and their contribution to agricultural work might be objectively somewhat smaller. We suggest that the generational hierarchy's harmful effect on social trust might be greater requires more power concentration.

The reported results are validated using a number of further robustness checks. Firstly, our findings remain robust to the inclusion of various measures of our main concepts (Table 4-4).

Horizontal family extensions are modelled in two different ways: (a) the mean household size (different versions) controlled for generational family hierarchy or (b) a special indicator of percentage of households having lateral (horizontal) and no vertical extensions. In both cases horizontal extensions are revealed to be not detrimental to trust.

Secondly, instead of the generational hierarchy index, we include in our model the percentage of vertically extended households. The results follow a similar pattern, but the significance level is lower, evidently because this measure does not take into account many nuances captured by the generational hierarchy index.

One of the limitations of the present study is that it was based on eight contemporary West and East European countries for which historical data were available. Thus, additional studies are needed to test whether the obtained results can be generalised. A further possible limitation of the performed analysis is that our data do not allow us to establish causality between historical family type and contemporary out-group trust. It might be the case that authoritarian family type was a reaction on the low trust level in the society. Alternatively, out-group trust level and particular family arrangements could be associated with a common factor that we do not control for in our regression. To cope with this problem, we include in our models all possible geographic and historical control variables suggested by the existing literature together with the country fixed effects. Even if some problems referring to causality still remain, our results might be interesting in light of correlational study as they illustrate the co-occurrence of authoritarian family relations and low out-group trust that can mutually reinforce each other. In contrast, horizontally extended families did not reveal to be an inherent feature of low trust societies.

4.5 Conclusions

Our study examines the impact of historical family structures on today's level of out-group trust. Using national historical censuses for a comprehensive set of European countries, we

construct a broad dataset of indicators reflecting various dimensions of the family organization in the past at the sub-national level. We focus on the role of (a) family extendedness and (b) intra-family hierarchy in matters of gender and seniority.

Our findings are tested on a core sample of 94 regions within 8 West and East European countries (7 historical states). We show that family extendedness is not harmful to out-group trust. Generational hierarchy within historical families turns out to have been a true obstacle for out-group trust until today. It suggests that people from extended families might have avoided contacts with the out-groups not because they could satisfy all their needs within the large family, but because being raised in an authoritarian family they did not build enough trust to interact with the out-groups.

Moreover, our analysis suggests that only generational hierarchy has a detrimental effect on trust. This is a new finding that calls for more attention in future research on inter-generational relationships and the role of seniority in society.

Thinking about the broader implications of our study, we would suggest that the firm enculturation of authoritarian norms in pre-modern families was the real hindrance for the formation of trust and its positive consequences for institutional development, socioeconomic modernization, and human emancipation. One should not overlook that at least in Europe today's power relations within the family are qualitatively different from the authoritarian family order in the past. Complete obedience of younger generations to older ones and of women to men remains a dying attribute of large intergenerational family units. Contemporary family forms in general have become more liberal that might lead to the lasting growth of out-group trust.

CHAPTER 5

Historical Family Structure as a Predictor for Liberal Voting: Evidence from a Century of Russian History

Family structure is considered a particularly important predictor of social and political development; historical differences in family size and other family characteristics cast a long shadow over societal development. This paper explores how differences in historical family size affect political behavior based on within-country variations of this characteristic in Russia. Unlike most papers on historical legacies, we trace the effect of family size across a century of Russian history with a focus on the first competitive and free elections held in Russia in 1917 – to the Constituent Assembly – and on the presidential elections of post-Soviet Russia of 1996 and 2000. Mean family size is measured from the census data for 1897. We find a robust and significant association between smaller family size and pro-liberal voting that holds in spite of differences in the political, economic and social environments of the 1910s and 1990s.

5.1 Introduction

Political, social and economic institutions and behavior exhibit strong persistence over time (Nunn 2012; Simpser et al. 2018; Voth 2021; Abad and Maurer 2021; Cirone and Pepinsky 2021). The booming literature on this topic documents important examples of historical persistence in a variety of cases including legacies of colonialism (Michalopolous and Papaioannou 2020), of continental empires in Europe (Becker et al. 2016), of Communist systems (Alesina and Fuchs-Schündeln 2007), of authoritarian regimes in general (Neundorf and Pop-Eleches 2020), of governmental repressions (Homola et al. 2020) and of wars (Oto-Peralias 2015).

The literature on historical legacies shares a common feature: it assumes that in spite of apparent historical discontinuities (like collapse of states, regime change or migration) social practices, which emerged at a particular point of time, "outlive" the environment in which they came to be. However, one can rarely offer a (quantitative) study of how historical institutions and structures, which are treated as the origin of the legacy effect, affected their societies in the past.

We can devise a research strategy and gather data for studying the effects of Communist regimes' legacies on attitudes and behavior of citizens of modern post-Communist countries. However, the data availability for studying the behavior of the subjects of the Communist regimes themselves during the peak of their rule is much worse. We can show that, for example, today citizens of former Communist countries are characterized by strong xenophopic attitudes (Libman and Obydenkova 2020); but we cannot be sure that when the Communist regime existed, its citizens were also xenophobic – we typically have no data (surveys, public opinion polls or experimental data) to test this conjecture.

This creates a problem. Most studies on attitudinal legacies are based on an implicit assumption: the legacy effects emerge because at some point of time in the past existing societal structures favored a particular type of behavior, and it became imprinted onto society, so that even after conditions changed people continued behaving like they did in the past (on the intergenerational value transmission, see Bisin and Verdier 2001). But what if from the very beginning the effect of the social phenomenon triggering legacy was a very different one than we assume today? In the example above – subjects of the Communist regimes were *not* xenophobic from the start?[13] In most cases, one is confronted with multiple historical narratives, highlighting different (and partly contradictory) aspects of past institutions and societies (Lustick 1996). On top of that, historical memories are often influenced by societal discourses or political manipulations (Mylonas 2019; Ochsner and Roesel 2019). Thus, it is possible, that the legacy research in some cases documents the effect of these 'manufactured' historical memories (with people behaving in line with their *beliefs* about the past) rather than the effect of actual social structures and institutions of the past.

From this point of view, ideally, we need to study both effect social structures had on behavior and attitudes when these structures existed (we will refer to it as *contemporary effect*), as well as effect social structures of the past have on the present behavior and attitudes (*legacy effect,*

[13] In this particular example, indeed, both assumptions are possible: that the ideology of the proletarian internationalism and the peoples' friendship made Communist citizens less xenophobic and that the practices of discrimination implemented by the regime (for which we have abundant anecdotal evidence) made them more xenophobic.

see Wittenberg 2015).[14] In this paper, we explore a setting allowing us to perform such an analysis. We look at one of the most basic social institutions – the organization of the family. Our main attention is devoted to an important element of family organization – the spread of nuclear vs. extended families. We look at differences, which existed across regions of Russia in the late 19th - early 20th century in this respect, and test how they affected voting behavior at that moment of time (contemporary effect).[15] Furthermore, although after almost a century of urbanization and modernization, the differences in the family structure almost disappeared, we test whether past differences in this respect affect voting behavior in Russia in the 1990s (legacy effect).

We extract the information about the historical nuclearity of the family from the first Russian census of 1897, and use two empirical cases. First, we look at the voting for the Constituent Assembly (*Uchreditel'noe Sobranie*), a public body elected in 1917 and conveyed in January 1918 immediately after the revolution to determine the new political organization of Russia. The Assembly operated for only one day before being disbanded by the Bolsheviks; however, the elections to the Assembly remained (until the fall of the USSR) the only case of universal free elections Russia has ever experienced (Dando 1966). Second, we look at the presidential elections of modern Russia of 1996 and 2000; we select these two years because later, due to consolidation of Putin's regime, electoral fraud and other restrictions on the freedom of elections became extremely widespread. We use highly disaggregated subregional (district) data (*uezd* for 1917 and *rayon* for 1996 and 2000) to perform our analysis.

We show that small family size (which, with some caveats discussed in what follows, could be indicative of the prevalence of nuclear families) has been positively correlated with voting for political forces supporting liberal values (the constitutional democrats (*Kadet*)) in 1917. At the same time, parts of Russia, which were historically characterized by stronger family nuclearity, exhibited stronger pro-liberal voting (for Grigoriy Yavlinskiy) in 1996 and 2000 and weaker support of the Communist Party of the Russian Federation. The finding is important for three reasons. First, it uncovers an important (and historically robust) cause of pro-liberal political attitudes and voting. Second, as we will show in what follows, theoretical predictions of the effect

[14] On top of that, it would be necessary to study the specific mechanisms explaining the persistence of legacy effects. This is also an extremely difficult task, which remains beyond the scope of this paper.

[15] Subnational data reduce the impact of unobserved heterogeneity, improving the quality of our analysis (Pepinsky 2019).

of family size on political values and behavior are contradictory. Our study provides evidence for the former conjecture. Third, it offers a study of the contemporary and the legacy effect in a single setting.

5.2 Historical family structures and voting outcomes

In the research on historical legacies, family appears to be important both as a *cause* of societal outcomes and as a *mechanism of value transmission and persistence.* On the one hand, as personal values are acquired during the formative years and foremost at an early age (Grolnik et al. 1997; Inglehart 2008; Min et al. 2012), family is an essential socialization channel during childhood. Within the family occurs the transmission of values from older generations to younger ones, providing cultural continuity (for political values, see Davies 1965, Dowse and Hughes 1971, Jennings et al. 2009, Necker and Voskort 2014). On the other hand, the characteristics of the family as such (its organization, size, power hierarchy or intergenerational relations) can trigger a multitude of societal outcomes (Duranton et al. 2009; Alesina and Giuliano 2010, 2011, 2014; Dilli et al. 2013; Alesina et al. 2015; Dilli 2016; Pleit et al. 2016; Galasso and Profeta 2018; Lipset and Lenz 2000; Huning and Wahl 2021). Our paper focuses on the second aspect of the societal role of the family (predictor of social and political characteristics).

One of the basic characteristics of family structures historically emerging in various societies is the difference between nuclear and extended families. A nuclear family consists only of a married couple and their children while an extended family may include either several generations or lateral relatives. In some societies the nuclear family has become historically prevalent while in others the extended family has been the norm.[16] In our paper, we focus on the historical legacies of nuclear vs. extended families and their impact on political outcomes. We concentrate in particular on how family structure influences the prevalence of values of *economic liberalism* (defined as support of market economy, private property, free enterprise and rejection of encompassing governmental redistributions, see Helleiner 2003) in the society.

Before we proceed to the discussion of the relevant literature, several caveats have to be made. To start with, as already mentioned in the introduction, one needs to distinguish between the effects of the *historical* family structure and of the *contemporary* family structure. In the first

[16] Throughout the paper, we refer to the spread of nuclear (or extended) families to characterize the forms of cohabitation typical for the society – either situation when only members of a nuclear family live together or when a broader extended family occupies a single dwelling.

case, the explanatory variable in the analysis is the family structure as it existed at certain point of time *in the past*. The temporally persistent characteristic is the *consequence of the family structure* (e.g., values) and not *family structure itself.* The mechanisms explaining the persistence of these consequences once the original cause is gone (e.g., the characteristics of family have changed) could be numerous (we review them in what follows). In the second case, if certain societal characteristics do not change over the course of history, they persist *because* of the family structure persist. If prevalent family structure were to change, so would the social outcome. Empirically, the research confirms both – persistence of family structure over time at least in some social settings (Fussell and Palloni 2004) and change of family structure as a consequence of general societal and demographic transitions in other settings (Reher 1998). The history of change of family structures is by itself a very contested topic (Smith 1993).

Furthermore, while the distinction between societies with high family nuclearity and with prevalence of extended families is frequently made in many studies, it is still a certain simplification. Families undergo a life cycle and thus the same family can be either extended or nuclear over the course of its evolution (Berkner 1972, 1977; Goody 1983). In many parts of the Imperial Russia, for example, families were divided upon death of the father and each son inherited his share of the parental farm. Therefore, relatively young married sons tended to live with their parents forming extended families. When the old family head died his mature sons became heads of their own (at that stage nuclear) families. In the next cycle when their children grew up the families became multiple again. Married men lived on parental farm approximately till the age of 40, then they established their own nuclear families and usually after age of 60 their families contained several generations (Mironov 2016; 2018).[17] We will discuss how this issue affects our analysis in what follows.

Individualism and modernization

In what follows, we review the literature in order to derive the hypotheses for our study. To start with, an argument frequently made in the literature is that nuclear families promote **individualistic**

[17] This fluidity of family structure was very much acknowledged in the scientific and the political debates in Russia in the early 20th century: Chayanov's famous model of the peasant economy used an autarkic family as a core unit, acknowledging that the structure of this family (and thus its needs and the cooperation with other families) will change over time (see Tschajanow 1923).

values (including greater reliance on one's own effort and smaller willingness to share), which in turn strengthen the values of economic liberalism (Gorodnichenko and Roland 2011). Individualism within a nuclear family emerges because of two mechanisms.

The first mechanism is based on the interplay between the **relative role of the family** (as opposed to other channels) in providing access to resources and the **type of behavior** optimal within a family (and especially extended family) to get access to these resources. Max Weber (1978) highlighted that the basic rule underlying family life sounds the same as a basic postulate of Communism: 'Everybody contributes what he can and takes what he needs.' He viewed families as small redistributive units in which people with fewer resources, for example children, contribute less but get as much as they need. All types of families function according to this rule where more effort does not result in a larger return. This runs contrary to the individualistic ideal that one's benefits depend on one's effort and one is ultimately responsible for her own success or demise. In extended families, this 'unfairness' is even more salient as according to seniority rule, older generations may get even more than they need while younger generations may contribute less than they can, compensating for their limited efforts through their loyalty to the family head.

Psychological studies find that people raised in an extended family are more likely to value "responsibility above individual achievement, conformity above self-expression, cooperation and obedience above individualism" (Rosen 1961). Larger family size is associated with more authoritarian relations within the family and parenting styles based on physical punishment, ridicule and shouting rather than verbal reasoning and a system of positive rewards (Elder and Bowerman 1963). Children socialized in a nuclear family are more inclined towards individualistic behavior understood as the ability to set one's own goals and to choose which social groups to join in view of personal interests (Triandis et al. 1990). For the Russian pre-revolutionary case, Mironov (2018) shows that peasants families were strictly hierarchical, with family head having unrestricted power over all the family members, women expected to obey men and younger generations to obey older ones. According to Mironov (2018) in extended and multiple families the power hierarchy was even stronger given the necessity to avoid family divisions that threatened family wealth and were counter the interests of the village authorities and the landlords. Therefore, in larger families, children were raised in even more authoritarian atmosphere and had to bey a

larger number of adults, i.e. not only to their parents but to all their adult relatives presented in the family.[18]

Thus, the rules of interaction within extended family suppress individualist values. At the same time, the crucial difference between areas dominated by extended and nuclear families is that in the former case, most people's needs are satisfied within the family. An extended family is an almost self-sufficient cell with enough agricultural workers to ensure food security for all family members and that can provide child and elderly care. A prevalence of extended families slows the development of other societal institutions (Greif 2006), leading the family to become not only the primary but also the sole socialization unit. Therefore, in areas dominated by extended families, values developed in the family including collectivism and preferences for redistribution could become culturally dominant.

The second mechanism is more complex and assumes that the link between the spread of the nuclear families and the prevalence of economic liberal values runs through **modernization** as a mediating variable. The relation between family nuclearity and modernization is not unambiguous (Szołtysek et al. 2011). There is, however, a large literature, which suggests that greater spread of nuclear family type could affect wealth accumulation and patterns of production in the society, which would support modernization.[19] Hajnal (1965, 1982), in particular, suggested that European marriage patterns characterized by an advanced age at first marriage and high celibacy rates in combination with neolocality and life cycle servants led to economic growth. Delayed marriage, according to Hajnal, allowed men and women to amass savings before they formed a new family, resulting in wealth accumulation. Relying on family characteristics proposed by LePlay (1871), such as inheritance type and family complexity, Todd (1990) has shown that the nuclear family structure and impartible inheritance can be associated with the earlier onset and accelerated development of the Industrial Revolution and thus with economic development.

[18] At the same time, there were also factors contributing to the de-patriarchization of the family, e.g., short life span, leading to many parents dying early enough not to be present at the wedding of their late children.

[19] On top of that, the spread of the nuclear family form stimulated social trust and horizontal tie formation (Cole and Wolf 1974), which are indispensable to modernization (Knack and Keefer 1997). In a recent study, Schulz et al. (2019) show that the emancipation of the nuclear family from extended kin provoked by the Western Church gave rise to the specific psychological characteristics of modern Western industrialized societies and populations.

Similar results were obtained by Duranton et al. (2009) and Greif (2006), who suggest a positive correlation between family nuclearity and wealth.[20]

As long as this line of reasoning holds, another way of how nuclear family could turn out to be beneficial for economic liberal values would emerge. Inglehart and Welzel (2005) emphasize that modernization entails a deep cultural change leading to the greater emancipation of an individual from the state and collective and to the spread of rationalism and individualism. Santos et al. (2017) empirically document that the modern world has become more individualistic over time. By supporting modernization, nuclear family would therefore encourage this value change and, as a result, strengthen individualism and thus economic liberalism.

Extended family and aversion to governmental redistribution

While in the previous sub-section we suggested that nuclear families could strengthen liberal economic attitudes, there are (hypothetically) two other mechanisms, which would make extended families more conducive for some aspects of economic liberalism – specifically, rejection of large-scale state-led redistribution.[21]

First, extended families establish themselves as **alternative centers of power,** regulating the internal behavior of their members and resisting government's attempts to intervene into their functioning (for example, through redistributive programs). Thus, Todorova (1989) and Brunnbauer (2003) links the spread of extended families to the weakness of the state, with extended families providing protection in a lawless environment. Kaser (2001) suggests that extended families were important in environments where other social regulators (like the church)

[20] Again, as noticed, multiple papers come to the opposite conclusion though and suggest that extended family was instrumental for the proto-industrialization being an important source of the labor force and facilitating survival in the harsh conditions of early industrial period. Medick (1976) makes this conclusion observing the work of the proto-industrial artisans (he also emphasizes the role of child laborers in this context). Hareven (1975, 1982), studying American textile production of the 19th and early 20th centuries, similarly concludes that extended kin and children were important in the labor force acquisition during the industrialization period. Other studies arguing along these lines include Anderson (1971), Ruggles (1987) and King and Timmins (2001).

[21] At the same time, the arguments of this sub-section do not apply to other aspects of economic liberalism, especially the preference for economic freedom.

were weak. Under these conditions, extended family refuses to accept governmental authority in the areas traditionally regulated within the family structure (Boege et al. 2009), which would lead to rejection of political projects based on highly active interventionist state.

Theoretically, second, **utilitarian approach** suggests that extended family reduces the interest in state-sponsored redistribution for another reason. Nuclear families, as argued above, have limited resources and are unable to implement extensive redistribution within the kin group. From this perspective, a strong interventionist state could provide an alternative ensuring nuclear families from possible risks. Indeed, in countries with strong family ties, the kin group assumes responsibility for elderly care while in countries with weak family ties, this function is accomplished by societal institutions (Reher 1998). Additionally, long-term care insurance plays a lesser role in countries with strong family ties where the family takes on this role (Costa and Font 2010). Moor et al. (2013) show that family ties are more important for the well-being of elderly people in countries without an advanced welfare state.

This second argument, however, is not universal if one considers the role of the state over the course of history. For our paper, we mention it for the sake of completeness. In the early 20th century, the state-run social welfare systems were in their infancy, and most Russians had hardly any experience with them. Therefore, it is very unlikely that a typical voter of the Constituent Assembly election, if she was a member of a nuclear family, expected the government to provide social benefits to overcome the typical weaknesses of this family form. At the same time, for many Russians of that period, potentially, an interventionist state encroaching onto what they perceived to be a traditional area of authority of the family, was unacceptable. This could have made them more skeptical of political forces promising large-scale reorganization of social life through governmental policy.

Left-wing authoritarianism and extended family

The discussion above seems to have implications not only for the attitudes towards economic liberal values but also towards authoritarian left-wing projects – particularly those based on Communist ideology, which (in various varieties) played an important role in Russian discourses in 1917 and in the 1990s (on legacies of the left-wing authoritarianism in general see Pop-Eleches and Tucker 2020). Communist ideology is, strictly speaking, not incompatible with individualism and modern values. Paterskaya (2010) suggests that in the 1970s Communist Party in the USSR became an agent of promotion of individualistic values. At the same time, there exists a large

literature that, while treating Communism as an ideology of modernism, also claims that it represented a very different type of 'modernity' – based explicitly on the rejection of individualism (Kotkin 1997; see also Krylova 2014). From this point of view, there exists an debate about Communism in the sociological 'multiple modernities' literature – with some considering Communism as distinct type of modernity (different from the Western capitalism), other treating it as rejection of modern values (Arnason 2017; David-Fox 2006).

An interesting argument linking family structure with the development of the Communist ideology is provided by Todd (1985). He claims that while absolute nuclear family when children could be disinherited by the fathers will produced liberal political doctrine in England, stem family, implying only one inheriting son, led to authoritarian, inegalitarian doctrines. For him, the main values of the French revolution – liberty and equality – are rooted in egalitarian nuclear family that resulted from the parental farm division between all the male heirs. Communist doctrine, according to Todd, rests on exogamous multiple (multigenerational) families that prevailed in Russia as well as in many other East European countries, in Eastern societies, e.g. China and in the Latin America, e.g. Cuba (the 'communitarian family', see also Szołtysek and Poniat 2018). First, multiple families imply equality as all the male offspring inherit equal shares of land. Second, they rely on authoritarianism given that all the family members should obey to the family head. Third, exogamy triggers creation of impersonal bureaucratic rules of cooperation between the family members. By definition in an exogamous family spouses are two strangers who had different socialization during their childhood. Such a situation may potentially lead to conflicts which become even more plausible in multiple families consisting of several marital couples under one roof. Therefore, exogamy creates demand for extensive impersonal rules regulating people's behavior. All the three ingredients of the exogamous multiple family i.e. equality, authoritarianism and bureaucracy are conducive to the establishment of the Communist doctrine.[22]

Communism philosophy from the very beginning assumed abolition of family. According to Friedrich Engels (1933) family as a constraining institution is needed to have a limited number of heirs to pass property. Abolition of property leaves less meaning for 'bourgeois' family that could be substituted by free love and equal status of women. This should negatively resonate with the values prevalent in extended families.

[22] Gutmann and Voigt (2022), however, in an empirical test, provide only partial support to Todd's argument.

To some up, the anti-individualist nature of values developing in an extended family should make acceptance of Communist ideology easier.[23] But at the same time, interventionist nature of Communist ideology (and, to some extent, other left-wing authoritarian ideologies) encroaching onto the traditional boundaries of the family could have made this ideology particularly problematic for the extended family members.

Hypotheses

Based on the previous discussion, it is possible to formulate two main hypotheses we are going to explore in the subsequent analysis. Essentially, our discussion so far has shown that family structure (extended vs. nuclear family) could have contributed to greater or smaller support of economic liberalism through a variety of mechanisms associated with formation of different types of values. On the one hand, individualism associated with nuclear families could have resonated with economic liberal ideologies (with caveats provided above). Hence,

H1: Family size is negatively associated with liberal voting and positively associated with voting for left-wing authoritarian parties.

At the same time, the role of extended family as an alternative center of power to the state protecting its boundaries from the governmental intervention leads to the opposite hypothesis:

H2: Family size is positively associated with liberal voting and negatively associated with voting for left-wing authoritarian parties.[24]

[23] This idea resonates with the argument made by the Russian *narodniki* – predecessors of the non-Marxist party of socialist revolutionaries, which showed particularly strong performance in the Constituent Assembly elections. For *narodniki*, the local community of peasants – *obshchina* – was a nucleus of the future socialist order due to its distinct anti-individualist structure. Interestingly, the principles of redistribution of land in *obshchina* – according to the number of family members – favored the extended families.

[24] Our analysis focuses on testing these hypotheses and not the mechanisms themselves.

5.3 Persistence of effects of family structures

The arguments presented above concentrate on the contemporary effects of family structures. As mentioned, there are also reasons to argue that even if the prevalent family structure changes, the effect of historical family structure would persist long after that. Family structure affects voting behavior by producing a certain set of values and attitudes – perceptions of certain type of behavior as legitimate and acceptable. This type of perception often survives even after the preconditions for the emergence of values disappear. Children of migrants in the second or even third generations, for example, are shown to reproduce values, which emerged in the country of their origin (Rosenthal and Feldman1992; Algan and Cahuc 2010; Alesina et al. 2013; Simpser 2020). This is because parents are typically convinced by the belief about the superiority of the values they themselves were socialized in and attempt to transmit these values to their children, regardless of the changing external environment (Necker and Voskort 2014). On top of that, the legitimation of certain values, even if they emerged because of a particular family structure, rarely explicitly refers to this family structure: agents claim to follow these values because of ethical or religious grounds (and may even fail to realize the link to conditions, which produced the values). These ethical or religious legitimacy can obtain a life of its own even after the prevalent type of family changes. Values can even become a core element of one's identity, and thus their persistence is aspired by agents for reasons unrelated to the original factors driving their emergence (Greif and Tadelis 2010). Finally, at least in the Russian case, the convergence of prevalent family structures across regions, if at all, most likely occurred over the course of the most recent generations, and was associated with giant changes experienced by the societies primarily the last century (demographic and epidemiological transitions, rapid economic progress). The period of existence of preceding family structures was much longer, ensuring the robustness of values associated with them.

5.4 Empirical design

The Russian case

Before the revolution of 1905, while there were elections of representative bodies within the estate structure of the Russian Empire (e.g., gentry assemblies, corporations of merchants of individual cities, and peasants' *obshchina*), no nation-wide parliamentary institutions based on

free and fair elections existed.[25] The revolution led to the establishment of the State Duma as the national parliament; however, elections to the Duma were based on a class system assigning different numbers of representatives to different social groups; the government repeatedly disbanded the Duma when electoral outcomes did not favor it. In February 1917, the last emperor was deposed, and the Duma formed the Provisional Government, which pledged to organize elections to the Constituent Assembly to determine the new political constitution of the Russian state. In October 1917, the Bolsheviks took over; nevertheless, in November 1917, elections to the Assembly took place. The extent of franchise was unprecedented not only for Russia but also for most other countries at that point in time: all citizens above the age of 20 (including women) were allowed to vote. In spite of defunct communication networks and administrative problems caused by World War 1 and the revolution, elections took place and were characterized by extremely high turnout rates and competition between multiple political forces (the body responsible for organizing elections was outside of Bolsheviks' control) (Radkey 1989; Pipes 2011). Ultimately, the Bolsheviks failed to obtain the majority of votes, securing only 180 mandates of 767. As mentioned, after one day of work, the Assembly was disbanded. In the years to come, the Bolsheviks seized control of Russian politics, allowing no free and competitive elections in the country.

The situation started to change only with the onset of the Perestroika in the 1980s. In 1989, the first competitive elections to the Congress of People's Deputies took place; in 1991, Boris Yeltsin was elected as president after won against five other candidates. Elections in Russia remained competitive throughout the 1990s, though already during this period suspicions of electoral manipulation and fraud occasionally emerged in some regions (Moser and Allison 2017). In 2000, Vladimir Putin was elected president, which marked the onset of authoritarian consolidation in Russia; as a result, from the mid-2010s, Russian elections have been systematically manipulated in terms of restricting the access of opposition candidates and outright electoral fraud. The extent of fraud committed at Russian presidential and parliamentary elections has been investigated in a large body of literature (Enikolopov et al. 2013; Bader and van Ham 2015; Buzun et al. 2016; Harvey 2016; Skovoroda and Lankina 2017; Lankina and Skovoroda 2017). However, the elections of the 1990s, while not entirely free from external influences (e.g., of regional governors, occasionally heavily affecting elections in their regions), can be used to

[25] With the exception of territories with special governance status such as Finland.

make an approximation of the political preferences of Russians and can be treated as relatively free. Given data availability issues (at the level of aggregation we need, i.e., *rayony*), we specifically focus on the 1996 and 2000 presidential elections.

Both the Constituent Assembly elections of 1917 and presidential elections of 1996 and 2000 were characterized by the presence of strong left-wing candidates partly embracing the authoritarian transformation of politics and of society. In 1917, the majority of votes were received by parties belonging to the group of Socialist-Revolutionaries (*Eser*) or by Social Democrats (including Bolsheviks). While there were substantial differences in ideologies across these parties, they all advocated various forms of redistribution and rejected the notion of free markets and liberal democracy. A party most consistently associated with liberal values was the Constitutional Democrats (*Kadet*) (Rosenberg 1974). The Kadet party was established in 1905 and was officially prohibited soon after the revolution (but was still able to participate in elections). The party's original agenda was focused on developing parliamentary institutions within the framework of a constitutional monarchy; after the revolution of February 1917, the party embraced republican principles. The Kadet program included a call for an independent judiciary, government accountability towards the parliament, freedom of speech and religion. Kadets embraced the principles of the economic liberalism; their program called for the abolishment the estate structure and the protection of private property; but it also included a set of social rights (the legalization of strikes and gradual introduction of the eight-hour workday). Essentially, the Kadet party supported the slow and evolutionary path of liberalization of the Russian state, which made it strikingly different from the left-wing parties and especially the Bolsheviks with a much stronger focus on equality and redistribution and on the revolutionary transformation of society.

In the 1990s, the political spectrum of Russian politics was characterized by high levels of fragmentation. In our analysis, we focus on two candidates who fit our hypotheses relatively well: Grigoriy Yavlinskiy and Gennadiy Zyuganov (although we also study other candidates, as it is discussed in what follows). Yavlinskiy (as head of his Yabloko party) can be seen as the most consistent representative of the liberal political tradition in Russia at that point of time, being in strict opposition to both left- and right-wing extreme parties and to Boris Yeltsin (whom he accused of authoritarian tendencies and of ignoring the social needs of the population during the reforms). Yavlinskiy emphasized a program based on market reforms and the protection of civil liberties and social rights. Similar to the Kadets, Yavlinskiy's electoral support clustered in urban regions among well-educated groups of society (Hale 2004; White 2006). Zyuganov since 1993

has been chair of the Central Committee of the Communist Party of the Russian Federation (CPRF). The CPRF is firmly established at the left flank of Russian politics, pointing out its links to the Communist Party of the Soviet Union;[26] its ideology, while also eclectic to some extent, emphasizes issues of equality and redistribution, shows skepticism towards free markets, and glorifies the Soviet past (Hashim 1999). In the 1990s, the CPRF belonged to the strongest political forces in Russia with Zyuganov being a real challenge to Yeltsin during the presidential elections of 1996. Both Yavlinskiy and Zyuganov ran for president in 1996 and 2000 without substantial changes in their political platforms.

Thus, the goal of our study is to link the traditional family characteristics found in individual parts of Russia to the voting patterns of 1917 and 1996/2000. H1 would suggest that smaller historical family sizes should be positively associated with voting for Yavlinskiy and the Kadets and negatively associated with voting for Zyuganov.[27] H2 conversely suggests that territories with large historical family sizes should be negatively associated with voting for Zyuganov and positively associated with voting for the Kadets and Yavlinskiy. For the 1917 elections, we would observe the *contemporary effect* of the family structure. In 1996/2000, we would observe the *legacy effect*.

As a caveat, we most certainly do not treat the 1917 and the 1996/2000 electoral situations as identical. In 1917, elections didn't happen in the shadow of the Communist authoritarian experiment, which played an important role in the public debates in the 1990s. While in both cases Russians had very limited experience with free elections and democracy, it was smaller in 1917 (when many Russians voted for the first time) than in 1996. The composition of the Russian society was also different. However, and this is essential for our study, the fundamental feature of both elections was the presence of parties and candidates, which supported or rejected massive state-sponsored redistribution and interventions in the private economy – our goal is to understand how the legacy of nuclear families affected the support towards these political forces.

[26] It is, for example, a member of the SKP-KPSS, which is a union of Communist parties of the former Soviet Union that treats itself as a continuation of the CPSU.

[27] We do not look at 'left-wing' voting in 1917, since the elections featured numerous Socialist-Revolutionary and Social-Democrats groups, often competing with each other. It is therefore unclear how we would aggregate the respective vote shares.

Mean family size

Our key explanatory variable is extracted from the census of 1897, the first to be implemented in the Russian Empire and collecting detailed information on various social, economic and cultural characteristics of the population. The detailed records of the census therefore serve as an invaluable source for understanding the economic and social dynamics of the Russian Empire of the prerevolutionary era. The census data are available at the *district (uezd)* level.[28] Clem (1986) provides a detailed overview of the census data for Russia and the Soviet Union and treats the census of 1897 as a highly useful dataset for research, partly providing even more detailed data than subsequent Soviet censuses. At the same time, he also mentions problems of the census, in particular, incorrect reports of the age,[29] which is why he advises to use age groups rather than data on individual age (the practice we fully follow in this paper). Schwartz (1986) also mentions that problems like shortage of trained personnel could have affected the quality of the census data. Still, renowned intellectuals of that era (including Semenov-Tyan-Shanskiy, Chekhov and Tolstoy) participated in the census. In general, given the overall quality of bureaucracy and of human capital in the Russian Empire of that period, census is, without a doubt, a unique source of information, which has already been used as the main source of data for persistence studies (Lankina and Libman 2021; Lankina 2021).

The major enumeration unit in the Russian Empire was a household (*dvor*), consisting of all individuals co-habituating in a single house or (in cities) flat (this was also the basic enumeration unit in the census, unlike the subsequent Soviet censuses, where the basic enumeration unit was the family, see Anderson 1986). *Dvor* includes both blood relatives and other individuals (e.g., servants, apprentices etc.) living together with them. Luckily for us, the census provides (for each district) the information on the average number of individuals living in a *dvor* and the average number of blood relatives living together in a *dvor.* For our analysis, we

[28] The Empire consisted of a number of *gubernii (oblast),* which were subdivided into districts. A district typically included an urban settlement and a number of surrounding villages.

[29] This is not surprising given the major deficits in numeracy and still traditional way of life of many people in the country, especially peasants. On the age heaping in early modern Russia of the 17th century see Kaiser and Engel (1993). A'Hearn et al. (2006) show that age heaping was substantial for people born in the early 19th century but the situation improved for those born in 1860s.

use the second variable, which we will in what follows refer to as '*mean family size'* (MFS). MFS is thus defined (in line with the definition of the census) as *the district average number of blood relatives cohabitating within a single household.*

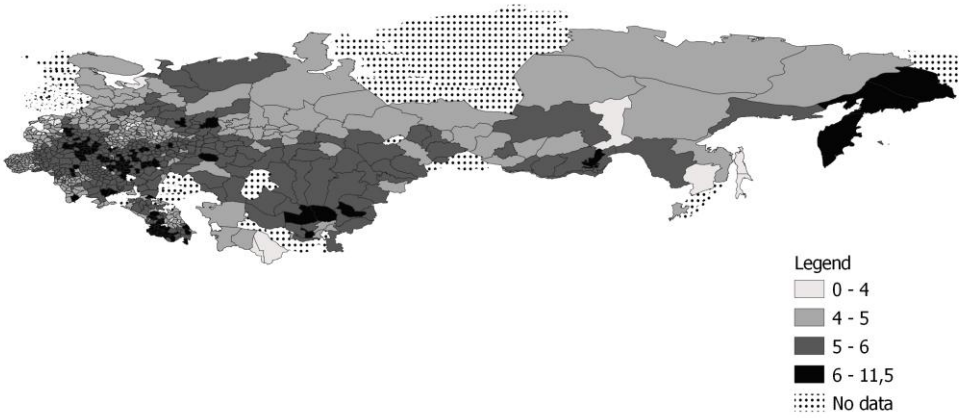


Figure 5-1: Distribution of MFS across the territory of Russia

Figure 5-1 provides the map of the distribution of the historical MFS over the territory of the Empire. Families consisting of 5 and less persons were observed mostly in the Northern part of Russia and in central region. Families containing 5 and more persons that are likely to be extended or multiple families were located in the Southern part of the Russian Empire, in the black earth regions and in the Far East (note that in the subsequent analysis we control for dummies for groups of regions to isolate the effect of MFS from other characteristics of the regions' groups). The average family in 1897 consisted of 5.18 people; in some districts, it was as large as 17 people.

Should we treat this variation as one between regions with more widespread extended and nuclear families? Czap (1983) and Hoch (1986) argue that extended families have been dominant throughout the Russian Empire, but base their conclusions from the data from two villages located in the black earth region of Russia. Todd (1990) similarly treats the entire Russia as a country with

predominantly extended families, but his data attracted a lot of criticism from historians, anthropologists, and sociologists alike for his far-reaching generalizations and claims (Rijpma and Carmichael 2016).[30] Mironov's (2018) analysis of the family structure in the Russian empire is more sophisticated. Though he generally agrees that extended and multiple families were predominant, he shows that there is still heterogeneity among the Russian regions. Mironov notes an especially large variation between agricultural and industrial regions by the end of the 19th century (Mironov 2018: 681-682). Dennison (2003) also points to the evidence that family structure in the Russian Empire was far from being uniform. She assigns differences in family structure to the different regulations imposed by the landlords. From this point of view, we can expect some level of variation in terms of family nuclearity to have existed in the Imperial Russia, and we leverage this variation for our investigation.

We have already mentioned that the MFS as a proxy for family nuclearity could be problematic on several accounts. One is the fluid nature of the family, changing from nuclear to extended over the course of its life cycle. We acknowledge this complexity as a limitation of our analysis, but also suggest a way of dealing with at least some of the biases it could produce. Given the logic of the evolution of the family presented above, the family size and nuclearity in a region is likely to be endogenous to the mean age of men – determining how frequent particular types of families should be in a region. We deal with this problem by controlling for the share of men aged 40-59 years in our analysis (it is a possible proxy for the share of nuclear families emerging at a particular stage of evolution of family development in line with the logic presented above), and demonstrate that this control does not affect our results (*Appendix CH5-E*, *Table CH5-E3*).

Another problem is that larger MFS is not necessarily indicative of more widespread co-habitation of near relatives (i.e., what we would define as extended family); it can be driven by higher fertility, leading to a larger number of children in a family (see discussion in Laslett 1972; Burch 1967; Burch and Gendell 1970; King and Preston 1990). Ideally, we would need information on the individual family members and their status (spouses, children, blood relatives etc.). This information was indeed collected when the census took place; however, for almost all regions of Russia, it was lost during the turbulent 20th century. Still, we conduct a number of tentative tests, which suggest that the MFS is at least a good proxy for the proliferation of extended

[30] His data are less reliable especially for the regions outside of the Western Europe, e.g. Todd was criticized for lumping much of Africa together into one system classification.

families (see *Appendix CH5-C*). *Appendix CH5-D* discusses application of a different explanatory variable (marital unit per household, MUH) for our analysis – we look at the possible advantages and the disadvantages of this proxy and, nevertheless, show that applying this indicator we come to the same conclusions than using MFS. In the *Appendix CH5-E* (*Table CH5-E7*) we report regressions controlling for the share of females in the marital age (20-30 years) in the district, and similarly confirm results. *Appendix CH5-G* looks at an alternative proxy for the spread of individualism derived from family statistics (number of household divisions).

Still, even with these additional tests, we acknowledge that the literature we refer to for constructing our theoretical argument in many cases uses more sophisticated and nuanced proxies of the family nuclearity and, generally speaking, more nuanced approach to family characteristics than we do. For example, Alesina and Giuliano (2014) demonstrate that strong family ties are associated with lower demand for governmental labor market regulations (since actors are more used to solving all problems within the family ties). This argument fits our H2; however, they extract information on the strength of family ties from the World Value Survey, which contains questions explicitly covering the individuals' attitudes towards the family. Strong family ties with the associated consequences (like the 'amoral familism', see Banfield 1967) could also hypothetically exist in a society with predominantly nuclear families. Still, Alesina and Giuliano show that there is a strong correlation between the survey items measuring family ties and dominance of extended families. Unfortunately, there are hardly any other proxies of the family characteristics, which are available for the period of our study (late 19th century – early 20th century) with sufficient degree of spatial disaggregation; in fact, already the analysis of this paper focusing on districts (rather than *gubernii*) is innovative as opposed to the absolute majority of the studies.[31]

Construction of the dataset

Our analysis then proceeds as follows. For the 1917 elections, we match individual electoral districts with the *uezdy* of the Empire. We use Protasov's (2014) data to compute the share of votes the Kadet party received in an electoral district and regress it on the MFS and a number of further

[31] There is a handful of very recent studies of historical legacies looking at *uezd*-level data, for instance Buggle and Nafziger (2021), Lankina (2021) and Lankina and Libman (2021). Almost all studies work with *guberni*-level data.

controls presented below. Our data cover all regions of the Russian Empire[32] where elections took place[33] and for which their outcomes are available (i.e., not only the territories of modern Russia but also those of other modern post-Soviet states), though we remove individual electoral districts of Central Asia from our analysis given their striking cultural dissimilarities from the rest of the Empire and numerous lacunae in election data in this part of the Empire. The European part of the Empire, parts of Siberia, the Baltic provinces and the Caucasian region, where the elections took place, included 470 *uezdy*.

For the 1996 and 2000 elections, performing our analysis is substantially more difficult, because the territorial boundaries of the Russian regions changed considerably since the census of 1897. In the 1990s, Russia consisted of 89 regions (*republic, krai, oblast,* etc.) subdivided into a number of *rayony.* Fundamentally, one can still find analogues between the old and new territorial units: *gubernii* correspond to regions, and *uezdy* correspond to *rayony.* However, there are over 2,000 *rayony* in Russia. To match the territories of historical and modern territorial units, we use the dataset generated by Andrey Medvedev (NRU HSE) generously provided to us to perform our analysis. This approach is implemented as follows: a map of the Russian Empire was divided into a grid of squares of 5 x 5 km in size. Each square was attributed to a particular *uezd*. Then, a map of the modern Russian Federation was superimposed onto it. Thus, for each modern *rayon,* one was able to see how many squares of the grid belonged to a particular historical *uezdy*. We then computed the historical MFS in a *rayon* as the weighted average of the historical MFS of the *uezd* the territory of the *rayon* (partially) covers with the share of grid squares of the *rayon* belonging to the historical *uezd* as weights.[34] Then, we estimated a regression of voting outcomes in 1996/2000 on the MFS of 1897.

[32] By the end of 1917, the Provisional Government had already proclaimed it a republic, but there was no established term for the new state; we refer to the 'Russian Empire' for convenience.

[33] The elections did not take place in some regions (particularly in Poland, which was under German control, in Finland, which had declared independence, and in most of Central Asia).

[34] Thus, if a hypothetical rayon consisted of seven 5 x 5 km squares, of which 3 belonged to uezd A and 4 belonged to uezd B in the past, the historical MFS for this rayon was computed as 3/7 x MFS in uezd A + 4/7 x MFS in uezd B.

More specifically, we use two approaches. First, we regress voting outcomes for 1996 and 2000 on the historical MFS using two separate regressions (one for each election). Second, we pool data for both elections and estimate regressions including time fixed effects (dummy for 2000 elections).[35] The advantage of the pooled data is larger number of degrees of freedom; yet at the same time, voting behavior in 1996 and 2000 could be characterized by time-specific features, which are better captured if we estimate the regressions separately. The analysis for 1996 and 2000 covers only the territory of the current Russian Federation, i.e., it does not include territories of the Empire, which now belong to other post-Soviet states. We exclude the territories of the present-day Kaliningrad Oblast and Tyva Republic, since they did not belong to the Russian Empire prior to the revolution, and no information on the historical family structures of these territories can be extracted from the Imperial census.[36]

Control variables

In the regressions for 1917, we control for a number of additional confounders (given data availability for this period).

- First, Russian regions differed considerably in terms of economic well-being and development level, and it is possible that these differences reflected themselves in voting patterns and MFS.[37] Income data at the *uezd* level are not available; therefore, we extract the wealth of the *uezd* through a principal component analysis of two variables: *share of the urban population* and the *share employed in the industrial sector*, both serving as indicators of modernization and accelerated development in the 1890s. Thus, this variable also captures the extent to which urbanization prevailed in certain districts by late 19th century. We acknowledge that this variable is merely a proxy rather than a direct indicator of wealth.

[35] Note that rayon fixed effect models cannot be used because the historical MFS does not change for the same rayon in 1996 and 2000.

[36] In Kaliningrad with almost 100% population replacement after World War 2, any information on historical family structure would be useless regardless.

[37] Economic development often triggers a decline in family size due to lower fertility and greater autonomy among women (Lesthaeghe 2010); at the same time, it can also strengthen liberal voting.

- Second, we control for the share of agricultural employment in the *uezd*, which could be associated with voting for the Eser parties (representing the interests of the peasants) and at the same time be linked to larger MFS (reflecting needs of agricultural production at the technological level predominant in Russia in that period).[38]
- Third, we control for the number of children aged 0-4 years per woman aged 15-44 years. We have already mentioned that fertility rates can affect the MFS (and furthermore make it more difficult to infer the nuclearity of the family from the MFS proxy). Furthermore, fertility affects political attitudes (Fieder and Huber 2018). By introducing this control, we want to differentiate between regions where families have different size not because of different birth rates but because of different social norms making multiple generations co-habitate in a single family or leave this family at a certain period of their lives.
- Finally, we include dummies for major geographic areas of the Empire: the Siberian regions, Volga regions, Northwestern regions and Caucasus regions with central Russia serving as a default group. These dummies ought to capture the heterogeneity of cultures and environmental conditions, influencing both voting preferences and MFS.

In addition to these main variables, we also estimate two specifications we further controls as a robustness check:[39]

- First, we control for shares of key non-Orthodox confessions (Old Believers, Muslim, Jews, Armenian Grigorians, Catholic and Protestants) as reported by the census of 1897. For prerevolutionary Russia, religion is a better marker of differences in identity than ethnicity (given that nation-building processes in many parts of the Empire were in still relatively early stages). Religious identities can affect both MFS and political attitudes.
- Second, we control for three geographic characteristics: elevation from sea level and dummies for *uezdy* located less than 50 kilometers from the nearest large river and and from the sea.

[38] Certainly, if the share of agricultural employment in the regions does down, the share of industrial employment typically goes up, so that two variables in our regressions can be collinear (although the fact that we use the principal component analysis of two variables to construct our wealth proxy prevents perfect collinearity). In the *Appendix CH5-E* we replicate our regressions controlling for only one of these variables; the results remain unchanged (see *Table CH5-E8*).

[39] The results are reported in the *Appendix CH5-E* (*Tables CH5-E4, CH5-E5 and CH5-E6*).

These dummies serve as a proxy for the historical attractiveness of a location for commerce and industry, which could have affected the formation of population norms and values. They also capture the access to international trade and extent of contacts with foreigners, influencing the development of social norms.

For the modern Russia we estimate several regressions with varying sets of control variables:

- First, our baseline regression contains the same variables as the baseline historical regression, with only one exception: we replace the dummies for macroregions of the Russian Empire with the dummies for federal districts of modern Russia to capture spatial heterogeneity present in modern Russian politics and society more precisely.[40] We also add a dummy for all districts belonging to the ethnic republics and to other ethnic regions of Russia.[41] These regions have been shown to be characterized by electoral behavior significantly different from the rest of Russia (White 2015; White and Saikkonen 2017) and are likely to differ from the rest of Russia in terms of transmission of historical legacies due to cultural specificity.[42]
- Second, we estimate a specification, which also includes the historical geographical and religious characteristics of territories mentioned above.
- Third, in a further specification, we add to the set of controls the prevalent modern family characteristics within the districts, extracted from the Database of Indicators for Municipal Units (2010, 2012), provided by the Russian official statistics (Rosstat): average number of

[40] Federal districts are large groups of regions originally established by Putin in 2000. They have to be distinguished from districts (rayony), which are sub-divisions of regions and main unit of our analysis.

[41] Russian federalism includes both the so-called ethnic regions (republics, autonomous okrug and oblast) where a specific ethnic group – *titul'naya natsional'nost'* – enjoys special rights and privileges) and non-ethnic regions (oblast, kray, federal city). Ethnic regions typically have large share of non-ethnic Russian population, while in the non-ethnic regions Russians are the predominant ethnic group.

[42] We also use two robustness checks, where instead of the dummy for all ethnic regions we apply: (a) a dummy for all districts of the ethnic republics of the Northern Caucasus and of some republics of Southern Siberia (which Zubarevich (2013) in her influential analysis of Russian political and social geography treats as strikingly different from the rest of the country: we include Adygeia, Kabardino-Balkaria, Karachaevo-Cherkessia, Northern Ossetia, Ingushetia, Chechnya, Dagestan and the Altai Republic; Tyva is, as mentioned, not included in our sample); and (b) a set of dummies for each of the ethnic regions of Russia.

family members and average number of children per woman. These control variables allow us to isolate the causal path through which historical family structure affects modern political outcomes: is the effect driven by the persistence of the family structure, or can be observed *ceteris paribus* modern family structure, i.e., operate through norm and value persistence as described above.

Figure 5-2 plots the correlation between the historical and the modern family size in Russian districts: it shows that the MFS in the modern Russia is smaller than it was in the Imperial era (as one would expect given the urbanization and the modernization processes of the last century) and is hardly correlated with the historical MFS (correlation coefficient of -.04). This is not surprising. Over the course of the 20th century, the family structure (in particular, the spread of nuclear and extended families) in Russia experienced substantial changes. First, Russian society became more urban: the share of city dwellers increased from 15% in 1897 to 73% in 2001. Urbanization fosters the spread of nuclear families (Kaldate 1962). The construction style of housing pursued by the state in Russia since the Khrushchev era explicitly followed the ideal of a nuclear family: in cities, hardly any apartments or individual houses applicable for residence of extended family were constructed. Second, the social and childcare infrastructure of the Socialist era, while imperfect, also supported family nuclearity, making reliance of extended family support less important. Third, Communist regime in general was hostile to local specificities and social practices, aiming at unification of social behavior throughout the Soviet Union. Empirical research confirms the shift from extended towards a nuclear family in Russia over the course of the 20th century (Afontsev et al. 2008), although it points out that some aspect of extended families turned out to be very persistent (e.g., support parents receive from their grandparents in exercising childcare functions). Essentially, it means that over the last century there was a *convergence* of the regional variation of MFS in Russia (with some exceptions) and the *transition* to omnipresent family nuclearity. This makes it possible to test the effect of extended family structures of the past even after this type of family organization became almost irrelevant in most regions of Russia.

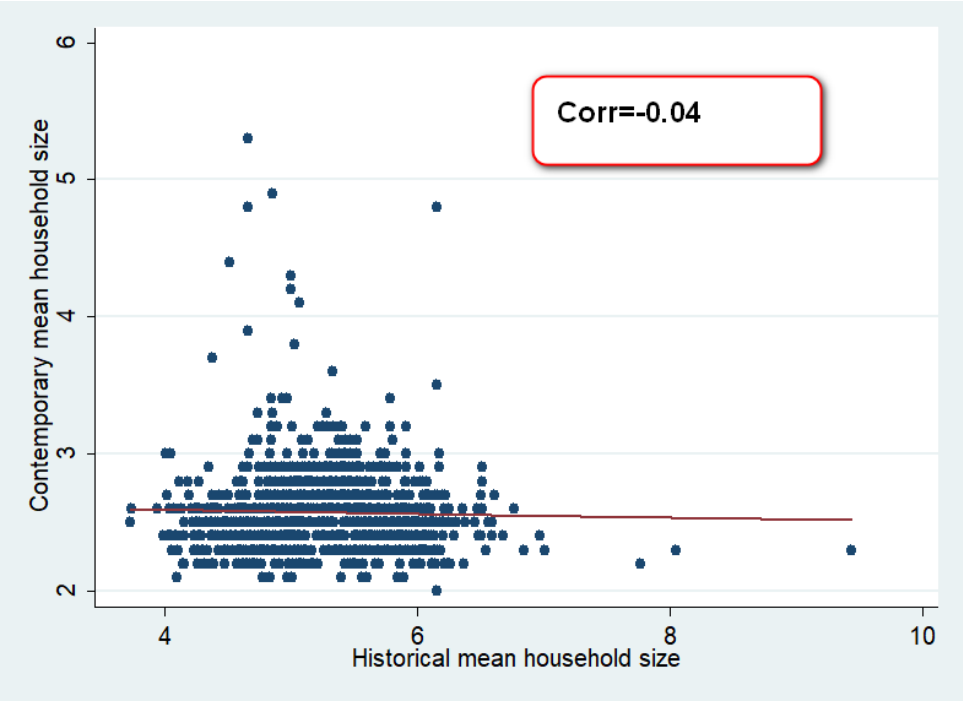


Figure 5-2: Correlation between the historical and contemporary MFS

We also use a further specification, where additional modern control variables are added. We are cautious in interpreting this specification, since many modern variables (e.g., economic development or education levels of the district) could be 'on the path' between historical variables and modern outcomes. For example, the economic development of a *rayon* is most likely influenced by historical economic development and possibly by historical family structures; thus, by adding this variable to the set of covariates, we may create overcontrol bias (Morgan and Winship 2015; Lenz and Sahn 2021). If the modern variables are *not* driven by history, they are unlikely to constitute omitted confounders (the temporal ordering of the variables suggests that modern variables cannot influence the preceding historical variables), and therefore controlling for these is not necessary. Still, in a robustness check, we use data assembled by Lankina and Libman (2021) and control for several modern rayon-level characteristics: share of urban population in the total population of the district (urbanization levels); number of doctors per capita (quality of healthcare); education level (share of population with a university degree); retail trade turnover; housing construction per capita; and income level per capita (three proxies of well-

being).[43] While we present the baseline regression results in what follows, specifications using additional controls are available at request: they entirely confirm the main findings of this paper.

Finally, throughout our analysis, two further robustness checks are applied. First, we use an alternative way of regionalization of Russia – instead of looking at large macroregions typically used to provide complex characterization of certain territories, we use dummies for different landscape types as identified by Moon (2013). We digitalized the maps in Moon's (2013) book and matched them to our dataset. Landscape types may be particularly important for the type of agricultural economy and thus for the family structures of Russian pre-revolutionary peasants (the majority of the country's population at that moment). For the same reasons, we also use Galor and Özak (2016) data, which is a more advanced version of Ramankutty's Land Suitability for Agriculture Index with a more fine-grained resolution. Again, we match the information on the agricultural suitability of certain terrains in Russia to our dataset. The results do not change after adding these controls (see *Appendix CH5-E*, *Tables CH5-E1 and CH5-E2*).

Second, we address the contemporary criticisms of the legacy studies provided by Kelly (2020), according to which many papers in the persistence studies literature suffer from the problem of ignoring the spatial dependence of the residuals. As a result, the papers mistakenly report the existence of deep historical correlation, which in reality reflect only spatial patterns of the data. We address this problem in the *Appendix CH5-F*. MFS indeed exhibits strong spatial correlation, which makes our regressions for the legacy effect (elections in 1996 and 2000) questionable. However, we also replicate these regressions using spatial lag and spatial error models and confirm our findings: thus, the legacy effect we observe in our study cannot be reduced to simple persistent spatial associations.

5.5 Results

Table 5-1 reports our findings for historical voting outcomes to the Constituent Assembly. The results are unambiguous: there is a strong significant and negative association between MFS and the share of votes for the Kadet party. This implies that smaller families went hand in hand with more liberal voting when socialist ideas were very popular in Russia. An increase in MFS of 1 person reduces the share of votes for the Kadet party by 1 percentage point (with the average share of votes for Kadet being 4.7% and the standard deviation being equal to 3.7%). The effect is

[43] Other variables at the rayon level are not available due to poor quality of Russian statistics.

obtained while controlling for other district-level characteristics, including the wealth and share of agricultural employment. The results are strongly in line with H1 and refute H2; in Russia, individualistic values associated with smaller MFS seem to trump fears of governmental intervention in the autonomy of extended families. *Figure 5-3* reports the non-parametric association (local polynomial smoothing) between the size of the family and the share of votes for Kadet; one can see the association remains robustly negative throughout the range of observed data.[44] Our findings are therefore not merely an artefact of the linear functional form of the regressions we estimate.

Table 5-1: Effect of the family structure on the share of votes for Kadet party (%) in 1917 elections

	OLS
MFS (census 1897)	-0.905***
	(0.338)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-19.302***
	(6.152)
Proxy for wealth (census 1897)	-0.634
	(0.453)
Share of agricultural employment (census 1897)	-11.667***
	(3.031)
Region dummies (central region as reference group)	
Volga	0.602
	(0.637)
Siberia	-0.870
	(0.907)
North-West	-2.925***
	(0.370)
Baltic	-6.055***
	(0.552)
Caucasus	-1.202*
	-0.694
Constrant	30.703***
	(4.763)
Number of observations	422
R squared	0.46

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses.

[44] We excluded two districts, for which census reports the average MFS smaller than two; exclusion of these districts from our regressions also has no effect on the estimation outcomes.

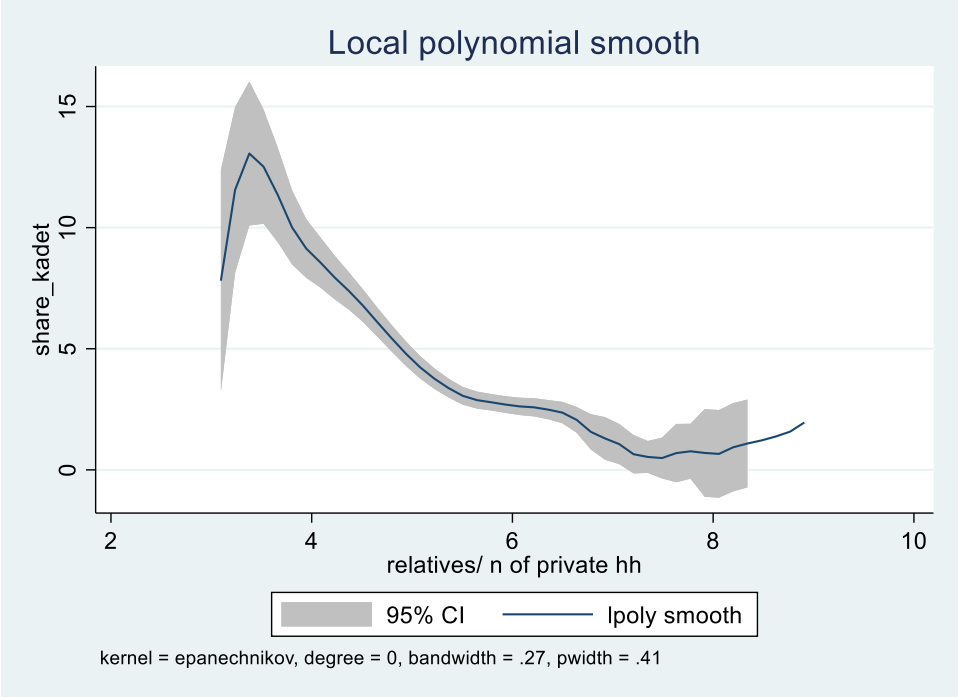


Figure 5-3: Non-parametric association between the MFS and the share of votes for the Kadet party.

Table 5-2 looks at voting outcomes eighty years later – in post-Soviet Russia and during the presidential elections of 1996 and 2000. As mentioned, we estimate regressions using pooled data and for each of the elections separately. Regardless of the approach used, however, we find a significant and positive correlation between MFS and voting for Zyuganov and a significant and negative correlation between MFS and voting for Yavlinskiy. An increase in MFS by 1 person produces an approximately 5 to 11 percentage point increase in votes for Zyuganov and a 1 to 2 percentage point decrease in votes for Yavlinskiy. This is a substantial effect: Zyuganov in 1996 received on average 41.3% of the votes (standard deviation 16.1%), and Yavlinskiy received 5.1% (standard deviation 2.9%). Again, the effects are consistent with H1. *Figure 5-4* confirms the association we find using non-parametric local polynomial smoothing.

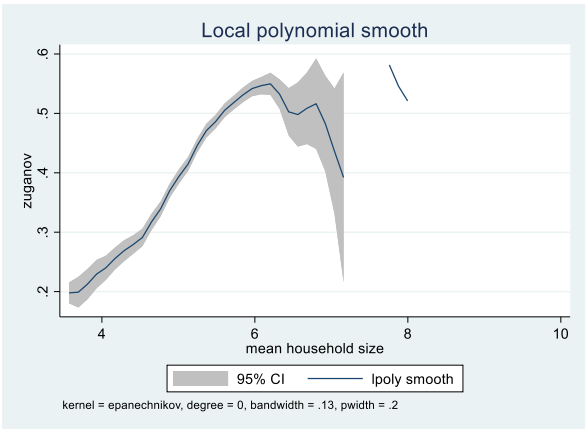
The results are robust throughout different specifications presented in the previous section. Furthermore, modern MFS has no robust effect on the modern voting patterns once one controls for the historical MFS (see *Appendix CH5-E*). This means that the effect we observe is indeed one of norms and values, which emerged historically and survived throughout the last century; modern differences in the family size after a century of convergence and societal transformation under Communist rule do not produce similar effect on the political behavior.

Table 5-2: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections

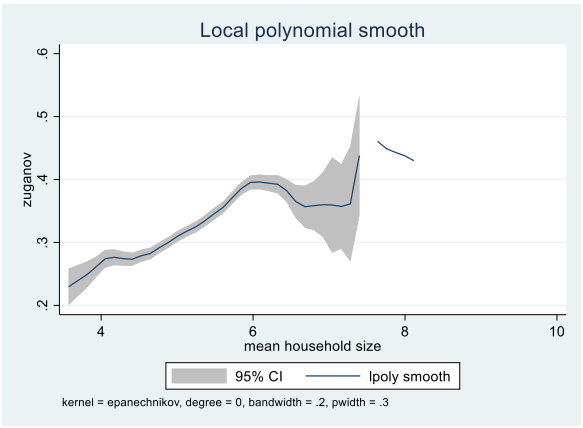
	Share of votes for Zyuganov OLS	**Share of votes for Zyuganov OLS**	**Share of votes for Zyuganov OLS**	**Share of votes for Yavlinskiy OLS**	**Share of votes for Yavlinskiy OLS**	**Share of votes for Yavlinskiy OLS**
MFS (census 1897)	10.64***	5.497***	8.056***	-1.173***	-1.077***	-1.122***
	(0.945)	(0.551)	(0.541)	(0.132)	(0.161)	(0.106)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-17.18*	6.387	-5.445	1.855	-0.133	0.873
	(10.10)	(7.724)	(6.898)	(2.185)	(1.958)	(1.469)
Proxy for wealth (census 1897)	1.450*	2.223***	1.838***	-0.212	0.617**	0.202
	(0.838)	(0.669)	(0.547)	(0.132)	(0.294)	(0.172)
Share of agricultural employment (census 1897)	27.86***	18.30***	23.13***	-4.397***	-2.529	-3.475***
	(5.437)	(4.321)	(3.576)	(0.952)	(1.650)	(0.997)
Dummy federal districts (Central District as reference group)						
North-West	-16.65***	-13.10***	-14.89***	2.698***	-0.169	1.267***
	(0.930)	(0.722)	(0.598)	(0.285)	(0.250)	(0.202)
South	2.674**	1.342	2.007**	-0.398	-1.314***	-0.855***
	(1.314)	(1.081)	(0.861)	(0.261)	(0.272)	(0.190)
North-Caucasus	4.483*	-0.502	2.080	-1.322***	-0.289	-0.828**
	(2.444)	(1.322)	(1.473)	(0.428)	(0.690)	(0.414)
Volga	1.412	-2.187***	-0.399	0.0751	-0.972***	-0.446***
	(0.876)	(0.719)	(0.579)	(0.184)	(0.166)	(0.126)

Ural	-10.42***	-3.194***	-6.816***	-0.187	0.0717	-0.0559
	(1.047)	(0.940)	(0.789)	(0.227)	(0.259)	(0.177)
Siberia	2.284**	0.858	1.564**	0.442**	-1.085***	-0.319**
	(0.958)	(1.020)	(0.712)	(0.219)	(0.208)	(0.153)
Far East	0.939	0.732	0.840	-0.160	-1.453***	-0.808***
	(2.315)	(1.574)	(1.393)	(0.347)	(0.388)	(0.263)
Dummy ethnic region (contemporary Russia)	-1.666*	-6.886***	-4.263***	0.267	0.517***	0.388***
	(1.011)	(0.829)	(0.690)	(0.223)	(0.173)	(0.146)
Constant	-16.55**	-8.888	-7.978	12.33***	10.09***	12.54***
	(7.843)	(6.199)	(5.282)	(1.710)	(1.718)	(1.183)
Number of observations	1,521	1,519	3,040	1,521	1,519	3,040
R squared	0.488	0.290	0.422	0.241	0.358	0.401
Period	1996	2000	Pooled 1996/2000	1996	2000	Pooled 1996/2000
Time FE			YES			YES

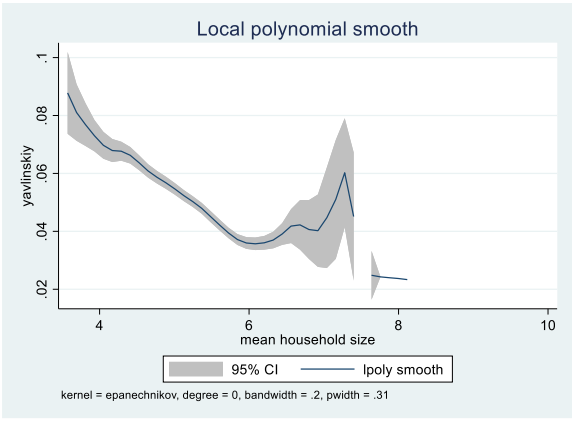
Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses



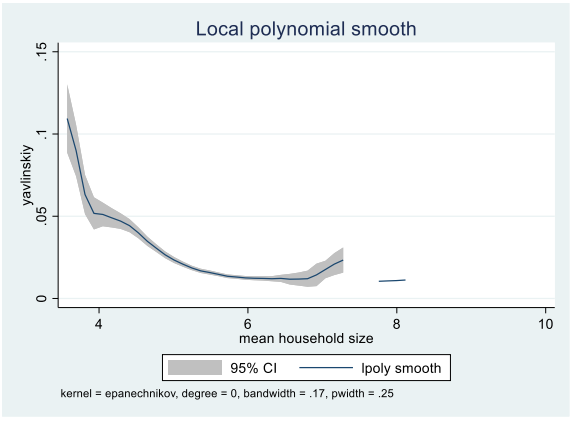
Zyuganov, 1996



Zyuganov, 2000



Yavlinskiy, 1996



Yavlinskiy, 2000

Figure 5-4: Non-parametric association between the MFS and the share of votes for Zyuganov and Yavlinskiy.

Note: observations with MFS smaller 2 and larger 15 excluded to make the graphs easier to read

Regressions using region-level data are particularly likely to be influenced by outliers, and we deal with this problem in a robustness check. We apply three tests: (a) we estimate robust regressions (*rreg* routine in Stata, particularly robust to outliers), (b) estimate median regressions (with bootstrapped standard errors); and (c) exclude *uezdy* and *rayony* with particularly large and small MFS (less than three and more than seven – MFS of less than three could represent extraordinary conditions, as they appear to be highly unlikely for most societies; as a result, we remove ten *uezdy* from our analysis). For the modern elections, we exclude all districts in which Yavlinskiy received more than 10% of votes (again, they constitute a very small share of all districts), and for historical elections we remove all districts in which the Kadet party received more than 10% of votes (again, these are mostly outliers).

Furthermore, for the modern elections, we also estimate an additional set of regressions, where we use shares of votes received by other major presidential candidates as dependent variables. While for Yavlinskiy and Zyuganov the ideological positions of their programs particularly fit our theoretical framework, other candidates are more difficult to analyze from this perspective: nevertheless, they could provide interesting observations for us. Specifically, we look at the share of votes received by Vladimir Zhirinovskiy (1996 and 2000), Vladimir Putin (2000) and Boris Yeltsin (1996). Zhirinovskiy's position in the Russian political spectrum is one of a populist-nationalist candidate with extremely vague and unclear program, rejecting both democratic reforms and the Communist past (Yoffe 1994). As for the incumbent president Yeltsin and his designated successor Putin, their position on the liberalism – illiberalism spectrum is also difficult to analyze. Yeltsin himself, who originally came to power as a proponent of liberal market reforms, but who by mid-1996 had a more eclectic position and electorate. Furman (2010) argues that quite a few voters supported Yeltsin simply as the incumbent president and thus as the representative of the existing status quo. Putin in the early years of his presidency enjoyed support of some pro-market liberal reformers,[45] but also used elements of etatist rhetoric of restoring rule and order and was expected to become a more authoritarian leader than Yeltsin was.

The results for Yeltsin, Zhirinovskiy and Putin are reported in *Appendix CH5-A*. For Zhirinovskiy, we follow the approach of *Table 5-2*; for Putin and Yeltsin, we cannot use panel data, since they ran only, once in our dataset (in 1996 and in 2000, respectively). For Zhirinovskiy, the results are not robust: we find a significant and negative correlation between the share of votes

[45] And indeed implemented several important reforms, see Aslund 2004.

for Zhirinovskiy and the historical family size in 2000, but not in 1996 and not in panel data. For Yeltsin and for Putin, the correlation between the historical family size and the votes' share is also negative. It looks like all prominent candidates were losing votes in locations with bigger historical MFS in favor of Communist (left-wing authoritarian) candidate.

Finally, we acknowledge that a potential problem for our analysis is omitted variable bias: other characteristics of districts can influence both district-level MFS and voting outcomes. This problem is very typical for legacy studies and in a sense reflects the issue associated with choosing the right 'point of time' in exploring when the legacy originated: the alleged historical legacy variable may merely mediate another deeper historical legacy (see, e.g., Pop-Eleches 2015; Lankina et al. 2016; Huning and Wahl 2019). In the *Appendix CH5-B,* we attempt to provide an at least partial solution to this problem by using instrumental variables.[46] Our IV approach is based on using the exposure to famine of 1891-1892 as a possible exogenous shock influencing the historical family structure. The results of the IV estimations confirm our findings; however, we urge to treat the analysis of this section with caution and acknowledge that our choice of instruments is imperfect (particularly in terms of exclusion restriction). We still believe, however, that even correlational evidence on the research topic of our study is important, given the potential salience of family as a social institution and its impact on pro-liberal voting.

5.6 Conclusion

The goal of the paper was to investigate the effect of family nuclearity on political behavior and in particular on voting for liberal parties. We offer two possible explanations of this effect: stronger individualistic values (which would increase pro-liberal voting) vs. reliance on extended family as an alternative power structure to the state (which would reduce support of state redistribution, although most likely will not be associated with other elements of the liberal thinking). We use within-country comparisons of MFS at the district level in Russia (which improves the quality of our analysis in reducing the impact of unobserved variables) and for the first time investigate the effect of MFS at two points of time separated by almost a century. While for the first point of time (1917) we can treat our findings as documenting the effect of *contemporary* MFS on outcomes, for the second point of time we study the impact of the legacy of *historical* MFS in triggering

[46] For other applications used in the context of historical legacy research, see Wimmer 2016.

changes in values and behaviors and that survive subsequent historical discontinuities. In both cases, smaller MFS is associated with pro-liberal voting.

The results of our analysis provide evidence of long-term effects of family characteristics on political outcomes; our analysis of the persistence of effects over almost a century and use of a within-country analysis at a highly disaggregated (district) level make our investigation more convincing. The combination of purely historical analysis and analysis of historical persistence reassures us in the value of our hypotheses and in our results. At the same time, we acknowledge a number of limitations of our research. First, as for any single-country study, our paper faces external validity problems; further studies investigating similar patterns in other countries would therefore be highly valuable. Second, again, the strategy we use to address endogeneity issues is not perfect; caution would require us to treat our results as correlational rather than causal. Nevertheless, even correlational evidence provides valuable insights into the political effects of family characteristics and into their survival over time.

CHAPTER 6

Market and network corruption: Theory and evidence

In this paper, we study a division between market corruption - impersonal bribery - and network corruption that operates through social connections. We provide a thorough theoretical discussion of this division, compare it with other categorizations of corruption, and also demonstrate differences between market and network corruption existing in practice. Using data from the World Economic Forum in the period from 2007 to 2016 we measure market and network corruption across about 150 countries all over the globe and show that network corruption is more related to countries' cultural backgrounds and more harmful to investments than market corruption. Overall, our paper argues that the market-network dimension, unfairly abandoned in the literature, may be useful for better understanding of such a complex phenomenon as corruption.

6.1 Introduction

Corruption is an extremely popular topic in social sciences. Hundreds of studies examine its determinants and implications in a comparative cross-national perspective (see reviews by Lambsdorff, 2006; Pellegrini and Gerlagh, 2008; Svensson, 2005; Treisman, 2000, 2007). Typically, they refer to corruption as abuse of public office for private gain and use broadly defined indices to measure it (e.g., Corruption Perception Index, CPI by Transparency International or Control of Corruption Index, CCI by World Bank).

While this literature provides useful insights and suggests a basis for policy recommendations (e.g., Huther & Sah, 2000; World Bank, 2000), it neglects the fact that corruption is a heterogeneous phenomenon that includes very different practices. Existing literature distinguishes various types and forms of corruption (see Bussell, 2015 for a review), and such a more detailed look may be quite useful for better understanding of causes and consequences of corruption and also for designing more efficient policy measures.

In this paper, we emphasize a division between market corruption - impersonal bribery - and network corruption that operates through social connections. To the best of our knowledge, this division was first proposed by J. Scott in his seminal study of corruption in developing nations

(Scott, 1969), in which he distinguished between *market corruption* and *non-market* or *parochial corruption*. However, although many subsequent studies have differentiated these corruption types (Jancis, 2013; Husted, 1994; Lambsdorff, 2002, 2007; Kingston, 2007), this division still remains out of the mainstream literature. Widely cited analytical reviews by Aidt (2003), Bardhan (1997, 2006), Jain (2001), and Tanzi (1998) do not contain any explicit discussion on the role of social connections in shaping corruption. Moreover, market and network corruption[47] have never been examined jointly in cross-national quantitative research. While "most economic models of corruption take a somewhat parsimonious view focusing largely on market corruption or bribery" (Aidt, 2003: p.F632), quantitative sociological studies on corruption are rare and the 'sociological turn' in corruption research which highlights its social embeddedness (Granovetter, 1985) has been mostly theoretical and qualitative (Heath et al., 2017; Jancsics, 2013; Karhunen et al., 2018; Ledeneva, 1998; Nguyen, Doan and Tran, 2022; Uberti, 2016a,b; Warburton, 2013). As mentioned by Granovetter (2007: p.162), "no systematic comparative study of variation in the extent of obligation networks across societies exists, and daunting theoretical and methodological obstacles are easy to imagine. But this does not mean that variations are insignificant or that comparative research would not be of great interest".

We fill in this gap in the literature in our paper. Our contribution is twofold. First, we advance the theory behind the market-network dimension of corruption and compare it with other existing categorizations. Second, we measure market and network corruption across about 150 countries all over the world using data from the World Economic Forum and show that network corruption is more associated with countries' cultural variables and more harmful to investments than market corruption. These results may have important implications for scholarly literature on corruption and policy making.

The rest of the paper is organized as follows. In Section 2, we provide a theoretical discussion of market and network corruption, explain the key differences between them, juxtapose the market-network dimension with other existing classifications of corruption, and, finally, specify our hypotheses to be tested empirically. In Section 3, we describe the data and methodology used. In Section 4, we present our main empirical findings. In Section 5, we summarize our results and discuss their implications.

[47] Instead of 'parochial corruption' we prefer the term 'network corruption' proposed by M. Granovetter (Granovetter, 2007) as it exactly reflects the key feature of this corruption.

6.2. Theoretical background and research hypotheses

6.2.1. Market corruption vs. network corruption

Both market corruption and network corruption reflect situations when a bureaucrat provides some informal and/or illegal favors to certain persons(s) or firm(s) for some reward. In this regard, both types fall under the popular definition of corruption as abuse of public office for private gain, which is a reduced version of J. Nye's definition: "*Corruption is behavior which deviates from the formal duties of a public role because of private regarding (personal, close family, private clique) pecuniary or status gains; or violates rules against the exercise of certain types of private-regarding influence*" (Nye, 1967, p.419). The crucial difference between market and network corruption lies in the issue of *whom the bureaucrat provides those favors to*.

In market corruption, the bureaucrat provides favors to *any* person or firm that asks for an illegal or informal service and offers some reward. In other words, *everyone* who pays may get that service. Therefore, access to corrupt services depends only on the willingness and ability of a private actor to pay and does not depend on her or his personality and/or acquaintance with the bureaucrat. Since Scott (1969), the classic example of market corruption often mentioned in the literature is an auction for public procurement contracts where the winner is a firm that offers the highest informal bid (Beck and Maher, 1986; Rose-Ackerman, 2002). Such an auction does not undermine the logic of the market as (higher) bribes are usually paid by more efficient firms.[48] Another example of market corruption is an informal 'price list' for public services when the sizes of bribes which are to be paid are known beforehand. Such payments, for instance, were widespread in healthcare and traffic police in many post-socialist countries (Lewis, 2000).

Network corruption is different: *only* those persons (or firms) who have some kinship, friendship or business ties with the bureaucrat may get a service. That social network may be either large and bond dozens of bureaucrats and public officials, their close or distant relatives, friends, classmates, and business partners[49], or it may be small and include only a bureaucrat and one of her or his relatives or friends. The crucial thing is that only members of that network – insiders –

[48] In this sense, market corruption is similar to 'efficient corruption' discussed by Aidt (2003).
[49] A prominent example is a network supervised by Vladimiro Monestesinos in Peru (McMillan and Zoido, 2004).

have access to corrupt services, while all other persons or firms – outsiders – cannot benefit from them. Thus, for network corruption, the winner of the auction mentioned above will be a firm that is connected to the bureaucrat (e.g., when a CEO of that firm is a former classmate of the bureaucrat) but which is not necessarily the most efficient firm that is able to pay the highest informal bid.

The fact that network corruption operates through social networks and connections, while market corruption represents impersonal market-like transactions, implies important differences between them.

First of all, network corruption should be more persistent than market corruption, as social networks and structures evolve slowly over time and tend to reproduce themselves (Doreian and Stokman, 1997). Network corruption also tends to be more secure than market corruption as strong enforcement mechanisms that are built into informal networks may efficiently prevent opportunistic behaviors and whistle-blowing (Kingston, 2007; Lambsdorff, 2007). The members of informal networks are often bonded by strong 'esprit de corps', which complicates any legal investigations against them (e.g., Lambsdorff, 2002; McMillan and Zoido, 2004).

The motives of engaging in market and network corruption may also differ. The key motive behind market corruption is to gain a material benefit. In a pure economic perspective, bureaucrats are assumed to be rational utility-maximizing agents who decide to use discretionary power to extract bribes when the expected benefits exceed the expected costs (Kitgaard, 1988; Rose-Ackerman, 1978; Shleifer and Vishny, 1993). Due to the impersonal nature of market corruption any reward to the bureaucrat should have a universal value, irrespective of the personalities participating in the corrupt deal. Consequently, market corruption should always involve a transfer of money (usually cash).

The motivation behind engaging in network corruption usually is more nuanced. Beyond possible material gains, network corruption follows a natural propensity to treat a close circle of people (first of all, relatives and good friends) differently than everyone else (Alesina and Giuliano, 2014; Banfield, 1958). In a more general sense, it reflects particularism which is a type of social relationships when people treat or assess other people based on specific circumstances or personal backgrounds, putting much emphasis on their kinship ties and social connections (Lipset & Lenz, 2000; Trompenaars & Hampden-Turner, 1997). (The opposite of particularism is universalism when people treat or assess other people based on the same universal rules equally

applied to all.) Additionally, belonging to the same social network and previous experience of cooperation of the parties “activates” a reciprocity norm (Nguyen, Doan and Tran, 2022). All that together with the personalized nature of network corruption assume that not only cash but also any non-monetary gratitude such as a gift, a reciprocal service, or just a moral respect may potentially serve as a reward (Cartier-Bresson, 1997). Moreover, due to the persistent social connectedness of the parties this reward may be delayed in time, which is impossible in the case of market corruption. The fact that money transfers are easier to detect than reciprocal and delayed non-monetary exchanges additionally explains why network corruption usually is more secure and more persistent than market corruption.

In this regard, it may seem that market corruption is rare, but this is not the case. Impersonal bribery may be widespread in an environment of general permissiveness of corruption, which exists in most developing countries (Lambsdorff, 2007). It also flourished in many post-socialist countries during deep economic and political transformations in the transition period and continues to have an impact in these countries nowadays (Lewis, 2000; Levin and Satarov, 2000, 2015). Moreover, much of corruption operates through intermediaries between citizens and bureaucrats (e.g., Khanna and Johnston, 2007). As anyone who can pay can use these intermediary services, such a corruption has a market nature, though it contains a network element reflected in the connectedness between intermediaries and bureaucrats. In order words, intermediaries enable network corruption to be offered openly in the market.

Another important difference between market and network corruption concerns an access to the public services they provide. As the number of insiders is, by definition, less than the number of outsiders, network corruption provides a more restricted access than market corruption. In other words, the number of private agents who could benefit from corruption should be higher in the case of market corruption.

Finally, it should be mentioned that market and network corruption, of course, are related to each other. Wherever there is a place for impersonal market-like informal transactions, there should be a place for mutually beneficial exchanges between relatives, friends, or business partners. Moreover, market corruption tends to turn into network corruption over time. As noted by M. Granovetter, "Even in corruption that begins as a purely “market” phenomenon, the need for secrecy […] makes it highly likely that repeat offenders will cultivate appropriate personal ties for their own protection, thus endowing market corruption with important network elements" (Granovetter, 2007, 167-168). On the other hand, network corruption existing in some field may

provide a basis for the development of a broader market corruption in that field with the help of intermediaries.

6.2.2. Related concepts

Network corruption is related to several concepts studied in social sciences. Perhaps, the closest concept is 'blat', which is the use of personal networks and informal contacts to obtain goods and services in short supply (Ledeneva, 1998). Blat was widespread in socialist countries in Soviet times and may be viewed as a predecessor of network corruption in modern post-socialist societies.[50]

Another very close concept is 'favoritism' which, basically, is giving unjustified preferences to members of one's own social group, either to relatives ('nepotism' or 'familism', see Banfield, 1958; Lipset and Lenz, 2000) or to friends or acquaintances ('cronyism', see Kang, 2002; Khatri et al., 2006) or to the members of the same ethnic group, usually taking the form of offering jobs, contracts or resources (Bramoullé and Goyal, 2016). A series of studies provide ample evidence on *regional or ethnic favoritism* when political leaders or public officials favor economic development of their hometowns or regions (e.g., Hodler and Raschky, 2014). However, unlike network corruption, favoritism is less about the provision of public services and more about the distribution of public resources. Moreover, a group of private actors benefiting from favoritism can be very broad and vaguely specified and does not necessary play any active role in getting unjustified preferences, unlike private actors benefiting from network corruption.[51]

[50] Chinese 'guanxi' may be considered as an analogue of blat as it also relies on personal connections and helps to cope with the shortage. Guanxi, however, seems to be more culturally ingrained and morally justified than blat (see Ledeneva, 2008).

[51] That makes favoritism close to 'clientelism' (or 'patronage'), which is the informal and mutually beneficial exchange of goods or services between people with unequal economic or social status ('patrons' and 'clients'). While patrons usually provide clients with protection and resources, clients provide to patrons support and information (Boissevain, 1966). Political clientelism, for instance, assumes the exchange of goods or services for political support between politicians and citizens (Hicken, 2012) and thus it resembles network corruption as patrons abuse their office to provide informal favors to their clients.

There are also typologies of corruption that interact with the division between market and network corruption, but none of them focus on the role of social connections in shaping corruption (see Table 6-1).

Table 6-1. Market-network corruption distinction vs. other typologies of corruption**.**

		Market corruption	**Network corruption**
Degree of coordination between bureaucrats	Decentralized	YES	YES
	Centralized	YES	YES
Use of money	Monetary	YES	YES
	Non-monetary	NO	YES
Level of operation	Grand	NO	YES
	Petty	YES	YES
Branch of government (legislative or executive)	Political	NO	YES
	Bureaucratic	YES	YES
Strength of bargaining power of bureaucrat	Extortive	YES	NO
	Collusive	YES	YES
Degree of justification	White	NO	YES
	Grey	YES/NO	YES
	Black	YES	YES/NO

One of the most influential divisions centers on the organization of corruption among bureaucrats: in the *decentralized* case a firm should pay different bribes to different bureaucrats for different services, while in the *centralized* case bureaucrats coordinate their rent-seeking behavior, and this diminishes the costs and uncertainty brought about by corruption (Blackburn and Forgues-Puccio, 2009; Shleifer and Vishny, 1993). This division is, however, silent on the issue of relatedness between bureaucrats and private agents, therefore both market and network corruption may be centralized or decentralized.

Other divisions distinguish different corrupt practices depending on the use of money (monetary vs. non-monetary corruption), the level of operation (grand vs. petty corruption), the branch of government affected (political corruption vs. bureaucratic), the strength of bargaining

power of the bureaucrat (extortive vs. collusive corruption, e.g., Hindriks et al., 1999; active vs. passive corruption, see Capasso and Santoro, 2018), or the degree of justification of corrupt practices in a community ('white', 'gray', and 'black' corruption, see Heidenheimer, 2002). Here, one can see more intersections with the market-network division. As market corruption relies on cash transfers, is not protected by informal enforcement, and assumes 'open access' to corrupt services, this type of corruption may be only monetary and rarely grand and political. Network corruption, in turn, may be both monetary and non-monetary, grand and petty, political and bureaucratic.[52] While market corruption may be both extortive and collusive, network corruption, by definition, tend to be collusive. As network corruption often assumes nepotism, this type of corruption should have a lighter shade and be more justifiable in people's eyes than market corruption, as it is generally more justifiable to circumvent the law in order to help relatives or good friends, following the norm of reciprocity, than to circumvent the law in order to help to unknown people for money.

6.2.3. Research hypotheses

The theoretical discussion presented above shows that network corruption differs from market corruption in many important respects. These differences have important practical implications which will be tested in the empirical part.

Persistence and cultural embeddedness of corruption

Many authors argue that corruption has deep historical roots and is ingrained in the culture (e.g., Alesina and Giuliano, 2014; Becker et al., 2016; La Porta et al., 1999; Treisman, 2000; Uberti, 2018; Uslaner, 2017). Following this literature, we assume that both market and network corruption should be related to countries' historical and cultural backgrounds but expect that this link should be stronger in the case of network corruption. The key reason is that network corruption is embedded in persistent social networks and structures and follows particularistic values and reciprocity norms, which are deeply ingrained in culture and date back to ancient family

[52] Strong political corruption may take a form of 'state capture', when the whole decision-making process in the state is influenced by private agents or groups. Therefore, network corruption is much more related to state capture than market corruption.

organization and clan societal structures (e.g., Alesina and Giuliano, 2014; Greif, Tabellini, 2012), while market corruption represents impersonal market-like transactions in order to gain short-term economic benefits and lacks such foundations. To illustrate and test this general expectation empirically we consider three historical/cultural characteristics of countries: legal origins, the prevalence of Protestantism, and the strength of family ties and values.

Concerning legal origins, as argued by La Porta et al. (1999), English common law should have a restrictive effect on malpractices of authorities because this legal tradition has been shaped by Parliament and aristocracy at expense of the crown. German and Scandinavian traditions are also conductive to a better governmental quality because these countries have managed to build professional bureaucracies. In contrast, French civil law was relatively weak in deterring public officials from violation of the rules, thus this legal tradition should be less restrictive regarding corruption. We expect that these differences between legal traditions in their influence on corruption should be more visible in the case of network corruption as the adaptation of European legal systems in developing countries not only changed formal laws but also favoured the spread of more universalistic values and limited the commitment to the particularistic values, which, in their turn, provide a basis for network corruption.

A similar logic explains why the impact of Protestantism should differ between market and network corruption. As many author argue, corruption tend to be negatively associated with the share of Protestants across countries (e.g, Treisman, 2000), which seems to reflect the impact of Protestantism considered rather as a religious *tradition* and not as the *current* religious composition of population (Gockcekus, 2008). Protestantism is an individualistic and egalitarian religion that challenges the sanctity of the power hierarchy and supports the separation of church and state, which clearly undermines prerequisites of corruption, but additionally Protestantism conflicts with particularistic values and is conducive to more universalistic values.

Finally, some authors show that corruption is more widespread in countries with stronger family ties (e.g., Alesina and Giuliano, 2014). These ties tend undermine the impartiality of bureaucracy and public institutions as state officials feel obliged to give unofficial or illegal preferences to their relatives. In a similar vein, it was shown that corruption finds more approval among people expressing more particularistic values (Rotondi and Stanca, 2015). In this regard, we naturally expect that network corruption will be stronger associated with family ties and values than market corruption, as the former is much more related to these values than the latter.

Concerning market corruption, we may expect that this type of corruption, in contrast to network corruption, should be more sensitive to *current* economic development and regulations. The fact is that market corruption is not embedded in social networks and structures and hardly related to particularistic orientations but is more dependent on benefits/costs ratio, which, in turn, is conditional on the economic situation and the severity of anti-corruption policy measures. As a generalized measure of the economic development and severity of anti-corruption control we take the Human Development Index (HDI) which combines countries' GDP per capita with mean years of schooling and life expectancy at birth. In general, corruption should be lower in countries with a higher level of socio-economic development as these countries tend to have higher levels of literacy and education and can afford more effective formal institutions and better public administration (e.g., Treisman, 2000), but market corruption should be stronger (and negatively) associated with HDI than network corruption.

In sum, our two paired hypotheses are as follows:

Hypothesis 1.1. (H1.1): network corruption is more related to cultural variables than market corruption.
Hypothesis 1.2 (H1.2): market corruption is more sensitive to current socio-economic development and regulations than network corruption.

Which corruption is more harmful?

If there are two distinct types of corruption, then a natural question is which type is more harmful. Following the seminal study by Mauro (1995) we compare market and network corruption in their impacts on investment rate as an important indicator of economic performance and business activity. As market corruption provides a more open access to informal/illegal public services and less restricts competition, we expect that it is less harmful for investments as network corruption. Due to the same reason, we may also expect that market corruption may better 'grease the wheels' of economy (see Dreher and Gassebner, 2013; Meon and Sekkat, 2005) as it may help to overcome excessive bureaucratic barriers and regulations to more firms than it may do network corruption, which also should contribute to more investment activity. Therefore, our hypothesis is:

Hypothesis 2. (H2): Network corruption is more harmful to investments than market corruption.

6.3. Data and methodology

Measuring corruption

To measure market and network corruption we use questions from the Executive Opinion Survey, which are used in the construction of the famous Global Competitiveness Index within the framework of the World Economic Forum (WEF). We use results of that survey for the period from 2007 to 2016, covering more than 150 countries. To measure network corruption, we use answers to the following question: "*In your country, to what extent do government officials show favoritism to well-connected firms and individuals when deciding upon policies and contracts?"* The possible answers range from 1 = always show favoritism to 7 = never show favoritism, but in order to obtain higher values corresponding to more favoritism we rescale it by multiplying by (-1). Therefore, we measure the extent of network corruption in countries using a measure of favoritism, which should not create any serious biases as favoritism, arguably, is very close to network corruption (see discussion in Section 2.2). In this particular question, "giving contracts to well-connected firms or individuals" unambiguously implies network corruption.

For market corruption we use the following question: "*In your country, how common is it for firms to make undocumented extra payments or bribes connected with (a) imports and exports; (b) public utilities; (c) annual tax payments; (d) awarding of public contracts and licenses; (e) obtaining favorable judicial decisions?*". The answer to each question ranges from 1 (very common) to 7 (never occurs). Our measure of market corruption is the simple average of all answers. (Note that this question, unlike the question on network corruption, is available only since 2010.)

Measuring market corruption using this question has a potential limitation. It is not clear whether and to what extent those 'undocumented extra payments or bribes' present impersonal market-like transactions which are potentially accessible to any firm and to what extent those 'extra payments' are paid through social connections. Moreover, the question seems to reflect *grand corruption*, but at the grand level pure market corruption without use of any social connections is hardly possible (as discussed in Section 2.2). However, on the other hand, when it comes to multinationals (it is mostly their executives who participate in the WEF opinion survey), they may pay bribes to local officials or politicians without being socially embedded with them by

relying on local intermediaries or using ownership structures, and such corruption has a market nature.

To address these concerns and also to check how that ambiguity in measurement may affect our findings, we employ an auxiliary measure derived from the Global Corruption Barometer (GCB) conducted by the Transparency International. It is calculated as the percentage of "yes" responses to the question: "*In the past 12 months, have you or anyone living in your household paid a bribe in any form?"* and measures people's actual experience with bribery, hence it should be stronger correlated with market corruption than with network corruption.

Other variables

The *legal origins* variable is categorical taking four possible values reflecting English, German, Scandinavian, and French legal origins in countries former colonies (see La Porta et al., 1999). The *share of Protestants* in the country is taken from Treisman (2000). *Family Ties Index* measuring the strength of family ties comes from Alesina and Giuliano (2014).

When testing Hypothesis 2 the key dependent variable is the natural logarithm of the investment rate (% of GDP) taken from the World Economic Outlook database collected by the International Monetary Fund. Following Mauro's (1995) model, among control variables we use: HDI and population growth derived from the World Development Indicators (World Bank). To calm endogeneity concerns (see below) we also add a measure of judicial independence (the question is: *In your country, how independent is the judicial system from influences of the government, individuals, or companies?*" [1 = not independent at all; 7 = entirely independent] and a measure of reliability of police services (the question is: *In your country, to what extent can police services be relied upon to enforce law and order?" [1 = not at all; 7 = to a great extent]),* both taken from WEF. Summary statistics for all these variables used in our analysis are presented in Table 6-2.

Table 6-2: Summary statistics of all variables used in the paper.

	Variable	N	Mean	Std. Dev.	Min	Max
Corruption measures	NC (WEF)	1513	-3.246	0.927	-6.046	-1.402
	MC (WEF)	1124	4.159	1.203	1.948	6.763
	MC (GCB, % of people who paid bribe)	607	19.686	18.957	0	89
Historical and cultural variables	English legal origin	2010	0.333	0.472	0	1
	German legal origin	2010	0.035	0.183	0	1
	Scandinavian legal origin	2010	0.025	0.156	0	1
	French legal origin	2010	0.438	0.496	0	1
	% of Protestants	5346	14.663	23.217	0	99.8
	Family ties index	2160	0.030	0.277	-0.663	0.631
Other variables	Investment rate % of GDP (ln)	3324	3.108	0.401	-2.282	4.345
	HDI	4472	0.658	0.165	0.199	0.953
	Population growth	4333	1.402	1.541	-10.955	17.510
	Judicial independence	1630	3.958	1.307	1.113	6.818
	Reliability of police services	1629	4.308	1.164	1.708	6.812

Methodology

To test Hypothesis 1.1, we aggregate our data over time as cultural/historical variables are time invariant. The estimated equations are the following:

$$MC_i = \alpha_1 + \beta_1 HDI_i + \gamma_1 \, Cultural\ variable_i + \varepsilon_i \quad (1)$$

$$NC_i = \alpha_2 + \beta_2 HDI_i + \gamma_2 \, Cultural\ variable_i + \varepsilon_i \quad (2)$$

where MC and NC are measures of market and network corruption; *i* refers to countries; $\boldsymbol{\gamma}1$ and $\boldsymbol{\gamma}2$ are the coefficients of interest; ε_i is the conventional error term. All cultural and historical variables are included separately to avoid multicollinearity. In all regressions we also include HDI

as a control variable to avoid omitted variable problem and exclude spurious correlations.[53] At the same time, the estimated coefficients at HDI allow us to test Hypothesis 1.2.

In order to compare the impact of market and network corruption on investments (to test Hypothesis H2), we employ two alternative strategies. Within this first strategy, we estimate the impact of market and network corruption on investments in separate equations using panel data:

$$Ln\ investment_{it} = \alpha_1 + \beta_1 MC_{it} + controls_{it} + year_t + \alpha_i + \varepsilon_{it} \quad (3)$$

$$Ln\ investment_{it} = \alpha_2 + \beta_2 NC_{it} + controls_{it} + year_t + \alpha_i + \varepsilon_{it} \quad (4)$$

where $Ln\ investment_{it}$ is the natural logarithm of investment rate; β_1 and β_2 are the coefficients of interest; $year_t$ reflects yearly fixed effects; α_i s are country fixed effects; ε_{it} is the error term.

This model is estimated in two steps. At the first step, we exclude unobservable countries' fixed effects by demeaning all dependent and independent variables. At the second step, we estimate two equations simultaneously, as a SUR model, which allows to run statistical tests to compare β_1 and β_2.

The first step is important as it helps to reduce endogeneity concerns associated with omitted variables. However, it does not help to cure endogeneity stemming from possible reverse causality, i.e., when more investments lead to more corruption. Like the omitted variable problem, reverse causality also biases the estimates of coefficients. Fortunately, in our case we do not need to get unbiased or consistent estimates of the impact of market and network corruption on investments, but just need to compare them. As we do not see any substantive grounds to believe that the reversed impact of investments should differ among market and network corruption, we basically assume that the magnitude and direction of that bias due to reverse causality should be the same for market and network corruption. Consequently, any difference in the estimated coefficients β_1 and β_2 should reflect the difference in the effects of market and network corruption on investments.

[53] It might be the case that the level of socio-economic development that existed in the country in the past affected the historical level of corruption and, at the same time, is interrelated with the explanatory variables. As historical economic development measures are not available for a large number of countries in our sample, we employ a contemporary measure (HDI) that is correlated with the historical one (see Nunn, 2020).

To be completely on the safe side, we also allow a possible failure of that assumption. The reaction of market and network corruption on increase or decrease in investments, arguably, should be conditional on the cultural and historical background of a particular country and its institutional setting. While differences in cultural and historical backgrounds are already captured by the country fixed effects, we additionally include in our regressions two variables that affect relative costs of engaging in both market and network corruption, namely judicial independence and the reliability of police services. These time-varying variables help to capture any differences between market and network corruptions in their reactions to changes in investments.

Within our second strategy, we consider market and network corruption jointly in one equation by constructing a categorical variable based on MC and NC indices. This variable distinguishes four groups of countries with different regimes of corruption: 1) countries where NCt and MCt are below their sample means; 2) NCt is above the sample mean while MC_{ct} is below; 3) MC_t is above the sample mean while NC_t is below; 4) both MCt and NCt are above their sample means. We expect that high NC countries will have lower investment rates compared to high MC countries, as network corruption should be more detrimental for investments. At the same time, as market corruption may partially mitigate that negative effect of network corruption, we expect that high NC-high MC countries should demonstrate higher investment rate than high NC-low MC countries.

We note that within the second strategy it is not possible to estimate a panel model with fixed effects as the categorical variable capturing different corruption regimes is quite stable over time. Therefore, we run the OLS model on the pooled data sample including the same set of controls as in Equations 3 and 4 along with year fixed effects.

6.4. Empirical results

6.4.1. Descriptive analysis

Correlation analysis shows that market and network corruption are positively correlated with each other (see Table 6-3). The correlation between WEF-based measures is high and close to 0.87. As mentioned, this high correlation may exist because the WEF-based measure of market corruption may capture network corruption. However, the GCB-based measure of people's experience with

bribery is stronger associated with MC than with NC, which suggests the WEF-based measure of market corruption still reflects market corruption different from network corruption.

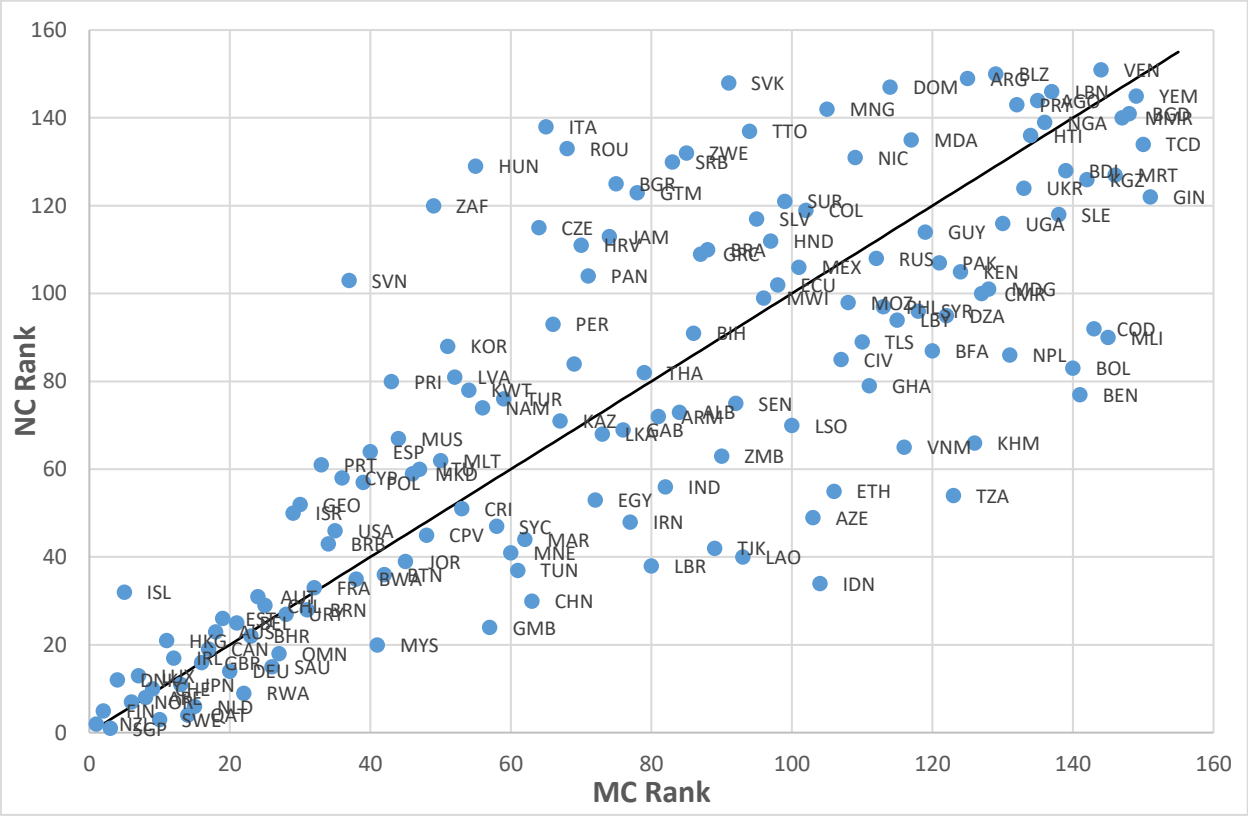
Table 6-3. Correlations between market and network corruption, estimates based on the aggregated WEF sample of countries.

	MC (WEF)	NC (WEF)	MC (GCB)
MC (WEF)	1		
NC (WEF)	0.869* (151)	1	
MC (WEF)	0.682* (127)	0.477* (127)	1

Note: * p<.05. Number of observations are in parentheses.

Figure 6-1 presents and compares countries' rankings by MC (horizontal axis) and NC (vertical axis). Top-10 countries clean of market corruption include New Zealand, Finland, Singapore, Denmark, Iceland, Norway, Luxembourg, United Arab Emirates, Switzerland, and Sweden. Top-10 countries clean of network corruption are much the same with some rare exceptions including Qatar (#4), Netherlands (#6), and Rwanda (#9). While these three countries are not among top-10 in MC, they still have a relatively high rank (#14, #15, and #22, respectively), which confirms the general rule that most countries with the lowest levels of market corruption also tend to have the lowest levels of network corruption. This rule is visible at Fig.6-1 which shows a point cloud at the lower left corner along the bisector line.

Figure 6-1. Rankings of countries by MC and NC (aggregated WEF data 2010-2016).



This rule, however, is less evident at the other end of corruption rankings, i.e., at the upper right corner of Fig.6-1, where the point cloud looks much less concentrated and more dispersed. Among bottom-10 countries with the highest MC only two (Venezuela and Yemen) belong to the group of bottom-10 countries with the highest NC. The point cloud looks even more dispersed at the middle of rankings with many country-points located far from the bisector line. In other words, many countries with moderate level of MC exhibit relatively high level of NC. Consequently, when only market corruption or bribery is considered, the relative position of many countries in corruption rankings may be overoptimistic. Perhaps, the most prominent example of such a country is Italy (ITA) which is notoriously known for its criminal networks (*mafia*): its rank in MC is 65, which quite low for a developed country, but its rank in NC is even lower, only 138 out of 150 countries.

Another example of middle MC – high NC countries which are located high above the bisector line at Fig.6-1 includes a group of post-socialist countries – Serbia (SRB), Bulgaria (BGR), Slovakia (SVK), Slovenia (SVN), Romania (ROU), Hungary (HUN), Croatia (HRV), and Czech Republic (CZE). While the level of MC in these countries is generally lower than among CIS countries due to the influence of Western Europe and adaptation of its institutions, the level of NC in these countries is still relatively high. A tentative explanation of this fact is the legacy of the socialist period or even of the Ottoman rule (see Dimitrova-Grazl, 2007; Obydenkova and Libman, 2014; Uberti, 2018). Strong NC might have survived in these countries due to its embeddedness in social networks and in structures that evolve very slowly and tend to reproduce themselves.

6.4.2. Regression analysis

Association with cultural and economic variables

Our results suggest that the colonization process, which involved the transplantation of Western institutions into less developed societies, has led to lower levels of corruption in the former colonies, irrespective of the legal system existed in the metropolitan state (see Columns 1 and 2 in Table 6-4). This effect, however, tend to be more significant for NC than for MC. This conclusion generally holds if we keep only former colonies in our sample (see Columns 3 and 4 of Table 6-4). Compared to the British legal tradition, the Scandinavian one is more restrictive for NC (beta NC= -0.167***) than for MC (beta MC= -0.087***), while the French one facilitates both types of corruption.

Table 6-4. The association of historical and cultural variables with WEF-based measures of market (MC) and network corruption (NC), estimates based on the aggregated WEF sample of countries.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	MC	NC	MC	NC	MC	NC	MC	NC
English legal origin	-0.286***	-0.321***	Base	Base				
	(0.0709)	(0.0908)						
Chi 2 test: MC=NC	0.52							
French legal origin	-0.0808	-0.136	0.234***	0.213***				
	(0.0693)	(0.0889)	(0.0638)	(0.0803)				
Chi 2 test: MC=NC	1.43		0.31					
German legal origin	-0.128**	-0.212***	-0.0288	-0.0786				
	(0.0561)	(0.0719)	(0.0638)	(0.0802)				
Chi 2 test: MC=NC	5.04*		1.69					
Scandinavian legal origin	-0.157***	-0.270***	-0.0871*	-0.167**				
	(0.0463)	(0.0594)	(0.0526)	(0.0663)				
Chi 2 test: MC=NC	13.14***		6.41*					
% of Protestants					-0.284***	-0.337***		
					(0.0629)	(0.0823)		
Chi 2 test: MC=NC					1.5			
Family ties							0.0561	0.217*
							(0.0873)	(0.116)
Chi 2 test: MC=NC							6.36*	
HDI	-0.729***	-0.445***	-0.689***	-0.422***	-0.699***	-0.439***	-0.998***	-0.716***
	(0.0568)	(0.0728)	(0.0632)	(0.0796)	(0.0555)	(0.0727)	(0.116)	(0.154)
Constant	0.0653	0.0313	-0.0389	-0.0638	0.036	-0.00942	0.311***	0.278**

	(0.0526)	(0.0674)	(0.0637)	(0.0801)	(0.0549)	(0.072)	(0.101)	(0.135)
Observations	144	144	109 (former colonies only)	109(former colonies only)	143	143	77	77
R-squared	0.621	0.381	0.621	0.368	0.601	0.321	0.584	0.372

Note: Entries are standardized coefficients. Historical indicators were included separately one at a time to avoid a multicollinearity problem. Heteroskedasticity robust standard errors are in parentheses. * p<.10, ** p<.05, *** p<.01. In Specification 1 the base group is countries which were not Western colonies in their past.

While the spread of Protestantism is negatively associated with both types of corruption, its correlation with NC is stronger than that with MC (see Columns 5 and 6 of Table 6-4). Concerning family ties, the correlation of the family ties index is positive with NC, which is in line with our expectations, but insignificant with MC (see Columns 7 and 8 of Table 6-4). A tentative explanation could be that pure bribery is incompatible with strong family ties and longstanding interpersonal relations (Granovetter, 2007).

Overall, we find that cultural variables are more strongly associated with network corruption than with market corruption, which is consistent with our Hypothesis H1.1. At the same time, market corruption seems to be more responsive to the current day level of economic development. Virtually in all specifications we received that MC is stronger (and negatively) related to HDI than NC. This result is in line with our Hypothesis H1.2 and suggests that developed countries tend to have less advantage over the developing ones in terms of network corruption than in terms of market corruption, which corresponds to the analysis of corruption rankings.

Impact on investments

The estimated SUR model suggests that NC has a negative impact on the investment rate, while the impact of MC is insignificant (see Column 1 Table 6-5). The Chi2-test shows that coefficients at MC and NC are statistically different from each other (at the 10% level).

Table 6-5. The impact of market and network corruption on investments.

DV: Investment rate (% GDP)	**(1)** SUR (with FE)	**(2)** SUR (with FE)	**(3)** FE	**(4)** SUR (with FE)
MC	-0.0775	‘-0.0650	-0.0434	-0.001
	(0.0499)	(0.0500)	(0.0476)	(0.001)
HDI	2.585***	2.101***	5.289	3.109***
	(0.608)	(0.562)	(3.415)	(0.678)
Population growth	0.0681**	0.0686**	0.105	0.267
	(0.0316)	(0.0319)	(0.0756)	(0.179)
Judicial independence		0.000***	0.0410	-0.000
		(0.000)	(0.0347)	(0.000)
Reliability of police services		0.000	0.00342	0.000
		(0.000)	(0.0349)	(0.000)
Constant	-0.0679***	-0.0514**	-1.118	0.038
	(0.0245)	(0.0232)	(2.571)	(0.030)
Year dummies	YES	YES	YES	YES
Adjusted R2	8%	5%	7%	15%
Observations	922	894	894	344
NC	-0.102**	-0.106**	-0.0601*	-0.076*
	(0.0450)	(0.0454)	(0.0317)	(0.041)
HDI	2.487***	2.006***	6.070***	2.997***
	(0.609)	(0.564)	(1.656)	(0.647)
Population growth	0.0708**	0.0714**	0.0468**	0.262
	(0.0316)	(0.0319)	(0.0214)	(0.177)
Judicial independence		0.000***	0.0378	-0.000
		(0.000)	(0.0257)	(0.000)
Reliability of police services		0.000*	0.00594	0.000

		(0.000)	(0.0304)	(0.000)
Constant	-0.0602**	-0.0442*	-1.457	0.036
	(0.0242)	(0.0233)	(1.224)	(0.030)
Year dummies	YES	YES	YES	YES
Adjusted R2	8%	7%	12%	15%
Observations	922	894	1254	344
Chi2 test MC=NC	4.41*	3.98*		3.51**

Note: Entries are unstandardized coefficients. In parentheses are standard errors clustered at the country level.

* p<.10, ** p<.05, *** p<.01. In Column 4 we employ a measure of market corruption derived from GCB.

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At the next step, we add additional controls - judicial independence and reliability of police services – as proxies for the anticorruption control (Column 2 in Table 6-5). This almost didn't affect the results. As in this case we are safe to assume that the strength of reverse influence running from investments to corruption is the same for both types of corruption, any difference between the estimated coefficients at MC and NC reflects differing impact of MC and NC on investments. Therefore, we find that network corruption is more detrimental for investments than market corruption. When we re-estimate the same regressions separately (see Column 3 in Table 6-5), we find that the coefficient at NC remains statistically significant, while the coefficient at MC remains insignificant, which supports previous conclusions.

Finally, we re-estimated our regressions using the GCB-based measure of actual experience with bribery as a measure of market corruption. This exercise didn't change our results qualitatively, though the coefficient at NC became larger and slightly less statistically significant, which seems to be due to a decrease in the number of observations (see Table 6-5, Column 4). This suggests that our findings are robust to a possibly imprecise measurement of market corruption using WEF data.

Table 6-6: The effect of corruption categories on investments (% GDP), aggregated WEF data 2007-2016.

	(1)	(2)
Low MC-high NC	BASE	
High MC-low NC	0.341***	0.301***
	(0.113)	(0.111)
Low MC- low NC	0.0505	0.00928
	(0.0691)	(0.0759)
High MC-high NC	0.112	0.121
	(0.0860)	(0.0843)
HDI	0.332	0.116
	(0.229)	(0.300)
Population growth	-0.0139	-0.0217
	(0.0184)	(0.0206)
Judicial independence		-0.0695
		(0.0442)
Reliability of police services		0.122**
		(0.0525)
Constant	2.850***	3.043***
	(0.186)	(0.250)
Observations	140	140
R-squared	8%	11.3%

Note: Entries are unstandardized coefficients. Standard errors clustered at the country level are in parentheses. * p<.10, ** p<.05, *** p<.0

The analysis of corruption regimes reveals that the group of countries with a high MC and a low NC exhibits the highest investment rates (see Table 6-6). However, countries with high MC and high NC already do not have any advantage in investments. Moreover, countries with high NC have lower investment rates, irrespective of the level of MC. These findings additionally suggest that MC has a less detrimental impact on investments and may even have a 'greasing' effect, unlike NC which unambiguously 'sands'. Interestingly, the group of countries where both types of corruption are low does not exhibit high investment rates. We may speculate that this is

because most countries in our main sample are developing, with relatively poor formal institutions, which may be compensated by a higher market corruption.

6.5. Summary and implications

In this study we advance a division between market corruption—impersonal bribery—and network corruption conditional on social connections. We provide a thorough theoretical discussion on these types of corruption and analyze them jointly across many countries using data from the World Economic Forum. Our main findings and their implications may be summarized as follows.

First of all, we show that the cross-country correlation between market and network corruption is high and positive, which suggests that these types of corruption go hand-in-hand. This match, however, is far from to be perfect and not the same at different levels of corruption. While countries with low market corruption tend to exhibit low network corruption, this is not the case for countries with moderate levels of market corruption. Many those countries have relatively high levels of network corruption, which suggests that focusing exclusively on bribery and ignoring network corruption may result in underestimating the overall scale of corruption and distorting national corruption rankings.

Secondly, in line with theoretical expectations, we show that network corruption is more related to countries' cultural/historical backgrounds including legal origins, the spread of Protestantism, and the strength of family ties and values than market corruption, while the latter is more sensitive to current economic development. This suggests that highlighting network corruption could help to understand the reasons for the persistence of corruption and its well-known resistance to the redesign of formal institutions (Persson, Rotstein, and Teorell, 2013; Heywood, 2017). Currently, there are two major approaches to this issue. One approach considers corruption as 'frequency-dependent equilibria' where expected gain from corruption crucially depends on the perceived number of other people participating in it (Andvig and Moene, 1990; Bardhan, 1997; Corbacho et al., 2016). Therefore, corruption is persistent because it is widespread. The other approach assumes that corruption persists as it works as a 'problem-solving' mechanism that compensates for the weakness of formal institutions (e.g., Marquette and Peiffer, 2015).

Our study highlights another source of corruption persistence, namely its embeddedness in social networks and structures and consistency with particularistic values and reciprocity norms. On the one hand, social networks tend to evolve slowly over time and reproduce themselves (e.g., see Kostiuchenko, 2012 for evidence on the continuity of Soviet elites in Ukraine), which implies that social interactions that are embedded in these networks persist as well. On the other hand, social networks have enforcement and self-protection mechanisms, which allow to hide informal or illegal transactions from outsiders. Moreover, in many societies network corruption may be viewed as acceptable, or 'grey', in Heidenheimer's (2002) terms, as it is linked to particularistic cultural traditions and follows reciprocity norms, which additionally supports its persistence.

Thirdly, we receive that network corruption is more harmful for investments than market corruption, while the latter may even facilitate investments. These findings may be interesting in light of discussion on whether corruption may 'grease the wheels' (Meon and Sekkat, 2005), suggesting to focus more on the issue *which corruption* may 'grease the wheels'. Moreover, as network corruption is close to favoritism, these findings also complement existing qualitative and theoretical studies on the impact of favoritism (Bramoullé and Goyal, 2016; Loewe et al., 2008).

Fourthly, we might speculate that distinguishing between market corruption and network corruption may be potentially useful for better understanding of the linkage between corruption and political (in)stability. One may expect that market corruption should be more harmful for political stability as everyone who has money can turn policies to their favor (Kang, 2002). Network corruption, in turn, should maintain political stability, as it assumes that authorities and business form an informal coalition based on partnership, friendship, or family relationships. However, even if network corruption seems to be less destructive for political stability, it may help to 'stabilize' less democratic (authoritarian) regimes and thus hinder the country's political development and transition to democracy in the long run.

Last but not the least, considering the market-network dimension of corruption might help to choose more appropriate anti-corruption policy measures. The standard legal institutional measures should be more efficient in countries with widespread market corruption, in line with the economics framework (e.g, World Bank, 2000). However, one should have in mind that "*if reforms eliminate certain loopholes and reduce one form of corruption, but corruption simply pops up somewhere else - like squeezing a balloon – then arguably the underlying causes of corruption may remain intact*" (Morris, 2009, p.12). Market corruption may partially evolve to network

corruption which is harder to fight (Lee, 2018). Although any concrete policy recommendations are out of the scope of our paper, a policy accent in this cases may be on such policies as the removal of conflicts of interest and the rotation of public officials (Abbink, 2004). It also makes much sense to investigate why social networks sustain corruption and not, instead, cultivate more fair practices (Lambsdorff, 2007)

7. Conclusion

The present dissertation aims to provide a small contribution to the "big" theoretical question of why some countries are more prosperous than the others. We highlight some important aspects of this interesting and understudied topic associated with historical family structures and the current day levels of corruption. Our main findings can be briefly summarised as follows. First, family extendedness across the regions of the Russian Empire is revealed to be positively correlated with favourable geo-climatic conditions for agriculture, low existential and economic security along with the strong group identity of the local population. Second, we trace the path dependence from the Cool Water-condition to the historical level of reproductive autonomy, and, finally, to the contemporary emancipative outcome. Third, we argue that the nuclear family entails liberal voting over a century of Russian history. Fourth, using historical data for West and East European countries we show that generational hierarchy i.e., the power of older generations over younger has a detrimental effect for current day interpersonal trust. Finally, we distinguish between market and network corruption and come to the conclusion that network corruption is more strongly associated with historical and cultural variables. Moreover, network corruption has a stronger negative effect on the investment rate which means that it "sands the wheels" of the economy to a larger extent than market corruption.

7.1 Is everything predetermined?

Our study (like other "legacy" studies) faces the problem of geographical or historical determinism. Are regions well-suited for agriculture doomed to be dominated by extended families, associated with institutional underdevelopment? And conversely, are the regions scoring high on the Cool Water index marked out for developmental success? We would suggest

a negative answer to these questions. The observed institutional and cultural persistence does not mean that *everything* has been predetermined since prehistoric times.

Some scholars argue that it is wrong to examine the effect of particular institutions in isolation while a more rigorous approach would be to study *systems* or *configurations* of institutions (Dennison, 2021; Acemoglu, Robinson, 2022). For example, many Russian regions would have much more advanced institutions as predicted by their CW-condition scores if they had not been dominated by the Tatar-Mongols for about 300 years (Welzel et al., 2021). Similarly, high female age at marriage is more beneficial for economic development when it is caused by additional labour opportunities for women instead of extreme poverty and the inability to form a family at a young age (Dennison, 2021).

It should be also noted that institutions and values can change over the course of time and, consequently, the developmental trajectories of societies may change as well. Family structure, as touched on in our study, experienced major changes at least twice during the history of the population in response to changes in the household's economic designation. The shift from the nuclear to the extended family structure first occurred after the Neolithic revolution when the household acquired a new role as an agricultural production unit (Welzel et al., 2021). The reverse shift was observed in the course of the industrialisation process when agriculture ceased to play the main role in the economy. It was also argued that during the Middle Ages the Catholic Church and the hide order ("Hufenverfassung") of the Carolingian Empire stimulated the spread of nuclear families that substituted extended ones (Schulz et al., 2019; Greif, 2006; Mitterauer, 2003). Building on this brief analysis we suggest the consideration of historical legacy in terms of "institutional systems" and co-existence between "persistence" and "change" instead of some sort of determinism.

We would also like to encourage our reader not to distinguish between "good" and "bad" historical legacies. We do find that generational hierarchy and family extendedness are harmful to trust formation and liberal values supporting democracy and the market economy. However, to evaluate all of the advantages and disadvantages of extended and nuclear families, our study would need to cover many other different aspects of social life such as individual life satisfaction and well-being, existential security, the ability to solve conflicts and readiness to use violence etc. It could be the case that people from extended families get more physical, economic and emotional support from their relatives that contributes to their well-being and existential security. The collectivistic values promoted in extended families may be helpful for solving conflicts in a peaceful way. To sum up, the "legacy" effect of historical family structure should be evaluated based on a thorough investigation of various contemporary social outcomes.

7.2 Directions for future research

This dissertation has several limitations that can be addressed in future research. First, we plan to extend our historical dataset using data for more fine-grained regional units and adding new countries. We also intend to complement it with geo-climatic variables derived from the global grid celled GIS databases. Second, this new dataset will enable us to investigate the determinants of historical family structure relying on a more extensive European sample. A larger number of countries will provide more heterogeneity in terms of geo-climatic conditions and make it possible to include in the analysis additional determinants of historical family structure that were not relevant for the Russian study. Among these determinants are, for instance, exposure to the Catholic Church, traces of Medieval colonisation, imperial legacy, inheritance type etc.

Third, using the extended dataset we could explore further contemporary outcomes of the historical family structure. It would make sense to focus on life satisfaction and individual well-being, both factors closely associated with the private sphere and family life. In addition, it is of great interest to study the effect of historical family structure on particularistic vs. universalistic values. Particularistic values imply that people put emphasis on kinship ties, social connections and status position in hierarchical social order when deciding how to treat other people, while universalistic values prescribe the treatment of all people based on the same universal roots. These values, supposedly, depend on the role of the family in the society. Apart from this, institutional characteristics e.g., democracy, corruption, the rule of law, use of violence etc., may be linked with historical family structure and are worth further study.

Fourth, we intend to collect data on family structure from contemporary censuses and to match them with the historical dataset. By doing so we can examine the persistence in family structure across a century and, gain an insight into the determinants of persistence or change. Moreover, it may shed light on the mechanism of the "family legacy" effect. We can answer the question of why historical family structure affects contemporary values and institutions: is it because 1) family structure is highly persistent itself, or 2) social values "outlive" the pre-industrial family arrangements which brought them into existence?

Our network and market corruption study could also be fruitfully extended. At the moment it faces the problem of data limitation. Comparable international indexes of network and market corruption could push forward our knowledge about the multifaceted nature of corruption and guide scholars' attention away from the already well-studied question of whether corruption is "good" or "evil" for the economy. We hope that all these intriguing topics, aimed at better understanding of values and institutions together with their historical origins, will be investigated in future studies.

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APPENDIX CHAPTER 2 (CH-2)

Table CH2-A1: Description and sources of the main independent variables.

Variable	Source	Method of calculation
Distance to the Fertile Crescent	Following Gangal el al., (2014) we measure distance to Gesher (Israel). It was one of the independent origins of the Neolithic revolution from which farming spread across Europe.	Distance between the centroids of the Russian districts and the centroid of Gesher, calculated using QGIS, version 2.14.3.
Mean temperature in the hottest month	Mean temperature in the hottest month of the year aggregated for 30 years from 1987-2017, www.meteoblue.com.	We collected data for the locations that were available and then merged them with the Russian historical districts.
Mean precipitation in the driest month of the year	As we are more interested to know how dry the climate is, we take mean precipitation in the driest month aggregated for 30 years from 1987-2017, www.meteoblue.com.	
Soil suitability for agriculture	Global suitability of soil project (http://geoportal-glues.ufz.de/stories/globalsuitability.html). The index score is based on such parameters as temperature,	The scores were aggregated at the level of the Russian historical districts using QGIS, version 2.14.3.

	soil quality, precipitation and topography.	
Share of territory covered with forest	Share of land covered with forest in pre-medieval times (Pongratz et al., 2008).	
Terrain elevation	The Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010), www.usgs.gov.	
Distance to the nearest river	Global Self-consistent, Hierarchical, High-resolution Geography Database (GSHHG), https://www.ngdc.noaa.gov/mgg/shorelines/.	Distance between the historical districts' centroids and the nearest point at the river, calculated using QGIS, version 2.14.3.
Orthodox (%) Protestants (%) Muslims (%)	Russian census, 1897.	We compare Protestants with the Orthodox and Muslims, because these two religions were the most widespread in the Russian empire.
Ethnicity	Russian census, 1897.	Percentage of people speaking different languages. We use the groups of languages provided with the census table firstly because single languages are often spoken by a negligible share of the district's population. Our second goal was to reduce the number of

		possible predictors. We split the groups of languages only when 1) ethnicities that belong to one group are not located close to each other, for example the Indo-European group (Greek, Indian, Armenian…) 2) we expect that the effects of particular languages might be different, for example the Lithuanian, Latvian and Zhmudskiy languages. 3) the share of people speaking one particular language is predominant within the group, for example theRomanian languages where Moldavian and Romanian prevail over other languages.
Modernisation	Russian census, 1897.	First principal component from literacy (% people 6+ who can read and write) and urbanisation (% of urban population).
Population density	Russian census, 1897.	People/km2.
Land ownership	Statisticheskiy vremennik Rossiyskoy imperii, serie 3. Edition 10. Pozemelnaya	% of land in private property, village community, church and the state.

	sobstvennost Evropeyskoy Rossii 1877 and 1878. (1886)	
Existential security	1. Vestnik zentralnogo statisticheskogo komiteta MVD, N41 Umershie nasilstvenno I vnezapno v 1988-1893, ed. 1897. 2. Statisticheskiy ezhegodnik Rossii, otdel 3, Sankt Peterburg, 1912.	1. Percentage of people killed of people who died suddenly. 2. Percentage of people suffering from infectious diseases in 1909.

APPENDIX CHAPTER 3 (CH-3)

Table CH3-A1: Data sources

Variable name	Variable description	Source	Year	N
CWI	Cool Water Index. We calculate 6 different versions of this index (for details see the do.file), but in the SEM analysis we use only the fourth version of CWI.	www.meteoblue.com	1988-2018	98
Historical variables used in SEM model				
Fertility	Coale A.J. fertility index Coale's fertility index compares the number of births to married women in a population with the number of births these women would have had if they had experienced the highest births as Hutterite women.	Vishnevskyi, Volkov, 1977	1897	50
women15-19	Share of married women 15-19	Census of the Russian Empire	1897	88
Child_mortality 0_1	Number of children died 0-1 / number of birth	Central Statistical committee of the	1903-1905	50

Child_mortality 3_4	Number of children died 3-4 / number of birth	Ministry of Internal Affairs, Dvizhenie naselenija v Evropejskoj Rossii, v dvuh gubernijah Sibiri : Enisejskoj i Tobol'skoj I Semipalatinskoj oblasti za 1900 god., Saint Petersburg, 1906., Dvizhenie naselenija v Evropejskoj Rossii, v dvuh gubernijah Sibiri : Enisejskoj i Tobol'skoj i Semipalatinskoj oblasti za 1901 god., Saint Petersburg, 1906., Dvizhenie naselenija v Evropejskoj Rossii, v dvuh gubernijah Sibiri : Enisejskoj i Tobol'skoj i Semipalatinskoj oblasti za 1902 god., Saint Petersburg, 1907., Dvizhenie naselenija v Evropejskoj Rossii, v dvuh gubernijah Sibiri : Enisejskoj i Tobol'skoj i Semipalatinskoj oblasti za 1903 god., Saint Petersburg, 1909.	1903-1905	50
forest_per_dec	Share of territory covered by forest	http://ristat.org/	1897	88
rye_area	Share of land cropped with rye (data for other crops potato, peas, bean, oat, barley and wheat are also available)	http://ristat.org/	1897	72
Rye productivity	Rye output in pud (16.3 kg) / area cropped by rye (decytin)	http://ristat.org/	1897	58

Literacy	Share of people 9+ who can read and write	Census of the Russian Empire	1897	89
Urbanization (component of "wealth")	Proportion of urban population	Census of the Russian Empire	1897	85
Density	Population density population per $1km^2$	Census of the Russian Empire	1897	89
Industrial output	Industrial output per capita in thousands rubel	http://ristat.org/	1897	88
share_HH6_plus	Share of households with 6 persons and more	Census of the Russian Empire	1897	89
Mean_hh_size	Mean household size without 1 person households	Census of the Russian Empire	1897	89
landplot_size1_4	Proportion of people in the region having land plots of particular size	Statisticheskiy vremennik Rossiyskoy imperii, Serie 3, issue 10. Posemelnaya sobstvennost Evropeyskoy Rossii 1877-1878 (1886).	1877-1878	44
share_orthodox share_mohammedans	Proportion of representatives of Orthodox Christianity and Islam.	Census of the Russian Empire	1897	89
Contemporary variables				
Grp2019	Gross regional product per capita	Russian Federal Statistical Bureau https://fedstat.ru/	2019	87

EV	Emancipative values. For methodology see Welzel, C. (2013). *Freedom rising*. Cambridge University Press.	"Survey of Russian Regions, 2020" provided by the Laboratory of Comparative Social Research (HSE). This survey is supported by the Russian Science Foundation, grant no. 18-18-00341 "Transformation of values and subjective quality of life: a regional perspective". The data were taken from the presentation by Anna Almakaeva and Ekaterina Nastina "Emanicipative Values across Russian Regions".	2019-2020	64
share_yavlinskiy	Proportion of votes for Grigoriy Yavlinskiy, the candidate from the only liberal party in Russia (Yabloko).	Russian Federal Central Electoral Commission http://www.cikrf.ru	2000	88

Table CH3-A2: Estimates of labor share for different crops from Prussian agricultural data.

	Bean	Potato	Wheat	Oat	Pea	Rye	Barley
Labor share	0.601	0.571	0.400	0.370	0.299	0.149	0.079

Source: Fouka, Schlaepfer, 2014

Table CH3-A3: Pairwise correlations between CW index with historical economic indicators.

	Literacy	Density	Industrial output per capita (rub)
cw1	0.464***	0.375***	0.215**
cw2	0.332***	0.134	0.206*
cw3	0.474***	0.432***	0.219**
cw4	0.284***	0.035	0.221**
cw5	0.410***	0.248**	0.222**

cw6	0.354***	0.182*	0.205*

Table CH3-A4: Pairwise correlations between CW index with natural or agricultural conditions.

	% land covered with forest	% of cultivated land	% land seeded with rye	rye productivity (pud per decyatina)	labor intensity
cw1	0.371***	0.314***	0.560***	0.272**	-0.063
cw2	0.359***	0.005	0.327***	0.498***	-0.378***
cw3	0.369***	0.380***	0.615***	0.175	0.097
cw4	0.418***	-0.095	0.273**	0.552***	-0.404***
cw5	0.403***	0.132	0.449***	0.429***	-0.258**
cw6	0.347***	0.089	0.391***	0.4526***	-0.308**

Table CH3-A5: Pairwise correlations between CW index and land plots size.

	% of people living on land plots less than 2 decyatin	% of people living on land plots 2-4 decyatin	% of people living on landplots 4-6 decyatin	% of people living on 6+ decyatin
cw1	-0.043	0.298	0.311**	-0.527***
cw2	0.107	0.180	0.426***	-0.381***
cw3	-0.161	0.307**	0.473***	-0.5037***
cw4	0.071	0.169	0.309**	-0.349**
cw5	-0.009	0.268*	0.420***	-0.498***
cw6	0.114	0.192	0.313**	-0.400***

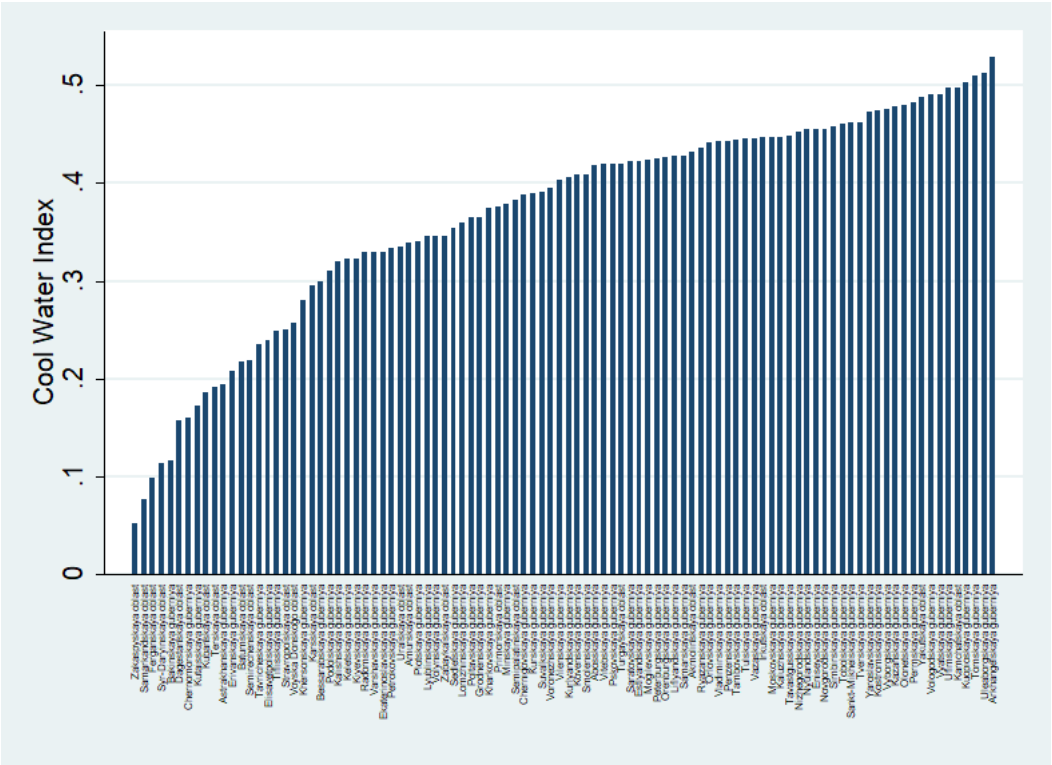
1 decyatina = 1.09 hectar

Table CH3-A6: Pairwise correlations between CWI and reproductive autonomy

CWI version	% of hh with 6 and more persons	Mean hh size	% of married women aged15-19	Fertility rates	Infant mortality (age 0-1)	Child_ mortality (age 3-4)
1	0.128	0.090	-0.812***	-0.004	0.171	-0.147
2	0.117	0.053	-0.716***	0.039	0.497***	-0.302**

3	0.134	0.073	-0.732***	-0.059	0.203	-0.150
4	0.113	0.053	-0.640***	0.005	0.550***	-0.327**
5	0.123	0.095	-0.778***	-0.010	0.330**	-0.234
6	0.121	0.048	-0.737***	0.053	0.460***	-0.280**

Figure CH3-A1: The distribution of CW-Index in the Russian Empire.



APPENDIX CHAPTER 4 (CH-4)

Table CH4-A1. Sources of historical data on family structure.

Historical state	Contemporary state	Source
Albania	Albania	Albanian census 1918, Mosaic Project https://censusmosaic.demog.berkeley.edu
Bulgaria	Bulgaria	Mosaic project, https://censusmosaic.demog.berkeley.edu
France	France	1. INSEE, Recencements de 1851 à 1921 (données de la SGF) http://www.insee.fr/fr/service/bibliotheque/tableaux_sgf/tableaux.asp?domaine=rec 2. Mosaic project, https://censusmosaic.demog.berkeley.edu
Germany	Germany, Poland	1. Vierteljahrshefte zur Statistik des Deutschen Reichs für das Jahr 1873", Verlag des Königlich Preussischen Statistischen Bureaus, 1874, provided by the DFG project 'Digitisation of the Statistics of the German Reich [A.F.] 1873-1883]' 2. Mosaic project, https://censusmosaic.demog.berkeley.edu
England and Wales	England and Wales	IPUMS, International
Habsburg Empire (Austrian part)	Austria, Szech Republik, Slovenia, Poland, Croatia, Northern Italy.	1. Household statistic, 1910 Österreichische Statistik, N. F., vol. 4, no. 3, p. 1. Wien 1918. 2. Mosaic project, https://censusmosaic.demog.berkeley.edu
Habsburg Empire (Hungarian part)	Hungary, Slovakia, Romania, Croatia.	1. évi népszámlálás. [Census 1910]. Vol. 6. Végeredmények összefoglalása. [Summary of results]. 1920 2. Mosaic project, https://censusmosaic.demog.berkeley.edu
Italy	Italy	"Sommario di Statistiche Storiche dell'Italia (1861-1975)", Instituto Centrale di Statistica, Roma, 1976.
Russian Empire	Russia, Poland, CIS states	1. Troinitskiy N. (1899-1904) The first universal census of Russian Empire, 1897. Central Statistical Agency of the Ministry of Internal Affairs (Первая всеобщая перепись населения Российской Империи, 1897 г Центральный статистический комитет МВД). 2. Mosaic project, https://censusmosaic.demog.berkeley.edu
Scotland	Scotland	IPUMS, International

Serbia	Serbia	Statistique du Royaume de Serbie, Belgrade, Imprimerie de l'etat du Royaume de Serbie, vol. XXIII-XXIV, 1903-1905
Sweden	Sweden	IPUMS, International

Table CH4-A2. Availability of historical explanatory variables

State	Province	Year	mean_HH no one person	one person HH	Mean HH (mean HH no children)	Mean kin group no one person hh	Children/adults	HH adult children	HH married son	Elderly not HH head
Albania		1923								
Albania		1918	X	X	X	X	X	X	X	X
Bulgaria		1877-1947								
Bulgaria		1881								
England and Wale		1881	X	X	X	X	X	X	X	X
France		1891								
France		1886	X	X	X	X	X	X	X	X
France		1881								
France		1872								
France		1846								
German Empire		1871	X	X						
	Prussia	1871								
	Ostpreussen, Danzig	1695-1772								
German Empire	Posen	1666-1809								
	Bromberg	1766-1792								
	Breslau, Liegnitz, Oppeln	1747-1805								
Habsburg Empire (Austrian part)		1900	X	X						

Austrian provinces	Silesia	1747-1805									
	Styria	1910									
	Galizia	1747-1805									
		1910									
Hungary											
Habsburg Empire (Hungarian part)			X	X	X	X	X	X	X	X	
		1869									
	Kingdom of Croatia	1910									
Italy		1901	X	X							
Italy		1900									
Polish provinces	Warshau	1666-1809									
	Warshau, Plotsk	1766-1792									
	Kalissk	1790-1792									
	Kelitsk, Petrokovsk	1789-1792									
	Lyublinsk, Sedletsk	1791-1792									
Romania		1859									
Romania		1838	X	X	X	X	X	X	X	X	
Russian Empire		1897	X	X							
Russian Empire	Vilna, Minsk	1768-1804									
	Volhinya	1791-1792									
	Volhinya, Kiev	1791									
	Minsk	1795			X	X	X	X	X	X	
Scotland		1881	X	X							
Serbia		1900	X	X							
Sweden		1900									
Sweden		1880	X	X	X	X	X	X	X	X	

State	Province	Year	Lateral relatives	Vertical family extensions (all variables)	Servants	women20_29	female hh heads (G)	young brides (G)	wives older (G)	female non kin (G)	Population density
											X
Albania		1923	X	X	X	X	X	X	X	X	
Albania		1918					X	X	X	X	
Bulgaria		1877-1947									X
Bulgaria		1881	X	X	X	X	X	X	X	X	X
England and Wale		1881									
France		1891	X	X	X	X					
France		1886									X
France		1881									
France		1872					X	X	X	X	
France		1846				X					X
German Empire		1871									
German Empire	Prussia	1871					X	X	X	X	
	Ostpreussen, Danzig	1695-1772					X	X	X	X	
	Posen	1666-1809					X	X	X	X	
	Bromberg	1766-1792					X	X	X	X	
	Breslau,	1747-1805				X					X

	Liegnitz, Oppeln																						
Habsburg Empire (Austrian part)		1900									X			X			X			X			
Austrian provinces	Silesia	1747-1805									X			X			X			X			
	Styria	1910										X			X			X			X		
	Galizia	1747-1805																					X
Hungary		1910	X		X		X		X			X			X			X			X		
Habsburg Empire (Hungarian part)		1869																					X
	Kingdom of Croatia	1910							X			X			X			X			X		X
Italy		1901																					
Italy		1900									X			X			X			X			
Polish provinces	Warsaw	1666-1809									X			X			X			X			
	Warsaw, Plotsk	1766-1792									X			X			X			X			
	Kalissk	1790-1792									X			X			X			X			
	Kelitsk, Petrokovsk	1789-1792										X			X			X			X		

	Lyublinsk, Sedletsk	1791-1792											X
Romania		1859	X		X	X	X	X	X	X			
Romania		1838			X	X							X
Russian Empire		1897					X	X	X	X			
Russian Empire	Vilna, Minsk	1768-1804					X	X	X	X			
	Volhinya	1791-1792					X	X	X	X			
	Volhinya, Kiev	1791	X		X	x		X	X	X	X		
	Minsk	1795					X	X	X	X	X		X
Scotland		1881					X	X	X	X	X		X
Serbia		1900						X	x	x	x		
Sweden		1900	X		X	X	X					X	
Sweden		1880											

Note: Time periods (ex.1666-1809) mean that different localities within one historical region were studied at different time points. Geographic indicators and Medieval Church exposure based on GIS analysis are time invariant variables and are available for all the regions.

Table CH4-A3: Regional geographic and historical controls

Variable	**Source**
Population density	Rothenbacher, F. (2017). *The European Population, 1850-1945*. Springer. Rothenbacher, F. (2016). The Central and East European Population since 1850. Springer.
Cool Water Index (CWI)	To calculate CWI we used methodology elaborated by Welzel, C., Alexander, A. C., & Klasen, S. 2018. The Cool Water Effect. www.researchgate.net. Data on temperature and precipitations is based on information

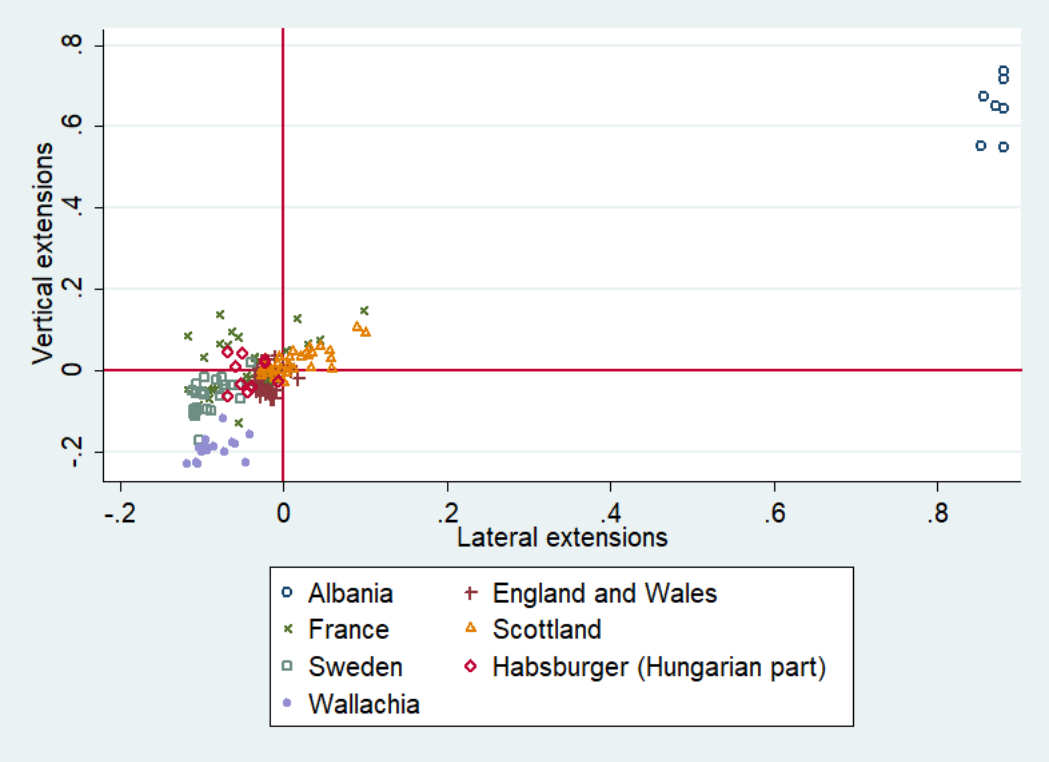
	from meteorological stations www.meteoblue.com
Caloric suitability of land for agriculture	Galor and Özak, 2016
Ruggedness of the terrain	Nunn and Puga, 2012
Proximity to the waterways (distance from the centroid of the region to the nearest point on the coast or on the main river)	Global Self-consistent, Hierarchical, High-resolution Geography Database (GSHHG), https://www.ngdc.noaa.gov/mgg/shorelines/
Prevalence of land suitability for hunting and gathering over agriculture	Beck and Sieber, 2010
Exposure to the medieval Catholic church	Schulz et a., 2019b

Table CH4-A4: The effect of the mean household size and the proportion of never married women in the age group 20-29 on the contemporary level of out-group trust (extended sample and core sample).

	Extended sample		Core sample	
DV: out-group trust (LiTS, 2010)	(1)	(2)	(3)	(4)
% of single women 20-29	1.620**	0.824	-0.713	-0.776
	(0.673)	(0.705)	(1.214)	(1.291)
Population density		1.54e-05		7.19e-06
		(1.81e-05)		(2.44e-05)
CWI		1.736		-0.433
		(1.509)		(1.192)
Individual level controls		YES		
Historical country FE		YES		
Observations	22,860	22,860	4,042	4,042
R-squared	0.098	0.107	0.225	0.225

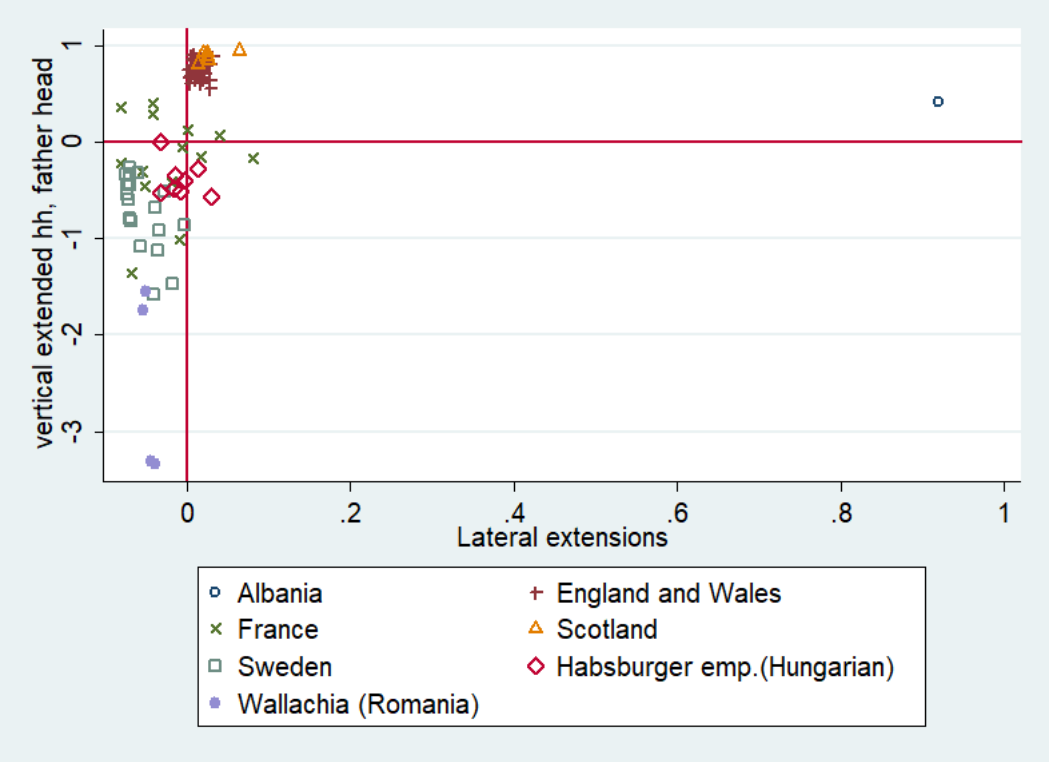
Note: For comparison we estimate the same model specification on a core sample in order to observe how the coefficients change with the increase of the sample size.
Standard errors are clustered at the level of historical sub-national regions (292 regions).
*** p<0.01, ** p<0.05, * p<0.1

Figure CH4-A1: Incidence of vertical and lateral extensions across 94 regions (core sample) of Western and Eastern Europe.



Note: Both variables were rescaled so that 0 is the mean value. On the x-axis is shown the percentage of historical households that have lateral (horizontal) extensions. On the y-axis is shown the percentage of historical vertically extended households headed by the oldest man in the household.

Figure CH4-A2: Incidence of generational hierarchy and lateral extensions across 94 regions (core sample) of Western and Eastern Europe.



Note: Both variables were rescaled so that 0 is the mean value. On the x-axis is shown the percentage of historical households that have lateral (horizontal) extensions. On the y-axis is shown the generational hierarchy index scores.

APPENDICES CHAPTER 5 (CH-5)

Appendix CH5-A: Electoral support of other major candidates in 1996 / 2000

Table CH5-A1: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections, **other major candidates**

	(1) Share of votes for Zhirinovskiy OLS	(2) Share of votes for Zhirinovskiy OLS	(3) Share of votes for Zhirinovskiy OLS	(4) Share of votes for Yeltsin OLS	(5) Share of votes for Putin OLS
MFS (census 1897)	0.180	-0.306***	-0.060	-7.027***	-4.093***
	(0.142)	(0.0585)	(0.082)	(0.720)	(0.564)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-6.752**	-1.766	-4.248***	31.93***	3.267
	(2.641)	(1.228)	(1.487)	(8.938)	(10.39)
Proxy for wealth (census 1897)	0.261*	-0.0119	0.124	-1.339*	-3.313***
	(0.155)	(0.0542)	(0.0941)	(0.726)	(0.807)
Share of agricultural employment (census 1897)	6.081***	1.396***	3.727***	-24.92***	-15.87***
	(1.099)	(0.368)	(0.631)	(4.856)	(5.021)
Dummy ethnic region (contemporary Russia)	-2.591***	-0.842***	-1.720***	6.522***	9.576***
	(0.218)	(0.0804)	(0.119)	(1.024)	(0.992)
Time FE			YES		
Dummies federal districts	YES	YES	YES	YES	YES
Constant	6.196***	4.885***	7.609***	68.64***	82.17***
	(1.851)	(0.791)	(1.040)	(8.365)	(7.951)
Number of observations	1,521	1,519	3,040	1,476	1,519
R squared	0.343	0.443	0.588	0.353	0.299
Period	1996	2000	Pooled 1996/2000	1996	2000

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Appendix CH5-B: IV regressions

For a successful IV strategy, we require a variable that would have a strong and significant effect on our explanatory variable (MFS) but at the same time be unrelated to any other characteristics of a locality, i.e., ideally determined by factors orthogonal to district characteristics. Weather shocks and their consequences have been particularly often used as instruments to deal with endogeneity, since the orthogonality assumption is in this case easy to justify (Miguel et al. 2004; Brueckner and Ciccone 2011; Tertychnaya and Lankina 2020). Natural disasters, similarly, have been used for causal identification in the social science literature (Baez and Santos 2007; Lazarev et al. 2014; Nikolova and Marinov 2017). We follow a similar approach and use exposure to the famine of 1891-1892 to single out exogenous variation in our explanatory variable.

The famine (Smith 1892; Robbins 1975; Simms 1982) was caused by weather conditions (a dry autumn and extremely cold winter with little snow, as well as a dry summer) and especially affected the Volga River basin and other parts of the Empire. The famine's victim count could have reached half a million people. As a consequence, the Imperial government called upon the citizens to create voluntary organizations to provide relief to affected territories. A tool particularly important for these relief measures were grain loans to peasants provided by local institutions (both governmental bureaucracies and self-government institutions of *zemstvo*) to the affected peasantry to replenish crops. The peasants were obligated to submit some of their crops in more successful years to local authorities so that they could accumulate grain resources to be distributed to the peasants in times of need. The Central Statistical Committee of the Ministry of the Interior of the Russian Empire collected data on issued grain loans (*khlebnye ssudy*) provided during the famine; we use this information to identify the extent to which a district was affected by the famine.

We argue that the weather shocks causing the famine were allocated across the territory of the Russian Empire in a way orthogonal to any other regional characteristics influencing (contemporary or future) political outcomes; at the same time, the famine could have had a significant impact on MFS. Specifically, on the one hand, the famine could have reduced MFSs due to high death tolls across the population. On the other hand, an increasing availability of agricultural land (due to the decline of the population) could have triggered an increase in MFS to process new land available to the peasants (Clay and Johnson 1992); furthermore, the death of family members could have forced blood relatives to form larger families to maintain agricultural production. Orphans could have also moved in with their surviving relatives, increasing MFS. There is some evidence of greater increases in the use of agricultural land by peasants as a consequence of famine (Akul'shin 2017).

From the point of view of the exclusion restriction, we acknowledge that the famine by itself may have affected peasants' political behaviors; however, while this issue is relevant for the 1917 elections (some twenty-five years after the famine; the literature documents that historical shocks could have left persistent legacies, see e.g., Rozenas and Zhukov 2019), it is unlikely that legacies of the famine survived to 1996, given that the Soviet population had suffered multiple other famines over the preceding century (e.g., from 1921-22, 1932-1933, and 1946-1947), as well as multiple other, substantially larger shocks and periods of prolonged hunger (e.g., during the Stalinist collectivization, Civil War or World War 2).

We use the share of people who received grain subsidies as our instrument for the MFS and report the results in *Table B1* (due to data availability issues, we remove some observations). The F-statistic for excluded instruments is substantially greater than 10 (the typically acceptable benchmark), confirming that our instruments are strong. The results of the IV estimations fully confirm the findings of the OLS estimations in terms of effect signs and significance.

Table CH5-B1: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections and of the family structure on the support of the Kadet party (%) during the 1917 elections, **IV estimates**

	(1) Share of votes for Kadet 2SLS	(2) Share of votes for Zyuganov 2SLS	(3) Share of votes for Zyuganov 2SLS	(4) Share of votes for Zyuganov 2SLS	(5) Share of votes for Yavlinskiy 2SLS	(6) Share of votes for Yavlinskiy 2SLS	(7) Share of votes for Yavlinskiy 2SLS
MFS (census 1897)	-1.957**	23.22***	14.17***	18.69***	-2.078***	-1.703***	-1.889***
	(0.854)	(2.618)	(1.992)	(1.665)	(0.388)	(0.321)	(0.256)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-13.956**	-61.62***	-22.78**	-42.24***	5.336*	1.871	3.626**
	(5.706)	(15.19)	(11.51)	(9.930)	(2.852)	(2.270)	(1.843)
Proxy for wealth (census 1897)	-0.223	2.312**	2.745***	2.528***	-0.255*	0.550*	0.148
	(0.463)	(0.945)	(0.725)	(0.606)	(0.138)	(0.295)	(0.174)
Share of agricultural employment (census 1897)	-6.468	9.164	4.606	6.896	-2.900**	-1.734	-2.324**
	(3.938)	(6.909)	(5.423)	(4.485)	(1.157)	(1.623)	(1.046)
Dummy ethnic region (contemporary Russia)		-0.516	-5.870***	-3.185***	0.134	0.521***	0.324**
		(1.158)	(0.889)	(0.760)	(0.237)	(0.181)	(0.154)
Constrant	29.013***	-41.57***	-26.69***	-29.40***	13.83***	11.57***	14.03***
	(3.784)	(10.70)	(7.869)	(6.864)	(1.863)	(1.923)	(1.297)
Number of observations	385	1,476	1,474	2,950	1,476	1,474	2,950
F of excluded instruments	32.63***	129.82***	129.11***	260.02***	129.82***	129.11***	260.02***
R squared	0.33	0.37	0.18	0.32	0.21	0.35	0.39
Imperial era macroregion dummies	YES						
Federal districts dummies		YES	YES	YES	YES	YES	YES
Period	1917	1996	2000	Pooled 1996/2000	1996	2000	Pooled 1996/2000
Time FE				YES			YES

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Appendix CH5-C: MFS and extended family

In this appendix, we report additional tests validating our claim that MFS can be seen as an (imperfect) proxy for the spread of extended family. In particular, we argue that differences in fertility (and hence, number of minors in a family) do not necessarily lead us to making wrong conclusions about the spread of extended family in a district using data on the MFS we apply in this paper.

1) As mentioned, the best test validating our claim would be to look at individual census data, where family status of individuals in the household was recorded. Unfortunately, for almost all regions these data did not survive; however, they are available for the Tobolskaya gubernia. We used these data (published here: https://person1897.histcensus.asu.ru/) to test whether the MFS (as defined above) and the average number of blood relatives in the household excluding children of the age of 0-14 years are correlated. The correlation coefficient is equal to .79 and is significant at 1% level (number of households = 16,415; number of settlements = 9).

2) Another test can be performed using data collected by Kravtsova et al. (2018), who assembled data on family structure using microdata from historical censuses in Western and in Eastern Europe in the 19th century (IPUMS International and MOSAIC project). In this dataset, both variables MFS (as defined in this paper) and MFS excluding children of age 0-14 years are available. The variables are highly correlated: the correlation coefficient is equal to .87 and is significant at 1% level (the dataset contains 178 historical regions). It is highly unlikely that Russia is an abnormal case in Europe for which this correlation would not hold.

3) Mironov (2016, 2018: 664), in his work on the social history and demography and Russia, similarly comes to the conclusion that size of the family can serve as a proxy for whether the family is a nuclear or an extended one (relying on evidence from local case studies). He concludes that families consisting of less than 5 individuals are usually nuclear, while families with 6 members are typically extended (nuclear family unit + unmarried relatives of the same generation) and families with 7 and more members are multiple (multigenerational families with several marital units). Thus, qualitative evidence on Russian history also supports our conclusions.

Appendix CH5-D: Marital unit per household

An alternative indicator suggested in the literature is the so-called 'marital unit per household' (MUH). MUH is obtained by dividing the "absolute numbers of married, widowed and divorced males, as well as widowed and divorced females, by the total number of households in a given region" (Szoltysek et al. 2014). In the Table D1, we replicate the results of the main regressions of this study replacing the MFS by the MUH and estimating regressions using regions (gubernia) rather than districts as the unit of observation (for districts, MUH data is not available). One can see that the main results hold [the regressions do not control for the number of children per woman, since MUH is an indicator explicitly computed from the population of adults]

Table CH5-D1: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections and of the family structure on the share of votes for Kadet party (%) in 1917 elections, **MUH instead of MFS**

	(1) **Share of votes for Kadets** **OLS**	**(2)** **Share of votes for Zyuganov** **OLS**	**(3)** **Share of votes for Yavlinskiy** **OLS**
MUH (census 1897)	-6.132**	0.218***	0.0182
	(2.608)	(0.0665)	(0.0159)
Share of agricultural employment (census 1897)	-34.65*	0.0374	0.127*
	(18.65)	(0.233)	(0.0756)
Proxy for wealth (census 1897)	-5.212	-0.0541	0.0304**
	(3.789)	(0.0376)	(0.014)
Dummies federal districts		YES	YES
Dummies historical regions	YES		
Time FE		YES	YES
Constant	22.81***	0.105	-0.061
	(4.940)	-0.17	-0.0595
Observations	39	148	148
R-squared	0.420	0.429	0.455
Period	1917	Pooled 1996/2000	Pooled 1996/2000

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Furthermore, Kravtsova et al. (2018), using the dataset of 178 European regions, correlated MUH and the indicator identical to one used in this paper (MFS), as well as the MFS excluding children of 0-14 years. They found that all three indicators were significantly correlated with each other. Thus, similarity of results using MUH and MFS is not surprising.

It remains to point out that MUH also faces a number of important problems. Already the original paper introducing this measure (Parish and Schwarz 1972) indicated one of them: never married persons, who live in the same household, are included in the denominator, but not in the numerator. Since the data we have do not distinguish between single households occupied by widowed or divorced people and never married people living separately, we cannot solve this problem, which could bias the MUH indicator. Furthermore, Szoltysek et al. (2014) indicates that MUH does not account for the horizontal extension of domestic groups, which result from the presence of unmarried siblings, aunts, uncles, nephews etc., of the family head or head's spouse

Appendix CH5-E: Additional regressions

Table CH5-E1: Effect of the family structure on the share of votes for Kadet party (%) in 1917 elections, **controlling for landscape characteristics and agricultural suitability**

	(1) OLS	(2) OLS
MFS (census 1897)	-0.601**	-0.547*
	(0.302)	(0.302)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-20.65***	-23.36***
	(5.635)	(5.480)
Proxy for wealth (census 1897)	0.0950	0.200
	(0.479)	(0.507)
Share of agricultural employment (census 1897)	-7.958***	-7.611**
	(3.049)	(3.264)
Landscape dummies (mountains as reference group) (Moon 2013)		
Coniferous forest		4.730***
		(1.366)
Mixed forest		1.491
		(1.262)
Forest steppe		1.199
		(1.218)
Steppe		1.193
		(1.257)
Caloric Suitability (Galor and Özak 2016)	-0.00184***	
	(0.000388)	
Constant	30.37***	27.08***
	(4.480)	(4.933)
Observations	420	403
R-squared	0.358	0.398

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-E2: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections, **controlling for landscape characteristics and agricultural suitability**, pooled data for 1996/2000

	(1) Share of votes for Yavlinskiy OLS	(2) Share of votes for Yavlinskiy OLS	(3) Share of votes for Zyuganov OLS	(4) Share of votes for Zyuganov OLS
MFS (census 1897)	-0.867***	-0.652***	7.208***	5.628***
	(0.114)	(0.111)	(0.649)	(0.573)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	1.039	-3.072**	15.38*	25.92***
	(1.976)	(1.386)	(9.089)	(5.947)
Proxy for wealth (census 1897)	0.00455	0.301	1.738***	1.494***
	(0.167)	(0.196)	(0.556)	(0.543)
Share of agricultural employment (census 1897)	-4.953***	-3.461***	16.50***	19.40***
	(1.048)	(1.099)	(3.784)	(3.610)
Landscape dummies (mountains as reference group) (Moon 2013)				
Coniferous forest	2.011***		-4.540*	
	(0.688)		(2.512)	
Mixed forest	0.729		7.367***	
	(0.668)		(2.479)	
Forest steppe	0.547		10.23***	
	(0.677)		(2.579)	
Steppe	-0.0242		10.23***	
	(0.680)		(2.551)	
Semi desert and desert	0.796		10.57***	
	(0.726)		(2.894)	
Caloric Suitability (Galor and Özak 2016)		-0.000911***		0.00763***
		(0.000100)		(0.000488)
Constant	11.17***	14.09***	-23.37***	-28.35***
	(1.379)	(1.102)	(6.373)	(4.496)
Time FE	Yes	Yes	Yes	Yes
Observations	2,518	2,966	2,518	2,966
R-squared	0.409	0.397	0.459	0.385

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-E3: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections and of the family structure on the share of votes for Kadet party (%) in 1917 elections, **controlling for the share of men aged 40-59**

	(1) Share of votes for Kadets	(2) Share of votes for Yavlinskiy	(3) Share of votes for Zyuganov
MFS (census 1897)	-1.260***	-1.077***	8.281***
	(0.374)	(0.120)	(0.672)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-20.10***	4.882**	-18.05*
	(6.416)	(2.152)	(9.805)
Proxy for wealth (census 1897)	-0.505	0.635**	-0.133
	(0.442)	(0.256)	(0.624)
Share of agricultural employment (census 1897)	-10.31***	-1.425	9.186**
	(2.956)	(1.421)	(4.169)
Share of men aged 40-59 (census 1897)	28.48	15.08**	-89.08***
	(20.75)	(6.568)	(29.13)
Dummies federal districts		YES	YES
Dummies historical regions	YES		
Time FE		YES	YES
Constant	27.61***	5.566**	23.48**
	(7.408)	(2.449)	(10.62)
Observations	380	2,442	2,442
R-squared	0.426	0.427	0.450
Period	1917	Pooled 1996/2000	Pooled 1996/2000

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-E4: Effect of the family structure on the share of votes for Kadet party (%) in 1917 elections, **controlling for main religious groups and geographical characteristics**

	(1) OLS	(2) OLS
MFS (census 1897)	-0.854***	-0.828**
	(0.329)	(0.347)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-19.36***	-20.21***
	(6.277)	(6.608)
Proxy for wealth (census 1897)	-0.698*	-0.498
	(0.419)	(0.463)
Share of agricultural employment (census 1897)	-11.94***	-11.00***
	(2.822)	(3.024)
Less than 50 km. to the main river (GSHHG*)	-0.307	-0.288
	(0.337)	(0.337)
Less than 50 km to the sea (GSHHG)	1.275	1.910
	(1.277)	(1.319)
Elevation (GMTED)**	-0.000955	-0.00185**
	(0.00116)	(0.000884)
% Muslims (census 1897)		-0.0346**
		(0.0143)
% Jews (census 1897)		-0.137***
		(0.0513)
% Old believers (census 1897)		0.255***
		(0.0951)
% Protestants (census 1897)		0.0758
		(0.0564)
% Armenians (census 1897)		-0.185*
		(0.111)
% Catholics (census 1897)		-0.0329***
		(0.0123)
Dummies historical regions	YES	YES
Constant	30.85***	30.99***
	(4.833)	(5.094)
Observations	419	418
R-squared	0.373	0.413

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses. ***Global Self-consistent, Hierarchical, High-resolution Geography Database (GSHHG),** https://www.ngdc.noaa.gov/mgg/shorelines/

** The Global Multi-resolution Terrain Elevation Data 2010 (GMTED2010), www.usgs.gov

Table CH5-E5: Effect of the historical family structure on the support of Yavlinskiy (%) during the 1996 and 2000 elections, **controlling for historical religions, geographical characteristics of historical units, modern economic and social development and modern MFS**

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS	(9) OLS
MFS (census 1897)	-1.168***	-1.104***	-1.015***	-0.997***	-0.710***	-0.672***	-1.073***	-0.889***	-0.845***
	(0.135)	(0.148)	(0.167)	(0.165)	(0.194)	(0.209)	(0.109)	(0.124)	(0.148)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	6.231**	6.604***	2.232	-0.187	0.320	-5.646	3.219*	3.920	-1.671
	(2.510)	(2.456)	(2.796)	(2.796)	(4.019)	(4.059)	(1.890)	(2.409)	(2.804)
Proxy for wealth (census 1897)	-0.0688	-0.284	-0.353**	1.021***	0.117	0.186	0.466**	-0.108	-0.0851
	(0.171)	(0.175)	(0.167)	(0.352)	(0.266)	(0.229)	(0.214)	(0.161)	(0.156)
Share of agricultural employment (census 1897)	-3.903***	-4.951***	-2.533*	-0.569	-3.160	0.945	-2.344*	-4.299***	-0.809
	(1.163)	(1.323)	(1.322)	(2.108)	(2.220)	(1.954)	(1.283)	(1.317)	(1.331)
Less than 50 km. to the main river (GSHHG)	0.340*	-0.231	-0.331	-0.0601	-0.0492	-0.0495	0.145	-0.129	-0.194
	(0.194)	(0.185)	(0.204)	(0.146)	(0.163)	(0.144)	(0.124)	(0.128)	(0.137)
Less than 50 km to the sea (GSHHG)	15.16***	13.44	1.030	8.160***	40.35*	19.93	11.55***	27.66**	10.82
	(3.871)	(18.63)	(11.88)	(2.680)	(20.75)	(15.50)	(3.396)	(13.84)	(9.962)
Elevation (GMTED)	-0.00112	-0.00164***	-0.00156*	0.00159	0.000738	0.000721	8.72e-05	-0.000710	-0.000426
	(0.000741)	(0.000599)	(0.000843)	(0.00134)	(0.00180)	(0.00135)	(0.000778)	(0.000932)	(0.000864)
% Muslims (census 1897)	-0.00705	0.00415	0.00678	-0.00141	9.81e-05	0.00328	-0.00393	0.00265	0.00504
	(0.00597)	(0.00595)	(0.00538)	(0.00446)	(0.00712)	(0.00472)	(0.00374)	(0.00473)	(0.00380)
% Jews (census 1897)	-0.342***	-0.354***	-0.310***	-0.287***	-0.191***	-0.109***	-0.316***	-0.274***	-0.210***
	(0.0542)	(0.0425)	(0.0388)	(0.0515)	(0.0411)	(0.0413)	(0.0406)	(0.0338)	(0.0352)
% Armenians (census 1897)	-214.3***	-199.7	35.45	-115.5***	-597.8**	-268.4	-163.5***	-410.4**	-121.3
	(57.53)	(270.0)	(172.8)	(41.16)	(302.1)	(224.5)	(50.03)	(201.1)	(144.4)
% Old Believers (census 1897)	-0.0702***	-0.0412	0.0348	-0.0775***	-0.0790**	-0.00798	-0.0716***	-0.0565**	0.0132
	(0.0263)	(0.0265)	(0.0258)	(0.0244)	(0.0377)	(0.0266)	(0.0182)	(0.0237)	(0.0194)
% Catholics (census 1897)	0.439	0.429**	0.423	0.459**	0.133	0.0359	0.440**	0.259*	0.226
	(0.289)	(0.212)	(0.264)	(0.201)	(0.201)	(0.146)	(0.182)	(0.149)	(0.153)
% Protestants (census 1897)	-0.168	-0.136*	-0.142	-0.118*	-0.0220	0.00531	-0.141**	-0.0726	-0.0675
	(0.105)	(0.0724)	(0.0883)	(0.0690)	(0.0680)	(0.0509)	(0.0651)	(0.0511)	(0.0522)
Contemporary MFS (Rosstat, 2010)		-0.235	0.00464		1.409**	1.407		0.567	0.701
		(0.414)	(0.481)		(0.683)	(0.855)		(0.429)	(0.550)
Contemporary number of children per woman (Rosstat, 2012)		-2.003*	0.896		-2.632***	0.693		-2.284***	0.787
		(1.168)	(1.297)		(0.789)	(0.695)		(0.716)	(0.778)
Share of urban population, 2012 (Lankina and Libman 2021)			0.0208***			0.00972***			0.0152***
			(0.00248)			(0.00195)			(0.00168)
Number of doctors per capita, 2012 (Lankina and Libman 2021)			0.000368*			-4.40e-05			0.000156
			(0.000214)			(0.000354)			(0.000214)
Share of population with university degree, 2012 (Lankina and Libman 2021)			0.0115***			0.0138***			0.0125***
			(0.00358)			(0.00497)			(0.00343)
Income per capita, 2012 (Lankina and Libman 2021)			4.01e-05**			0.000101***			6.97e-05***
			(1.78e-05)			(2.29e-05)			(1.60e-05)

Housing construction, 2012 (Lankina and Libman 2021)			-5.56e-06***			-6.59e-09			-2.98e-06
			(2.14e-06)			(3.31e-06)			(2.26e-06)
Retail trade turnover, 2012 (Lankina and Libman 2021)			0.0119			0.00340			0.00984
			(0.0184)			(0.0202)			(0.0157)
Dummy ethnic regions (contemporary Russia)	0.407*	0.952***	1.059***	0.377**	0.259	-0.196	0.389***	0.614***	0.436
	(0.237)	(0.265)	(0.303)	(0.159)	(0.261)	(0.356)	(0.148)	(0.201)	(0.266)
Dummies federal districts	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE							YES	YES	YES
Constant	9.080***	10.33***	6.920***	8.239***	5.091***	1.757	9.901***	8.852***	5.796***
	(1.958)	(1.836)	(1.963)	(2.106)	(1.534)	(1.651)	(1.405)	(1.228)	(1.381)
Observations	1,484	1,092	810	1,482	1,090	809	2,966	2,182	1,619
R-squared	0.267	0.381	0.555	0.387	0.298	0.596	0.415	0.483	0.638
Period	1996	1996	1996	2000	2000	2000	Pooled 1996/2000	Pooled 1996/2000	Pooled 1996/2000

Note: the data for the contemporary characteristics of districts (housing, income etc.) were extracted by Lankina and Libman (2021) from the Russian municipal statistics. Unfortunately, the information in this dataset is highly incomplete and differs a lot across regions. Thus, Lankina and Libman assembled the dataset in the following way: they tried to collect data for the date, which would be as closed as possible to 2012, depending on the data availability for individual regions. Income is computed as unweighted average of income per capita across various industries of the district. Earlier data (for the 1990s and early 2000s) are unavailable. *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-E6: Effect of the historical family structure on the support of Zyuganov (%) during the 1996 and 2000 elections, **controlling for historical religions, geographical characteristics of historical units, modern economic and social development and modern MFS**

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS	(6) OLS	(7) OLS	(8) OLS	(9) OLS
MFS (census 1897)	10.36***	8.432***	7.172***	5.647***	3.987***	3.400***	7.995***	6.211***	5.272***
	(1.005)	(1.176)	(1.262)	(0.616)	(0.717)	(0.791)	(0.586)	(0.682)	(0.726)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-24.86**	-35.96***	-32.24**	-1.600	-20.19*	-46.34***	-13.42*	-28.05***	-38.89***
	(11.59)	(13.85)	(13.76)	(8.673)	(11.08)	(12.59)	(7.915)	(9.746)	(9.667)
Proxy for wealth (census 1897)	0.0121	0.656	-0.0157	1.327**	2.055***	1.198	0.679	1.354**	0.580
	(0.905)	(1.183)	(0.885)	(0.635)	(0.771)	(0.754)	(0.563)	(0.682)	(0.617)
Share of agricultural employment (census 1897)	21.29***	27.22***	9.295	14.16***	21.23***	16.97***	17.83***	24.21***	13.06***
	(6.047)	(7.992)	(6.616)	(4.462)	(5.885)	(5.855)	(3.839)	(4.939)	(4.636)
Less than 50 km. to the main river (GSHHG)	0.252	2.412***	0.965	-2.373***	-1.252	-2.927***	-1.066*	0.580	-0.983
	(0.831)	(0.868)	(0.851)	(0.717)	(0.841)	(0.967)	(0.572)	(0.635)	(0.685)
Less than 50 km to the sea (GSHHG)	14.55	111.3	207.6**	23.08*	315.5**	291.5**	18.92**	213.4**	251.7***
	(17.58)	(115.1)	(95.10)	(11.83)	(138.1)	(130.2)	(9.549)	(85.31)	(82.22)
Elevation (GMTED)	-0.00336	0.00149	0.00417	-0.00203	0.00237	0.00284	-0.00255	0.00192	0.00349
	(0.00303)	(0.00423)	(0.00343)	(0.00242)	(0.00266)	(0.00317)	(0.00207)	(0.00277)	(0.00235)
% Muslims (census 1897)	0.105***	0.0253	-0.0300	0.00824	-0.0756***	-0.0642**	0.0565***	-0.0251	-0.0469**
	(0.0322)	(0.0383)	(0.0284)	(0.0238)	(0.0287)	(0.0311)	(0.0213)	(0.0249)	(0.0223)
% Jews (census 1897)	1.050***	0.846***	1.126***	1.330***	1.159***	1.755***	1.192***	1.002***	1.436***
	(0.274)	(0.291)	(0.263)	(0.354)	(0.387)	(0.319)	(0.228)	(0.250)	(0.220)
% Armenians (census 1897)	-171.9	-1,530	-3,149**	-214.9	-4,425**	-4,214**	-194.7	-2,978**	-3,712***
	(264.1)	(1,676)	(1,384)	(176.5)	(2,005)	(1,886)	(144.3)	(1,239)	(1,192)
% Old Believers (census 1897)	0.161	-0.0130	-0.0714	0.317***	0.189*	0.197	0.237**	0.0881	0.0617
	(0.158)	(0.124)	(0.121)	(0.0887)	(0.0972)	(0.147)	(0.0988)	(0.103)	(0.0981)
% Catholics (census 1897)	0.437	1.643*	1.772**	0.551	1.999**	2.601**	0.503	1.820**	2.185***
	(0.716)	(0.978)	(0.850)	(0.722)	(0.984)	(1.227)	(0.512)	(0.711)	(0.756)
% Protestants (census 1897)	0.175	-0.478	-0.449	-0.423*	-1.111***	-1.288***	-0.126	-0.794***	-0.868***
	(0.240)	(0.327)	(0.285)	(0.251)	(0.343)	(0.418)	(0.170)	(0.243)	(0.257)
Contemporary MFS (Rosstat, 2010)		-3.703*	-1.840		-1.544	-0.717		-2.631*	-1.262
		(2.118)	(2.490)		(1.546)	(2.183)		(1.390)	(1.889)
Contemporary number of children per woman (Rosstat, 2012)		2.808	-7.128		13.39***	6.415		8.101**	-0.409
		(5.252)	(5.864)		(4.283)	(5.438)		(3.456)	(4.108)
Share of urban population, 2012 (Lankina and Libman 2021)			-0.0760***			-0.0340**			-0.0548***
			(0.0127)			(0.0144)			(0.00990)
Number of doctors per capita, 2012 (Lankina and Libman 2021)			-0.00140**			-0.00108			-0.00128*
			(0.000564)			(0.000939)			(0.000700)
Share of population with university degree, 2012 (Lankina and Libman 2021)			-0.0133			0.0448***			0.0155
			(0.0131)			(0.0126)			(0.0102)
Income per capita, 2012 (Lankina and Libman 2021)			-0.000674***			-0.000468***			-0.000578***
			(6.41e-05)			(6.96e-05)			(5.41e-05)
Housing construction, 2012 (Lankina and Libman 2021)			2.08e-05***			1.32e-05*			1.59e-05**
			(5.58e-06)			(7.60e-06)			(6.52e-06)
Retail trade turnover, 2012 (Lankina and Libman 2021)			-0.0296			-0.0407			-0.0224
			(0.0427)			(0.0588)			(0.0444)

Dummy ethnic regions (contemporary Russia)	-1.624	-3.562***	1.721	-7.216***	-9.394***	-2.864**	-4.417***	-6.476***	-0.568
	(1.095)	(1.203)	(1.268)	(0.902)	(1.108)	(1.273)	(0.728)	(0.848)	(0.942)
Dummies federal districts	YES	YES	YES	YES	YES	YES	YES	YES	YES
Time FE							YES	YES	YES
Constant	-5.327	17.58*	45.13***	-1.201	15.80*	43.35***	-9.412***	-11.63***	-9.719***
	(8.567)	(10.44)	(10.32)	(6.510)	(8.293)	(9.447)	(0.396)	(0.436)	(0.458)
Observations	1,484	1,092	810	1,482	1,090	809	2,966	2,182	1,619
R-squared	0.513	0.488	0.637	0.322	0.319	0.349	0.440	0.456	0.515
Period	1996	1996	1996	2000	2000	2000	Pooled 1996/2000	Pooled 1996/2000	Pooled 1996/2000

Note: the data for the contemporary characteristics of districts (housing, income etc.) were extracted by Lankina and Libman (2021) from the Russian municipal statistics. Unfortunately, the information in this dataset is highly incomplete and differs a lot across regions. Thus, Lankina and Libman assembled the dataset in the following way: they tried to collect data for the date, which would be as closed as possible to 2012, depending on the data availability for individual regions. Income is computed as unweighted average of income per capita across various industries of the district. Earlier data (for the 1990s and early 2000s) are unavailable. *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-E7: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections and of the family structure on the share of votes for Kadet party (%) in 1917 elections, **controlling for the share of never married women**

	(1) Share of votes for Kadets OLS	(2) Share of votes for Yavlinskiy OLS	(3) Share of votes for Zyuganov OLS
MFS (census 1897)	-0.782**	-1.130***	8.186***
	(0.315)	(0.115)	(0.590)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-17.89***	1.646	-13.48*
	(6.011)	(1.552)	(7.318)
Proxy for wealth (census 1897)	-0.616	0.416**	0.705
	(0.444)	(0.201)	(0.564)
Share of agricultural employment (census 1897)	-11.71***	-2.267**	15.62***
	(2.988)	(1.138)	(3.693)
% of never married women aged 20-29 (census 1897)	4.151***	0.0743	-2.804
	(1.226)	(0.343)	(2.473)
Dummies federal districts		YES	YES
Dummies historical regions	YES		
Time FE		YES	YES
Constant	28.22***	11.25***	2.334
	(4.682)	(1.259)	(5.544)
Observations	422	2,962	2,962
R-squared	0.386	0.402	0.418
Period	1917	Pooled 1996/2000	Pooled 1996/2000

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-E8: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 and 2000 elections and of the family structure on the share of votes for Kadet party (%) in 1917 elections, **dropping possibly collinear controls**

	(1) Share of votes for Kadets OLS	(2) Share of votes for Kadets OLS	(3) Share of votes for Yavlinskiy OLS	(4) Share of votes for Yavlinskiy OLS	(5) Share of votes for Zyuganov OLS	(6) Share of votes for Zyuganov OLS
MFS (census 1897)	-0.939***	-1.219***	-1.160***	0.00674	8.272***	0.968***
	(0.339)	(0.346)	(0.109)	(0.0432)	(0.545)	(0.252)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-18.98***	-19.70***	1.577	-4.508***	-13.75**	25.47***
	(6.086)	(6.363)	(1.448)	(1.540)	(6.662)	(8.240)
Proxy for wealth (census 1897)	-8.016***		-4.435***		11.18***	
	(1.369)		(0.418)		(1.728)	
Share of agricultural employment (census 1897)		1.017***		1.012***		-3.397***
		(0.247)		(0.0739)		(0.274)
Dummies historical regions	YES	YES				
Dummies federal districts			YES	YES	YES	YES
Time FE			YES	YES	YES	YES
Constant	28.35***	25.37***	12.85***	8.102***	4.276	22.67***
	(4.300)	(4.772)	(1.057)	(1.139)	(4.774)	(6.109)
Observations	426	422	3,046	3,070	3,046	3,070
R-squared	0.366	0.340	0.398	0.362	0.410	0.334
Period	1917	1917	Pooled 1996/2000	Pooled 1996/2000	Pooled 1996/2000	Pooled 1996/2000

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Appendix CH5-F: Spatial econometrics

As the first step of our analysis, we compute the measures of spatial association of the MFS in our data (we use the sample of contemporary Russian *rayony* for that to make the results better compatible with the next steps of research). Indeed, MFS exhibits strong spatial correlation: Moran's I is equal to 0.194 (and is significant at 1% level) and Geary's C is equal to 0.835 (and is equally significant at 1% level).

To deal with the problem of spatial correlation in residuals, we replicate our main regressions for the 1996 and 2000 elections using spatial lag and spatial error models. The spatial weights matrix is the inverse distance matrix constructed using QGIS from Open Street Map (https://en.wikipedia.org/wiki/OpenStreetMap). The distances we use are geographical distances between the capitals of the *rayony*. Tables F1 and F2 report the spatial lag and the spatial error regressions: while, as expected the term measuring spatial correlation of residuals (rho and lambda) are highly significant, the effects of the MFS on voting remain fully robust, reassuring us in the validity of our findings.

Table CH5-F1: Effect of the historical family structure on the support of presidential candidates (%) during the 1996 elections, **spatial lag and spatial error models**

	(1) Share of votes for Yavlinskiy ML	**(2) Share of votes for Yavlinskiy ML**	**(3) Share of votes for Zyuganov ML**	**(4) Share of votes for Zyuganov ML**
MFS (census 1897)	-0.809***	-0.968***	7.187***	8.290***
	(0.121)	(0.148)	(0.752)	(0.982)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	0.999	0.349	-12.404	-8.431
	(2.118)	(2.304)	(9.547)	(10.672)
Proxy for wealth (census 1897)	-0.243*	-0.327**	1.636**	1.890**
	(0.129)	(0.135)	(0.773)	(0.831)
Share of agricultural employment (census 1897)	-4.406***	-5.101***	28.972***	31.237***
	(0.921)	(0.380)	(4.927)	(5.385)
Dummy ethnic region (contemporary Russia)	0.232	0.166	-1.190	-0.872
	(0.215)	(0.232)	(0.923)	(1.002)
Dummies federal districts	YES	YES	YES	YES
Constant	5.848***	14.888***	-43.876***	-41.432
	(1.766)	(4.808)	(8.005)	(45.549)
Lambda		0.985***		0.992***
Rho	0.985***		0.993***	

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Table CH5-F2: Effect of the historical family structure on the support of presidential candidates (%) during the 2000 elections, **spatial lag and spatial error models**

	(1) Share of votes for Yavlinskiy ML	(2) Share of votes for Yavlinskiy ML	(3) Share of votes for Zyuganov ML	(4) Share of votes for Zyuganov ML
MFS (census 1897)	-0.680***	-0.856***	3.771***	4.583***
	(0.138)	(0.171)	(0.480)	(0.594)
Children in the age of 0-4 per woman of age 15-44 (census 1897)	-1.012	-1.416	7.172	8.000
	(1.806)	(1.964)	(7.452)	(8.277)
Proxy for wealth (census 1897)	0.351	0.331	2.043***	2.093***
	(0.226)	(0.250)	(0.693)	(0.740)
Share of agricultural employment (census 1897)	-2.939**	-3.213**	17.817***	17.509***
	(1.331)	(1.474)	(4.297)	(4.616)
Dummy ethnic region (contemporary Russia)	0.501***	0.446***	-6.292***	-6.853***
	(0.171)	(0.184)	(0.802)	(0.860)
Dummies federal districts	YES	YES	YES	YES
Constant	5.378***	7.369***	-32.585***	-21.883
	(1.599)	(0.014)	(6.519)	(29.817)
Lambda		0.987***		0.989***
Rho	0.989***		0.989***	

Note: *** p < 0.01, ** p <0.05; * p<0.10. Robust standard errors in parentheses

Appendix CH5-G: Household divisions

We also considered an alternative proxy for the spread of individualism or collectivism in the Russian regions: the number of household divisions (*razdel*), i.e., cases, when blood relatives previously co-habitating in one household established two or several new households (Frierson 1967). However, this proxy is also imperfect though: to a large extent it depends on the initial MFS in the region. In regions with larger MFS size divisions may occur more frequently. And conversely in regions where nuclear families prevail (for various reasons: worse agricultural conditions, special regulations of the aristocracy possessing the land and until the Great Reforms exercising direct power over their peasants, higher death rates, lower fertility or higher out migration) household divisions might be a very rare event. Available data on household divisions (1874, see: The data was published in: Zakonodatelnye materialy po voprosam otnosyashimsya k ustroistvu selskogo chozyaistva, Izdanie zemskogo otdela ministerstva vnutrennich del, St. Petersburg, 1899) supports this conclusion. The correlation between the MFS and the percentage of divisions from the total number of families in a region is 0.33 (significant at 1% level).