

## PhD THESIS DECLARATION

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# Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
<b>2</b>	<b>Institutional Transplant and Cultural Proximity: Evidence from Nineteenth-Century Prussia</b>	<b>3</b>
2.1	Introduction . . . . .	3
2.2	Historical Overview . . . . .	6
2.2.1	The Situation of the Holy Roman Empire before 1800 . . . . .	6
2.2.2	The French Revolution and the Napoleonic Military Campaigns . . . . .	8
2.2.3	The Imposition of the French Institutions . . . . .	9
2.3	Data and Variables . . . . .	10
2.4	Institutional Transplant and Religious Beliefs . . . . .	16
2.4.1	Identification strategy . . . . .	16
2.4.2	Results . . . . .	17
2.4.3	Robustness Checks . . . . .	18
2.4.4	Diff-in-Diff Specification . . . . .	22
2.5	Possible Alternative Explanations . . . . .	23
2.6	Discussion: The Relevance of Cultural Commonality . . . . .	25
2.7	Concluding Remarks . . . . .	28
<b>3</b>	<b>In Difference We Trust: Heterogamous Marriages and Cultural Transmission</b>	<b>31</b>
3.1	Introduction . . . . .	31
3.2	Model . . . . .	34
3.2.1	General Case . . . . .	34
3.2.2	Example . . . . .	36
3.2.3	Homogamous Couples . . . . .	37
3.3	Data . . . . .	37
3.4	Empirical Specification . . . . .	38
3.4.1	Main Specification . . . . .	38
3.4.2	Main Findings . . . . .	39

3.5	Transmission Channels: Discussion . . . . .	44
3.6	Concluding Remarks . . . . .	53
<b>4</b>	<b>Turmoil after Death: Leadership, Protests, and Growth</b>	<b>55</b>
4.1	Introduction . . . . .	55
4.2	Data and Variables . . . . .	56
4.3	Empirical Analysis . . . . .	59
4.3.1	Synthetic Control Method . . . . .	59
4.3.2	Main Findings . . . . .	60
4.4	Panel Data Analysis . . . . .	63
4.5	Concluding Remarks . . . . .	66

# List of Figures

2.1	Holy Roman Empire in 1789 . . . . .	7
2.2	Counties Under Napoleonic Influence . . . . .	9
2.3	Share of Protestant 1871 . . . . .	11
2.4	The expansion of Protestantism in Germany to 1570 . . . . .	13
3.1	Distribution of Mother's Values Across Different Marriages . . . . .	39
3.2	Distribution of Father's Values Across Different Marriages . . . . .	40
4.1	SCM in Countries with Unrests . . . . .	62
4.2	SCM in Countries with No Unrests . . . . .	65
4.3	Placebo Test: SCM in Countries with No Artificial Death . . . . .	65



# List of Tables

2.1	Summary Statistics . . . . .	15
2.2	Comparison of Means . . . . .	16
2.3	Institution and Religious Affiliation . . . . .	18
2.4	Robustness Checks on the Baseline Model . . . . .	21
2.5	Difference in Difference Estimation . . . . .	24
2.6	Alternative Channels . . . . .	26
2.7	The Effect of Cultural Commonality . . . . .	27
3.1	Summary Statistics . . . . .	38
3.2	Cultural Transmission: Trust . . . . .	41
3.3	Cultural Transmission: Preferences for Redistribution . . . . .	42
3.4	Cultural Transmission: Role of Women in the Labor Market . . . . .	43
3.5	Cultural Transmission: Trust (including additional controls) . . . . .	45
3.6	Cultural Transmission: Preferences for Redistribution (including additional controls) . . . . .	46
3.7	Cultural Transmission: Role of Women in the Labor Market (including additional controls) . . . . .	47
3.8	Cultural Transmission by Gender . . . . .	48
3.9	Time Allocation: Childcaring Activities . . . . .	50
3.10	Comparison of Means: Childcaring Activities . . . . .	50
3.11	Time Allocation: Childcaring Activities only for US Born Respondents . . . . .	51
3.12	Time Allocation: Childcaring Activities using Genetic Distance . . . . .	52
4.1	Summary statistics: Means All Collective Actions by Regime . . . . .	57
4.2	Summary statistics: Means General Strikes by Regime . . . . .	59
4.3	Summary statistics: Means Riots by Regime . . . . .	59
4.4	Comparisons of Means: Unrests Around the Death . . . . .	60
4.5	Comparisons of Means: Unrests Around the Death by Regime . . . . .	60
4.6	Leader's Effect: Panel Analysis . . . . .	64
4.7	Leader's Effect: Panel Analysis Controlling for Unrests . . . . .	64





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## Abstract

The thesis contains three chapters on culture, institutions and economic growth. Chapter 2 analyzes whether the economic impact of an institutional transplant depends on the underlying cultural environment of the receiving country. This chapter provides the first evidence that the positive effect of importing good institutions cancels out when the receiving territories are characterized by cultural traits in conflict with those embedded in the imported institutions. We obtain this result using county-level data from late nineteenth-century Prussia. This environment allows us to exploit both the quasi-natural experiment generated by the radical Napoleonic institutional reforms and the deeply rooted cultural heterogeneity across Prussian counties. First, using religious affiliation as a proxy of cultural commonality, we find no effect of French institutions in Protestant areas. Then, using hand-collected data on pre-Napoleonic reigns we show that kingdoms with stronger ties to French culture exhibit a more effective transplant even when controlling for institutional proximity. Our findings are consistent with the hypothesis that cultural compatibility between the country exporting the institution and the receiving areas is a significant determinant of a successful transplant. Chapter 3 focuses on parental socialization and cultural transmission. Are cultural traits transmitted when partners share different values? This chapter provides evidence that suggests they are. First, a new stylized model of cultural transmission predicts that in heterogeneous couples (i.e. those in which parents do not share the same cultural traits) cultural differences within parents incentivize additional effort compared to homogamous ones. The empirical analysis confirms that a strong correlation between one of the parents and the son exists and that the gender of the successful transmitter depends on the analyzed trait. Specifically, European survey data (ESS) are used in the empirical specification to capture this correlation between parents' culture (measured as the average value in the country of origin) and the respondent's one. Finally, the prediction of the model on higher effort in heterogamous couples is tested using American Time Use Survey (ATUS) data matched with CPS. Results confirm that spouses with different cultural background (proxied with different nationality or with genetic distance) spend on average 10% more time in child caring activities. Finally Chapter 4 provides evidence that the change in economic performance is not only driven by the differences between leaders per se. Political transitions generate instability and a window of opportunity that may lead to turmoils and protests. We use leaders' deaths in office as a source of exogenous transition and historical data on unrests. Using synthetic control method we find robust evidence that protests significantly affect economic growth after a change in leader and, thus it is a relevant confounding factor.

# Chapter 1

## Introduction

This thesis considers three different aspects that are very relevant for economic growth: institutions, culture and leaders. All of these three variables are important drivers for economic outcomes. Good institutions have been unanimously associated with better economic performance. Culture and social norms are fundamental for social interaction, law enforcement and long-term outcomes. In the next chapters I will delve more the effect of these variables in order to better understand the mechanisms behind. In the recent past economists have extensively investigated the impact of institutions on economic performance. In the first chapter of this thesis, jointly written with Laura Ogliari, we analyze how good institutions may have heterogeneous effect on economic outcomes depending on the interactions with local culture. Culture is, in my opinion, crucial for political and economic outcomes. In previous works we have evidence of higher political accountability or better economic performance in presence of higher social capital. Hence introducing culture in our economic analysis is important to better understand social phenomena. We estimate the interaction between institution and culture after an institutional transplant. We exploit historical data and a specific geographical environment, nineteenth-century Prussia, which allows us to exploit institutional exogeneity. The second chapter provides new evidence on cultural transmission. Many studies have documented cultural persistence, which has a strong impact on long-term economic outcomes. However, the mechanisms which determine this persistence are still unclear. I focus my attention on marriages where partners share different cultural traits and I analyze their ability to transmit cultural values. In societies where inter-ethnic and international marriages are increasing it is important to better understand cultural transmission mechanisms. In this chapter, I provide a stylized model of cultural transmission where parents compete on the trait to transmit and decide their own investment in term of effort. Then, I analyze correlation in cultural traits between parents and children using survey data. Finally, I test model's implication on effort exploiting time use diaries. The last chapter, also joint with Laura Ogliari, focuses on the role of leaders. National policymakers play a

relevant role for the organization and the well functioning of a country. Moreover their skills and ability are crucial for the economic performance. In the existing literature the evidence suggests that leaders are strongly affecting economic performances, especially in less democratic countries. We disentangle this "personal" effect from other confounding factor. Leader's transitions, in fact, generate a window of opportunities and this may determine social and political turmoils. This is true, especially in countries where rules and formal institutions are weak.

## Chapter 2

# Institutional Transplant and Cultural Proximity: Evidence from Nineteenth-Century Prussia

### 2.1 Introduction

Economists have long argued the importance of good institutions for economic growth. Rule of law, better enforcement of contracts, security of property rights are usually associated with better economic outcomes, such as higher investment in physical and human capital, and technological progress. Some countries lacking good legal institutions have attempted to import them from abroad with the goal of boosting economic growth (e.g. Chinese antitrust law, Japanese national Civil Code). However, the adoption of good foreign institutions not always led to positive economic outcomes (e.g. in British African colonies).

Why does institutional transplant fail? Is culture responsible for it? When institutions are perceived as "foreign" or in conflict with local culture and social norms they may not be assimilated and, thus, not fully enforced. If this is the case, the effectiveness of a transplanted formal institution will crucially hinge on the reception by local communities and elites. This paper focuses on the differential long term economic effect of an institutional transplant. Specifically, we argue that the growth effect of transferring a well functioning institution from its original setting depends on the cultural compatibility with the receiving country.

In order to test our hypothesis we focus on a particular historical natural experiment: the Napoleonic invasion of German territories and the consequent imposition of French institutions. Our novel finding is that the transplant of the Napoleonic Code, a good legal institution, had heterogeneous effects on economic performance across German areas characterized by different cultural traits. In particular, the transplant was more

effective in areas with stronger cultural commonality with France. The imposition of the Napoleonic Code increases our measure of economic performance by 12-20 % in areas culturally similar to France while it has virtually no effect in culturally distant ones.

A potential mechanism through which culture affects the adoption of the new formal institutions is local enforcement. In his quest to build a pan-European empire, Napoleon sought to assimilate the conquered territories and forge a class of loyal new *Frenchmen* to support him in the administration of the empire. Historical evidence shows how, in some areas, local elites willingly fit themselves into the Napoleonic society because they shared the same values, thus facilitating the implementation of new institutions (it is the case of Piedmont and Rhineland). In other areas, instead, the amalgamation policy pursued by Napoleon imposed French culture on a reluctant population and the Napoleonic Code was simply too alien to be enforced by local communities.<sup>1</sup>

In our empirical analysis we construct several measures to capture different dimensions of cultural distance with the French invader. Our first proxy of similarity is the Protestant share of the population. Given that France was predominantly Catholic at that time, this measure serves as an inverse proxy for cultural proximity. Religious affiliation has several advantages: it is available for all 451 Prussian counties, it is well measured and varies substantially across different areas. The Protestant share, however, may not capture all aspects of cultural commonality that maybe relevant for an institutional transplant: hence we also construct alternative proxies based on hand-collected data. These measures are intended to capture cultural linkages and the exposure to French Culture before the French revolution, namely: (i) presence of Huguenots colonies, (ii) ties between each German reign and the Kingdom of France, (iii) the attitudes of each ruler both towards the French enlightened ideals and French customs.

We perform several robustness checks to ensure that our results are not spuriously driven by observable and unobservable characteristics of Prussian counties. First, we map Prussian counties to pre-Napoleonic reigns. This allows us to condition the estimation on a full set of reign fixed effects, thereby controlling for any difference in pre-existing social norms, historical facts and economic characteristics. Second, we explore a wide range of alternative specifications using a large set of controls and different proxies for economic performance and institutions. Third, we show that our finding is not contaminated by past implementation of liberal reforms in some Prussian areas. Finally, we explore a number of competing explanations such as: (i) human capital accumulation, (ii) religious fractionalization within county and (iii) religious diversity with neighboring counties. We find none of these to fully explain our results.

Our paper contributes to an emerging literature on the interplay between cultural traits and institutions. Guiso et al. (2015) argue that social norms are crucial to sustain

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<sup>1</sup>See Parsons (2010).

legal institutions. Acemoglu and Jackson (2014), in a seminal paper, model the interaction between law enforcement and social norms.<sup>2</sup> An interesting prediction of their model is that laws in conflict with prevailing social norms may backfire as they do not spur the private cooperation from citizens necessary for an effective enforcement. We are the first to address a similar question from an empirical perspective. In the context of Napoleonic invasions, their prediction implies that the reception of French institutions can be different depending on the underlying cultural environment of the several states receiving the Code, consistently with our results.

We also connect to three strands of research. First we relate to the literature on transplant of legal systems.<sup>3</sup> While these studies mainly focus on the effectiveness of imported legal institutions and attribute differences in adoption to the process of lawmaking and to the demand for law, we test the channel of cultural similarity as a mediating factor in the reception of transplanted institution and analyze the long term economic effect of the interplay between new legal institutions and the local culture. The second important stream of literature we connect to is the one investigating the importance of good institutions for economic growth. Starting with the seminal work of Douglass North, many scholars have emphasized that institutions "matter".<sup>4</sup> In an influential paper, Acemoglu et al. (2011) exploited the variation in institutional reforms during Napoleonic campaigns across 18<sup>th</sup> and 19<sup>th</sup> century to show that these radical reforms had a positive and significant effects on long-term economic performance.<sup>5</sup> In contrast to the existing contributions, our analysis does not focus on the positive effect of adopting a good institution but on the heterogeneous reception and the different economic effect in areas characterized by variegated cultural traits.

Finally, we touch upon the literature analyzing the link between culture and economic performance.<sup>6</sup> In particular, related to our paper are the works by Becker and Woessmann (2009) and Cantoni (2014). They test the Weberian hypothesis<sup>7</sup> using data on early modern Germany – the same historical environment that we exploit – and provide controversial results. Cantoni (2014) analyzes the impact of Protestantism on urbanization, starting from the 17<sup>th</sup> century. He finds no significant effect of Protestant ethic on economic development. Becker and Woessmann (2009) use an argument similar to the

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<sup>2</sup>Bisin and Verdier (2015) also have a theoretical model on the interaction of culture and institutions.

<sup>3</sup>See, for example, Berkowitz, Pistor and Richards (2003).

<sup>4</sup>See, for example, North (1990) and Acemoglu et al. (2001, 2002). For the relation between institution and the legal origin of countries see Glaeser and Shleifer (2002) and La Porta et al. (2008).

<sup>5</sup>See also Acemoglu et al. (2010) and Bugge (2015).

<sup>6</sup>See Alesina and Giuliano (2010, 2015), Algan and Cahuc (2010), Bisin and Verdier (2000), Doepke and Zilibotti (2008), Fernandez, Fogli and Olivetti (2004), Galor and Moav (2002), Giavazzi et al. (2014), Greif (1993), Guiso, Sapienza and Zingales (2008), Nannicini et al. (2013), Nunn and Wantchekon (2011) and Tabellini (2008, 2010). Fernandez (2011) provides a detailed review on this literature.

<sup>7</sup>See the seminal work by Max Weber (1930) "The Protestant Ethic and the Spirit of Capitalism".



one proposed by Botticini and Eckstein (2005, 2012) stressing the importance of human capital to explain economic prosperity. Using cross-county variation in Prussia during the 19<sup>th</sup> century, they find evidence of higher level of human capital in Protestant areas, thus providing an alternative channel to explain the higher prosperity of Protestant regions. We provide the first empirical evidence of the mediating effect of culture in a law transplant, thereby marrying the literatures on culture and that on institutions.

The rest of the paper is organized as follows. Section 2.2 reviews the historical background, discussing the political situation of German territories before French invasion, French military campaigns, and the introduction of the Civil Code. Section 2.3 describes our data and provides some descriptive statistics. Section 2.4 presents our main results and discusses their robustness. Section 2.5 explores some alternative potential explanations for our findings. Section 2.6 investigates the effects of the other cultural measures, different from religious affiliation, that affect the reception of the Napoleonic code. Finally, Section 2.7 concludes.

## 2.2 Historical Overview

### 2.2.1 The Situation of the Holy Roman Empire before 1800

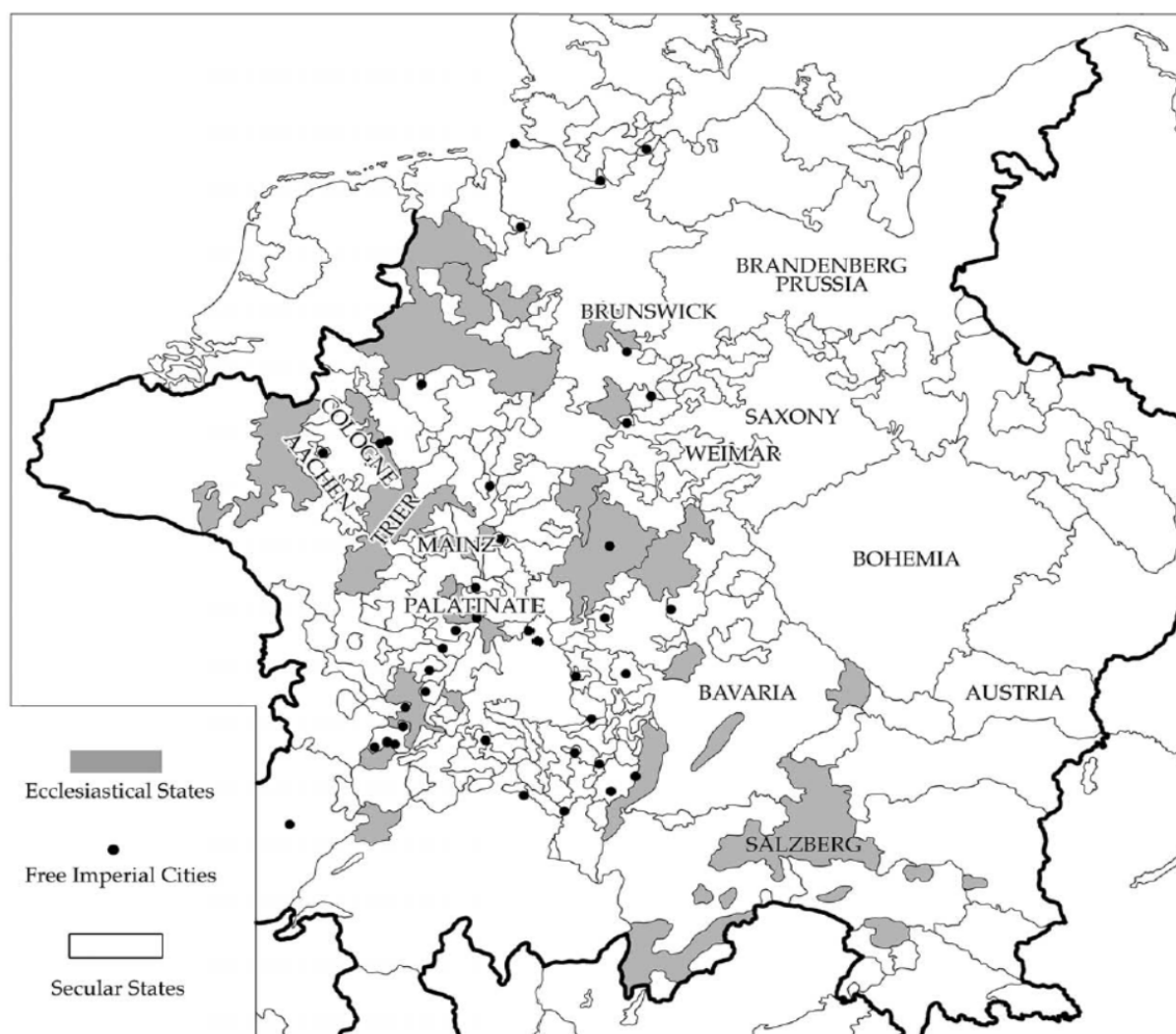
The territories of the Holy Roman Empire had always been characterized by a considerable degree of heterogeneity. Since its foundation in 962 AD the Holy Roman Empire was a multi-ethnic, multi-cultural, and multi-lingual ensemble of several entities – eventually hundreds – governed by kings, dukes, counts and bishops, collectively known as princes. These different layers of political power became gradually more autonomous as the Holy Roman emperors shifted their attention to their local kingdoms.

Pivotal in the progressive disintegration of the Empire was Protestant Reformation. Starting as a protest against the corruption of the Roman Catholic Church, the Reformation quickly spread out throughout central Germany gaining the support of several princes who wanted to stress their political and religious independence. In 1555, after several years of war, the Emperor and the Protestant German princes signed a peace treaty in Augsburg. The principle of *cuius regio eius religio* (“whose realm, his religion”) was affirmed making Lutheranism an official religion of the Empire. The ambition of the emperor to centralize power and rule over a unified empire was thus permanently shattered. Religious and political wars continued to afflict the Holy Roman Empire until a stable resolution was reached with the Peace of Westphalia. By 1648 the Empire was just a confederation of German princes who, in their own lands, had the right to legislate, impose taxes, organize an army, mint and engage in foreign policy.

The political fragmentation of the Empire (see Figure 2.1) gave rise to persistent institutional and cultural heterogeneity. This diversity was also reinforced by the internal

migration of religious minorities, most notably Jews and French Protestants, which imported their own values and customs. All these elements contribute to create an extremely variegated picture where each territory displays its own identity. Religious affiliation, albeit just facet, is the first evident aspect of these cultural differences.

Figure 2.1: Holy Roman Empire in 1789



Source: Eric D. Brose. *German History 1789-1871: From the Holy Roman Empire to the Bismarckian Reich*. Berghahn Books, 1997.

## 2.2.2 The French Revolution and the Napoleonic Military Campaigns

The emergence of revolutionary France as an aggressive and strong military power at the end of the 18<sup>th</sup> century marked the end of the Holy Roman Empire. The first crushing victories by the French army created a power vacuum in the German territories which Napoleon exploited to create a "cordon sanitaire" between France and its traditional Eastern enemies, Austria and Russia. By 1795 Napoleon was in control of the left bank of the Rhine which was formally annexed to the French Empire with the treaty of Luneville (1801).<sup>8</sup> When the Habsburg ceded part of their German estates to Napoleon's allies, in 1805, the end of the Holy Roman Empire was essentially determined. The following year, central Germany was unified in the *Confederation of the Rhine*, a formally independent confederation of sixteen states whose protector and unofficial ruler was Napoleon.<sup>9</sup> French expansion continued until Napoleon's downfall after the Russian campaign in 1812. By that time French sphere of influence extended to Poland (with the creation of the Duchy of Warsaw in 1807) and to Northern Germany (with the annexation of the Hanseatic cities of Hamburg, Lubeck, and Bremen in 1810). By the first decade of 19th century Napoleon had taken over the majority of German reigns. Figure 2.2 shows the counties in territories controlled by Napoleon differentiating between annexed areas and satellite states.

In his expansion of the French Empire, Napoleon was mainly driven by ideological and geo-political concerns, rather than by the economic outlook of the region. Besides the security concern of having influence over a buffer region that separated France from the two main Eastern powers, the Revolutionary rhetoric of *France natural borders* was driving his military campaigns.<sup>10</sup> Therefore, following Acemoglu et al. (2010), we can consider Napoleonic invasions as a quasi-natural shock in our empirical analysis.

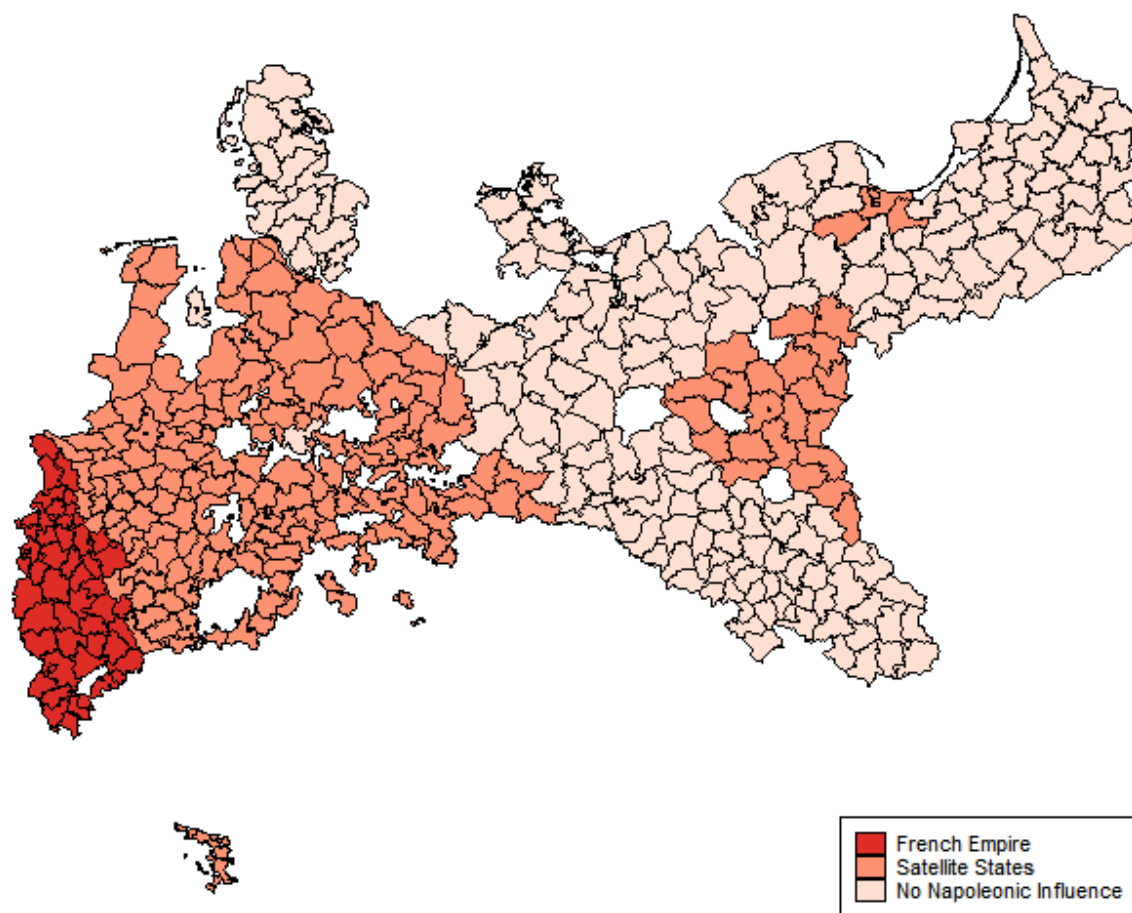
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<sup>8</sup>According to Fisher (1903), this treaty has also been called the "First Revolution of Germany" given that a "territory of 150,000 square miles, peopled by 3,500,000 inhabitants, and amounting to about a seventh part of the population and territory of the whole Empire" was transferred to the French Empire.

<sup>9</sup>The members of the Confederation promised to supply their "protector with a military contingent" (Lefebvre 1969) and, in return for their support, they were given higher statuses or additional territories. For example the free cities of Augsburg and Nuremberg were annexed by Bavaria and Frankfurt to Dalberg, Nassau became a duchy and Dalberg became the prince primate of the Confederation of the Rhine.

<sup>10</sup>Discussion on the Rhine question began well before the outbreak of the hostilities in 1792. The idea of French natural borders became prominent among the jacobian revolutionaries. Georges Jacques Danton on January 21, 1793 during the national convention was arguing in favor of the annexation of Belgium saying that "the limits of France are marked by nature, we will reach reach the four corners of the horizon, to the edge of the Rhine, to the edge of the ocean, to the edge of the Pyrenees, to the edge of the Alps. The boundaries of our Republic must be there". For more details see Smets (1998).

Figure 2.2: Counties Under Napoleonic Influence



### 2.2.3 The Imposition of the French Institutions

Despite the marked institutional heterogeneity of the Holy Roman Empire resulting from the high territorial fragmentation, some useful general features can be identified. At the dawn of 19<sup>th</sup> century the institutions of the "ancien regime" still pervaded the German territories and feudal privileges were the norm. In rural areas, even where serfdom had been abolished, peasants were subject to several restrictions and burdened by a list of duties and services they had to provide to their lords. In the cities, guilds regulated the access to different trades, often limiting the development and the growth of the industry they controlled.<sup>11</sup> Equality before the law was still far from being contemplated: aristocrats, clergy, military benefited from particular exemptions, while other groups were discriminated (e.g. Jews).

The arrival of Napoleon was a disruptive force. His rule over central Europe meant

<sup>11</sup>A good example in the Rhenish area is provided by Kisch (1989). The author provides an example of the limitations the guild imposed on the adoption of new technologies.

the imposition of a series of institutional reforms. The most important was arguably the introduction of the Civil Code. Emblem of the values promoted during the French Revolution, the *Code Napoleon* (1804) introduced equality before the law to all men regardless of their social and economic status. Moreover, it consecrated absolute property rights to which the code dedicated a total of 1776 articles.<sup>12</sup> Finally, the Code provided a modern legal framework that regulated all aspects of social interaction, from family matters to economic contracts. The process of codification continued with the promulgation of the Code of Civil Procedure (1806), the Commercial Code (1807), the Criminal Code and the Code of Criminal Procedure (1808) and the Penal Code (1810). All these codes were imposed on the satellites states under Napoleon's control. Interestingly, some states decided to retain the codes even after Napoleon's fall, and even in those reigns that formally abandon the Code Napoleon, the institutions were permanently affected.<sup>13</sup> Beyond the judicial innovations, French rule also implied a more efficient model of administration and the implementation of fiscal reforms that introduced budgeting and rationalization of public expenditures.

The introduction of judicial and bureaucratic reforms occasionally generated hostility among the indigenous population: the new norms were often perceived as extraneous and incompatible with local culture and customs.<sup>14</sup> Historical evidence shows that in some areas the code met the opposition not only of the aristocracy, deprived of its privileges, but even of the very social classes the revolution meant to emancipate. This suggests that the transition from the *ancien regime* to the modern era evolved at different speeds across territories and, in some states, the transplant of French institutions failed.

## 2.3 Data and Variables

We build a novel dataset containing cross-sectional information on 447 Prussian counties immediately after the German unification (1871).<sup>15</sup> We combine census data from the Ifo Prussian Economic History Database (iPEHD) with pre-Napoleonic information compiled

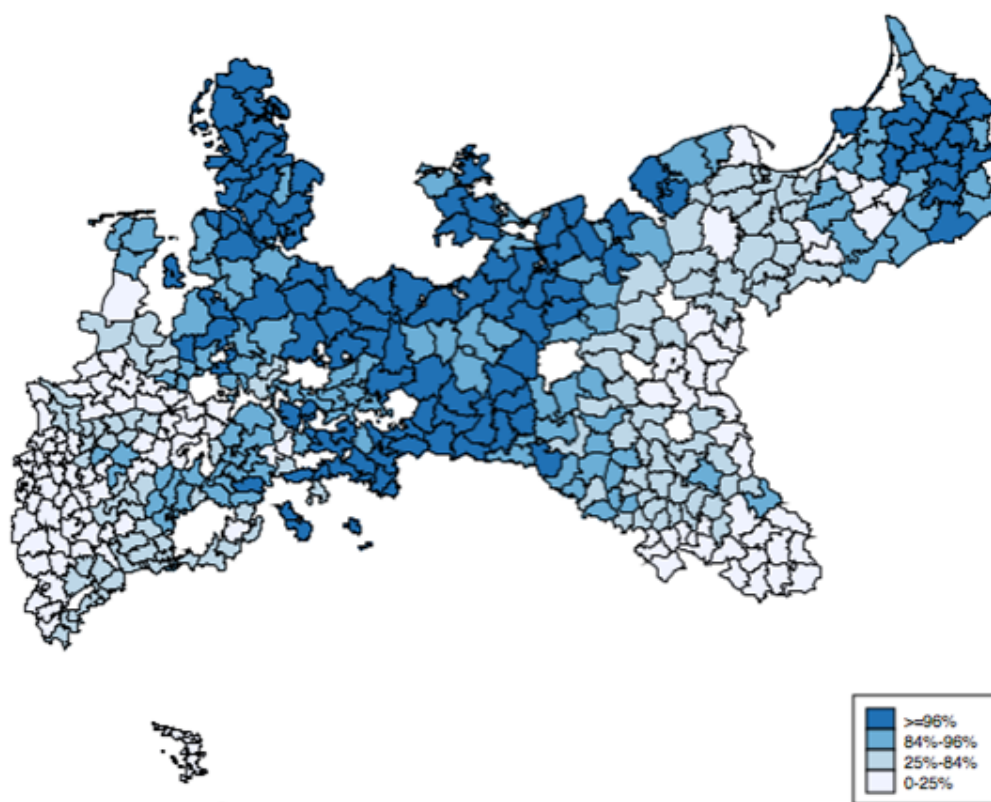
<sup>12</sup>A huge amount when compared to 515, the number of articles regulating person. See Woolf (1991).

<sup>13</sup>In the Rhineland territories annexed to Prussia after the Congress of Vienna, a commission was set up to decide whether to extend Prussian law or keep the French one. The Commission ended its work in 1818 and recommended the preservation of the French judicial system. French law remained in force in Rhineland until 1900. But also local population and business community were at the forefront to retain the code. See Rowe (2000) and Diefendorf (1980) for more details. Another notable example is the Duchy of Baden that decided to retain the Napoleonic code even after 1815.

<sup>14</sup>For anecdotal evidence on Rhineland and the Duchy of Warsaw, see Rowe (2003) p. 130 and Fisher (1903) p.151.

<sup>15</sup>We choose this period because it guarantees the widest geographical coverage (including information on the former members of the Confederation of the Rhine) and also a sufficient time lag for the new institutions to affect economic performance.

Figure 2.3: Share of Protestant 1871



using historical sources. In particular, we map all the counties into 48 18<sup>th</sup> century reigns: this allows us to build pre-Napoleonic variables at kingdom level based on historical rulers, their relations with France and the implementation of liberal reforms. We complement the resulting dataset with information on the historical religious affiliation by Cantoni (2012) and Spenkuch (2010).

Following an established strand of literature (Allen, 2001, Galloway, Lee and Hammel 1994, Becker and Woessmann 2009), we use wages to proxy for economic performance. Our main measure of county-level income is the average annual wage of male elementary school teachers from the 1886 Education Census. This is the only direct measure of income available for all counties at that time. Teacher's salary, albeit representative of a simple occupational group, reflects the development of the county as its main determinants were local contributions. One drawback of this proxy is that it may be influenced both by the value the local community attaches to education and by other benefits provided to the teachers (e.g. free housing). In our empirical analysis we address these issues controlling for factors that affect both the demand for teachers (e.g. number of pupils, demographic structure, etc) and supply of teacher (free housing, total number of teachers). Exploiting other waves of the Prussian Census, we assess the robustness of our results using the

wage of a daily laborer in 1892 and other two income proxies first proposed by Becker and Woessmann 2009: income tax revenue per capita and the size of the non agricultural sector.

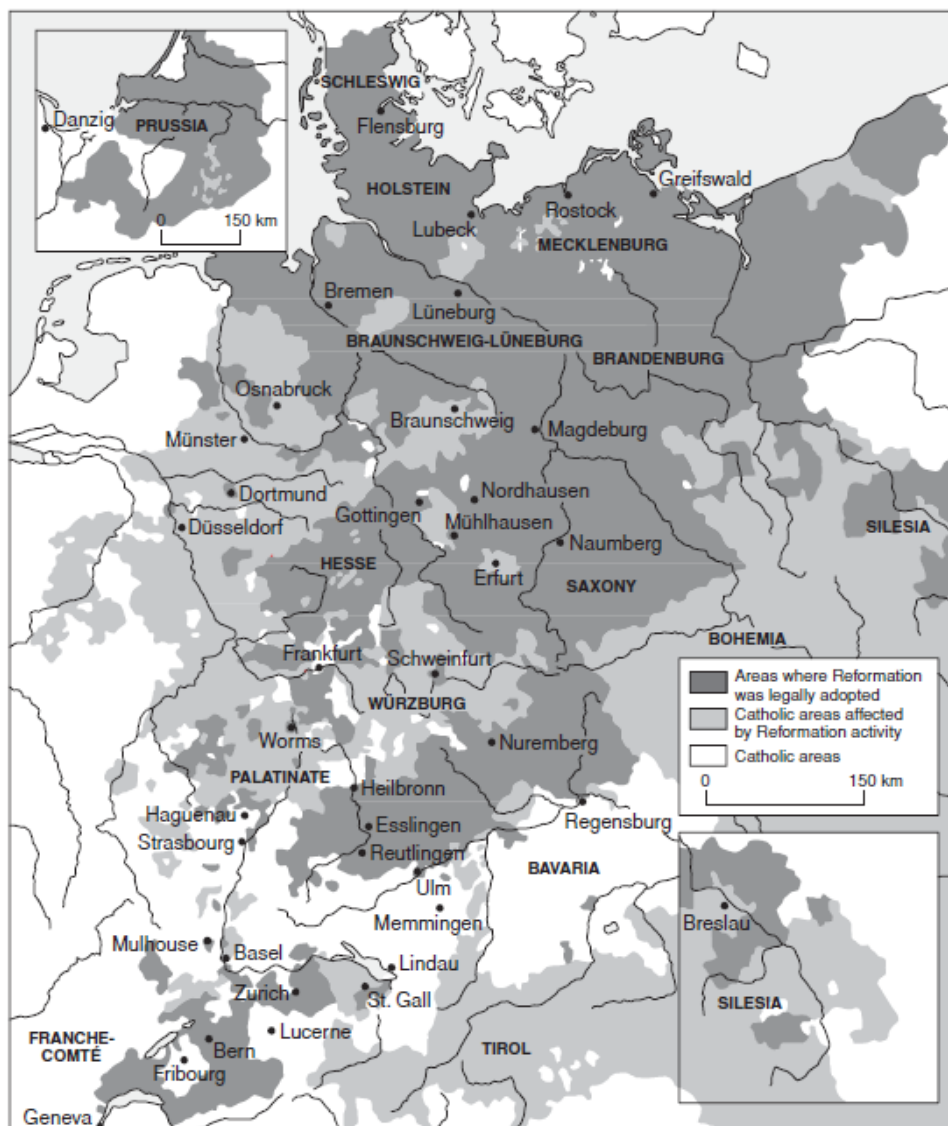
Cultural traits are notably difficult to measure. We use religious affiliation as our favorite measure of cultural diversity. Besides being easily measurable, religious beliefs are suitable to capture cultural commonality, in particular ”[we] expect that two countries with the same religion tend to have similar cultures” (Guiso et al. 2009). Moreover, as already mentioned above, religion has been of paramount importance in shaping the politics of the Holy Roman Empire, determining alliances, wars and lineages. Hence, we expect religious affiliation to synthesize various cultural aspects beyond the mere spiritual dimension and to play a fundamental role in the transplant of French institutions. In particular, we expect Protestant territories to be less receptive to the new institutions which embedded centuries of French Catholic culture. The persistence of religious affiliation across centuries has been well documented (Cantoni 2012). We then use the share of Protestants in the county from the 1871 Census as an inverse measure of cultural similarity before the Napoleonic invasion. Figure 2.3 shows the geographical distribution of this measure, Protestant are mainly concentrated in the central part of modern Germany. To test the robustness of the results we construct a dummy variable containing information on the religious affiliation at the beginning of the 17<sup>th</sup> century taken from Cantoni (2012) and Spenkuch (2010).

A possible concern is that religious affiliation does not capture all the relevant cultural aspects that contribute to a successful institutional transplant. We thus construct two alternative measures of cultural similarity with France: *French Ties* and *Pro French*. The former variable is based on the ties between each reign and the Kingdom of France in 17<sup>th</sup> and 18<sup>th</sup> century. First, we expect that early interaction with French courts and customs should facilitate the assimilation of French institutions. We investigate whether, during the 18<sup>th</sup> century, one of the rulers had a direct French relative (mother, father, spouse) and so an explicit link with the French aristocracy. Second, we investigate whether the reigns received Huguenots migrants during the 17<sup>th</sup> century, exploiting county level data by Hornung (2014).<sup>16</sup> Many Huguenots left France after Louis XIV revoked the Edict of Nantes in 1685 and the majority of them migrated to the Protestant neighboring countries. Some sovereigns even competed to attract these skilled French immigrants offering them special privileges: a prominent example is the Electorate of Brandenburg which, with the Edict of Potsdam, granted the Huguenots a tax-free status for ten years and allowed them to hold church services in their native language. Often, these French migrants built their own communities in the towns in which they settled preserving their own traditions and identity.

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<sup>16</sup>We complement these data by Lane Poole (1880).

Figure 2.4: The expansion of Protestantism in Germany to 1570



Source: C. Scott Dixon. *The Reformation in Germany*. Oxford: Blackwell Publishers, 2002.



We construct a dummy variable, *French Ties*, that equals one either if the ruler had a direct French relative, or if the reign registered the presence of Huguenots' colonies. We expect the transplant to be more effective if the reign in 17<sup>th</sup> and 18<sup>th</sup> century had ties with France since people were previously exposed to French culture.

The second variable we construct, *Pro-French*, should capture, using historical sources (Essays, Bibliography, etc.), the inclination of the local ruler toward either the French enlightened ideals or French habits and customs. The *Pro-French ruler* dummy equals 1 if the 18<sup>th</sup> century rulers (i) displayed a positive disposition toward customs and tradition of the French court (e.g. the Landgrave of Hesse-Darmstadt, Ernest Louis, was so fascinated with the grandeur of the Louis XIV court that he dissipated the finance of his reign in the effort of emulating it), or (ii) embraced the French Enlightenment ideals (e.g. the Elector of Palatinate Charles Theodore had an assiduous correspondence with Voltaire), or (iii) had a long standing relation with the French Royal House (e.g. William Henry, Prince of Nassau-Saarbrücken, often traveled to Paris where he even received military honors). We construct a *Pro-French index* based on the fraction of years the *Pro-French ruler* was in power. For example, Charles Theodore held power for 48 years, hence he contributes to the his reign's index by 0.533 (i.e. 48 over 90 years). Albeit highly subjective, this variable nicely summarizes the attitudes towards the foreign culture and we expect those rulers with a more favorable stance toward France to better accept and implement the transplanted institutions.

Our results might be induced by institutional rather than cultural proximity. In fact, during the 18<sup>th</sup>-century, some rulers, inspired by the Enlightenment principles, enacted reforms in their states promoting literacy, simplifying justice and the administration.<sup>17</sup> It is possible that these early reforms were implemented in places culturally closer to France, making it easier to enforce the institutions brought by Napoleon. In order to control for this potential confounding factor, we construct a measure of historical institutional proximity. In particular, we collect data on progressive reforms in the educational, judicial or administrative system implemented in each reign between 1700 and 1790. We classify as *Reformists* those rulers who implemented at least one modernizing reform. Given that this index captures similarity between the Napoleonic institutions and the pre-existing ones, we conjecture that *institutional-proximity* positively affects the success of the transplant.

Our main measure of institutional transplant is a binary variable, which takes value 1 if the county is either in the provinces annexed to the French Empire (e.g. Rhineland) or in a satellite state (e.g. Kingdom of Westphalia). This variable reflects the presence of French Institutions since, in our sample, all the territories under direct or indirect control of Napoleon were imposed the Civil Code and, at least partially, the set of modernizing reforms. Employing a dummy variable is the simplest way to account for the introduction

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<sup>17</sup>For more details, see Arvind and Stinton (2010).

Table 2.1: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Napoleon	0.555	0.498	0	1	447
French Empire	0.121	0.326	0	1	447
Satellite States	0.434	0.496	0	1	447
Years of French Invasion	4.749	6.072	0	19	447
Income of male elem. school teachers (1886)	983.123	201.322	711.961	1954.194	447
Protestant Share	0.644	0.377	0.003	0.999	447
French Ties	0.11	0.313	0	1	447
Pro-French	0.801	0.399	0	1	423
Huguenots	0.075	0.264	0	1	346
Institutional Proximity	0.469	0.361	0	1	447
% of county population in urban areas	0.276	0.22	0	1	447
% females	0.51	0.015	0.44	0.546	447
% age below 10	0.247	0.025	0.153	0.299	447
Total Population (log)	10.804	0.416	9.359	13.625	447
County Area (log)	10.798	1.152	5.313	12.955	447
Universities Holy Roman Empire	0.06	0.238	0	1	447
Hanseatic or Imperial City	0.098	0.298	0	1	447

of the Napoleonic institutions. Certainly, the exposure to the new institutions was not homogeneous across reigns as it varied according to the fortune of the military campaigns. Therefore, in some specifications, we employ alternative proxies that take into account the different intensity of French presence.<sup>18</sup> Consistently with the existing literature, the expected linear effect of the transplant of good institutions on economic performance is positive on average.

Finally, in our analysis, we use a rich set of controls including historical, geographic and contemporaneous controls. *Historical controls* are meant to capture pre-existing differences across counties. We construct a dummy variable for the presence of Hanseatic or free imperial cities in 16<sup>th</sup>-century, since they benefited from particular economic and diplomatic privileges. We also control for pre-Napoleonic economic development using urban population in 1500 taken from Becker and Woessmann (2009).<sup>19</sup> *Geographic controls* include the distance from the district capital to control for peripheral areas, the latitude (in rad) and a dummy variable for polish-speaking provinces (mainly located in the East and mainly underdeveloped).<sup>20</sup> Using information from the 1871 and 1886 Censuses, we

<sup>18</sup>In one specification we differentiate territories annexed to the French empire, which faithfully imported all French institutions, from satellite kingdoms. In another one, we use years of French presence, which ranges from 5 to 20 years, as a proxy of institutions.

<sup>19</sup>See also De Long and Shleifer (1993).

<sup>20</sup>We do not include longitude in our specifications because it is strongly correlated with institutional variable. Indeed, Napoleonic invasion followed the West-East trajectory starting from the neighboring

Table 2.2: Comparison of Means

	Napoleon=0	Napoleon=1	Diff
Catholic	855.64 (15.22)	1016.05 (21.62)	-160.41 (38.76)
Protestant	941.31 (15.54)	972.34 (16.85)	-31.04 (24.01)
Diff	-85.67 (26.57)	43.7 (32.99)	-129.37

*Notes:* Comparison of Average income of male elementary school teachers 1886 Standard errors in parenthesis.

control for demographic and social characteristics of the population and industrial features in the county (e.g. share of people employed in mining), and other aspects that may affect the wage of teachers (*contemporaneous controls*). Table 2.1 reports summary statistics for our main variables. Table 2.2 compares the means of our main dependent variable between invaded and not invaded territories across different religious affiliation.

## 2.4 Institutional Transplant and Religious Beliefs

### 2.4.1 Identification strategy

This section presents the empirical model we shall use to test our central hypothesis, namely the dependence of the reception of the Napoleonic Code on the pre-existing cultural traits of the county. We test whether the institutional transfer was more effective in kingdoms culturally more similar to the French Empire, thus inducing a better economic performance.

Our baseline model is as follows:

$$y_i = \alpha + \beta_1 Culture_i + \beta_2 Napoleon_i + \beta_3 Culture_i \times Napoleon_i + \mathbf{H}_i \beta_4 + \mathbf{H}_i \times Napoleon_i \beta_5 + \mathbf{G}_i \beta_6 + \mathbf{G}_i \times Napoleon_i \beta_7 + \mathbf{E}_i \beta_8 + \mathbf{X}_i \beta_9 + \varepsilon_i \quad (2.1)$$

where  $y_i$  is the average income of male elementary school teachers in county  $i$ ,  $Culture_i$  is measured by religious affiliation (i.e. Protestant share measured at county level),  $Napoleon_i$  is a binary variable for the adoption of the Napoleonic code.  $H_i$ ,  $G_i$ ,  $E_i$  and

territories toward Russia, hence longitude captures the intensity of the French presence.

$X_i$  are, respectively, vectors of historical, geographical, educational and economic controls;  $\varepsilon_i$  is a standard error term. We also include the interaction of  $Napoleon_i$  with pre-Napoleonic and geographic variables to control for potential non-linear confounding factors.

The key coefficient  $\beta_3$  is the interaction between the transplanted French institution and the measure of local culture. We expect  $\beta_3$  to be significantly different from zero and, in particular, that cultural similarity and institutions positively interact. Hence our prior is  $\beta_3 < 0$  when Protestant share is used (i.e. Napoleonic institutions had a weaker impact in Protestant areas). Our identification strategy relies on two main assumptions. First, the areas invaded by Napoleon were not chosen because they were more prosperous, i.e. French occupation is exogenous. As extensively argued by Acemoglu et al. (2011), French military invasions were not driven by economic reasons but mainly by geographic and historical ones, as discussed above. Second, religious affiliation is persistent across centuries and thus the share of Protestants in 1871 captures cultural traits that already existed before the arrival of Napoleon. Previous empirical evidence supports this assumption, persistence in religious distribution is observed when comparing religious affiliation data after the Peace of Augsburg (1555) with the more recent one. (see Figure 2.4).<sup>21</sup>

## 2.4.2 Results

In this section we test our main specification. The most striking result is the negative and significant coefficient of the interaction term across the different specifications. Column 1 in Table 2.3 provides evidence that Napoleonic institution had no impact on economic performance in strongly Protestant areas. In particular this is true in most of our counties given that in half of them the Protestant share exceeds 75%. The different specifications also show a significant positive effect of Protestantism and of the French institution on teachers' wage, in line with previous work. Column 1 refers to the most parsimonious specification, which includes only geographic controls, however our estimates prove to be robust to the inclusion of several control variables. In column 2, we control for a set of historical variables to take into account pre-existing differences. In columns 3-4 we add economic and education controls. These variables capture the economic and social outlook of the county after the Congress of Vienna. We find that some of these variables have an effect significantly different from zero but the significance of the interaction term coefficient is barely affected. Column 5 includes the interaction between Napoleonic institutions and historical and geographic controls in order to rule out potential concerns about possible alternative interactions driving the results. Column 6 adds to the baseline

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<sup>21</sup>Spenkuch (2010) provides detailed data and figures of Protestant and Catholic distributions in Germany after the Peace of Augsburg.

Table 2.3: Institution and Religious Affiliation

Log average wage male elementary teacher 1886	(1)	(2)	(3)	(4)	(5)	(6)
Napoleon	0.0969*** (0.0220)	0.0910*** (0.0218)	0.109*** (0.0276)	0.0881*** (0.0202)	0.220 (0.659)	1.838* (1.066)
Protestant Share	0.168*** (0.0238)	0.186*** (0.0242)	0.206*** (0.0296)	0.201*** (0.0242)	0.270*** (0.0248)	0.164*** (0.0232)
Napoleon $\times$ Protestant Share	-0.0936*** (0.0338)	-0.109*** (0.0335)	-0.182*** (0.0331)	-0.155*** (0.0284)	-0.269*** (0.0335)	-0.107** (0.0447)
Constant	8.526*** (0.322)	8.696*** (0.362)	6.801*** (0.335)	6.105*** (0.409)	6.420*** (0.451)	5.109*** (0.653)
Geographic Controls	yes	yes	yes	yes	yes	yes
Historical Controls	no	yes	yes	yes	yes	yes
Economic Controls	no	no	yes	yes	yes	yes
Education controls	no	no	no	yes	yes	yes
Hist & Geo Interactions	no	no	no	no	yes	yes
Reign FE	no	no	no	no	no	yes
$R^2$	0.377	0.403	0.637	0.648	0.718	0.808
Obs.	447	447	447	447	447	447

*Notes:* *Geographic Controls:* latitude, area of the county (log), distance from the district capital and polish speaking area. *Historical controls:* year of annexation to Prussia, population in 1500 and Hanseatic or Imperial cities. *Economic controls:* total population size (log), percentage of county population in urban areas 1871, percentage of labor force in mining 1882 and number of farms 1882 (log). *Education controls:* percentage of pupils with distance to school over 3 km, total number of pupils 1886 (log), total number of teachers 1886 (log) and number of free apartments for male teachers 1886.

Robust standard errors in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

specification pre-napoleonic reign fixed effects to control for existing differences across reigns and exploit within reign variation. The estimated coefficient of the interaction term does not change (it slightly decreases) and does not lose statistical significance.

### 2.4.3 Robustness Checks

This section presents a battery of alternative specifications in order to investigate the robustness of the baseline estimates. The results are reported in Table 2.4.

**Clustered Standard Errors** Panel a) clusters standard errors at the pre-Napoleon reign (row 1) and 1871 Prussian political district level (row 2) to allow for an arbitrary variance-covariance matrix capturing potential serial correlation in the residual error term. The coefficients of interest are always statistically significant as in the baseline estimates.

**Fixed Effects** In Panel b) we include additional pre-Napoleonic fixed effects. This is crucial to capture pre-existing differences across counties. We include rulers' fixed effects, these are a smaller number with respect to reigns' ones since several kingdoms had the same ruler. Our results are robust to the inclusion of this control.

**Additional Controls** In panel c), we show that our evidence is preserved when adding supplementary controls addressing potential issues. A possible concern could be that our result is induced by differences in purchasing power across regions or by other drivers that influence the demand for teachers, and hence their wages. Hence, we first include a price measure to capture potential differences in purchasing power across the different counties. This proxy is constructed as the ratio between total expenditures in new school buildings in 1886 over the total number of new school buildings. This measure should capture variation in housing prices, a relevant component of CPI.<sup>22</sup> Albeit not perfect, this is the only available measure of historical unit values at county level. We then add a group of demographic variables in 1871 - including household size, share of population born in the county, share of population of Prussian origin, share of females and share of the population under 16, that might influence the demand of teachers. We also include literacy rate in an additional specification. The results always confirm the baseline estimates.

Another important concern is that our results could be biased by the presence of printing presses in the county. Johannes Gutenberg established the first printing press in Mainz around 1450. The diffusion of printing presses is strongly correlated with distance from Mainz.<sup>23</sup> The presence of a printing press has facilitated the diffusion of French books and manuscripts. We collect data from the Universal Short Title Catalogue that is "a collective database of all books published in Europe between the invention of printing and the end of the sixteenth century". We focus our attention on all cities in which a book in French language was printed. We create a dummy variable at county level equal to one if a book in French language was printed in that county. Results are robust when we add a dummy controlling for French books (row 7).

Finally we want our results not to be determined by hostility or francophobia generated by previous military invasions. Bonaparte might have been seen as the legitimate heir of Louis XIV, hence the "hereditary enemy". We verify if the reign was occupied by the French Army for a period longer than one year before the Napoleonic invasion. In alternative, previous invasions might also be interpreted as a higher exposure to French culture, hence as a catalyst for the adoption of the new institution. We thus construct a dummy variable that equals one if the reign had been occupied by French troops after the

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<sup>22</sup>See Moretti (2013)

<sup>23</sup>See Dittmar (2011) for more information on the diffusion of printing presses and the economic impact in European Cities in sixteenth-century.

Peace of Westphalia. Our main result is not affected by the introduction of this control (row 8).

**Outliers** In panel d), we show that our evidence is not driven by influential observations. First, we trim (row 9) and winsorize (row 10) the extreme 1% of observations of our dependent variable. We then compute a measure of influence (row 11), specifically how much an observation has affected the estimate of a regression coefficient. In particular we computed the difference between the regression coefficient of the interaction term (Protestant x Napoleonic Code) calculated for the entire dataset and the regression coefficient calculated with the observation deleted, scaled by the standard error calculated with the observation deleted.<sup>24</sup>

**Alternative Institutional Variables** In panel e), we show that the results hold when using different proxies for the French institution. Specifically we reduce our treatment group depending on the exposure to Napoleonic code. We start by using a more conservative definition of institutional variable, namely we define as invaded only those territories formally annexed to the French Empire (row 12). In this subsample the effect of the treatment might be reinforced since, not only the code was imposed, but also the administrative structure and local governors were replaced by the French ones. We then exclude the territories under the direct control of the French Empire and we consider only those territories in the Confederation of the Rhine (i.e. Satellite States) which adopted the code (row 13). Finally, we use years of French domination as a proxy for intensity-to-treatment (row 14). Reassuringly, all measures yield the same message as the preferred Napoleonic-invasion dummy.

**Alternative Protestant Variables** In panel f), we show that the results are robust to using alternative measures of religious affiliation. First (row 15), we use a dummy that equals one if the county has an absolute Protestant majority (share of Protestant >50%). Crucial for our identification is the persistence of the religious affiliation, hence using a binary variable attenuates the potential concern that Protestant share may have changed over time.

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<sup>24</sup>The cut-off value we use for highly influential observation is :  $2/\sqrt{n}$ . Even though, our results are robust to different cut-off values.

Table 2.4: Robustness Checks on the Baseline Model

	Institutions $\times$ Protestant		Obs.	$R^2$
	Coeff.	Std.Err.		
<b>a) Clustered Std.Err.</b>				
1) At Pre-Napoleonic-Reign	-0.236***	(0.0605)	447	0.667
2) At 1871 District	-0.236***	(0.0686)	447	0.667
<b>b) Fixed Effects</b>				
3) Pre-Napoleonic Ruler FE	-0.160***	(0.0396)	447	0.796
<b>c) Additional Controls</b>				
4) Price (Real estate unit values)	-0.230***	(0.0366)	441	0.666
5) Price and Demo Controls	-0.154***	(0.0382)	441	0.696
6) Price, Literacy and Demo Controls	-0.0725*	(0.0373)	441	0.716
7) French Books	-0.247***	(0.0365)	447	0.670
8) French Occupation	-0.257***	(0.0368)	429	0.665
<b>d) Outliers</b>				
9) Trimming	-0.258***	(0.0319)	439	0.671
10) Winsorising	-0.236***	(0.0341)	447	0.672
11) Df Beta	-0.312***	(0.0286)	426	0.723
<b>e) Alternative Instit. Var.</b>				
12) French Empire	-2.125*	(1.239)	253	0.784
13) Satellite States	-0.222***	(0.0404)	393	0.663
14) Year of French Domination	-0.00773*	(0.00468)	447	0.665
<b>f) Alternative Protestant Var.</b>				
15) Prot. Maj. 1871	-0.175***	(0.0265)	447	0.658
16) Cantoni Prot. Maj. 1600	-0.0498**	(0.0236)	438	0.638
17) IV (Distance Wittemberg)	-0.328***	(0.0485)	446	0.660
<b>g) Alternative Dependent Var.</b>				
18) Wage Urban Male Lab. 1892	-0.256***	(0.0484)	430	0.716
19) Income Tax Revenue p.c.	-0.803***	(0.178)	421	0.329
20) % Pop in Manuf./Services	-0.0973***	(0.0267)	447	0.769

*Notes: Dependent variable:* Log average wage, male elementary school teacher 1886 unless differently specified in the table.

Robust standard errors in parenthesis unless differently specified in the table.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$



We then construct a historical measure of the Protestant majority in seventeenth century using data from Cantoni (2012). The advantage of this measure is that it is defined two centuries before the arrival of Napoleon. It has however two limitations: the historical religious affiliation is defined at reign level - not county level- in 1600 (row 16) and it is not available for the entire sample. Finally, in order to address endogeneity concerns, we follow the literature instrumenting Protestant share with the distance from Wittenberg. We identify the exogenous variation in Protestantism using the concentric diffusion of Protestantism in Prussia around Luther's city (row 17). Note that the coefficients maintain the same sign as in the baseline specification, and remain significant at conventional levels.

**Alternative Outcomes Variables** Panel g) shows that the baseline results hold for alternative proxies of economic prosperity. In row (18) we use the only other direct measure of income available, that is wage of daily laborer in 1892.<sup>25</sup> Following Becker and Woessmann (2009) we use income tax revenue per capita (row 19) and the size of the non agricultural sector (row 20). The coefficient of the interaction term remains consistently negative and statistically significant across the different specifications.

#### 2.4.4 Diff-in-Diff Specification

Our main specification allows us to exploit a rich variation across counties and to investigate several dimensions of institutions and culture. However, a possible concern is that historical controls and reign fixed effects do not fully account for pre-Napoleonic trends. We then test our hypothesis using a different dataset that allows us to implement a Diff-in-Diff specification. We exploit the dataset compiled by Acemoglu et al. (2011). The dataset has information on urbanization levels and religious affiliation for a panel of 19 independent German states (or provinces of larger states) for the period 1750-1900. Unfortunately these data have a higher level aggregation (19 states vs more than 400 counties) and are not fit for a deeper investigation of potential channels that may drive our results.

In this case our baseline specification is

$$u_{it} = \delta_t + \mu_i + \alpha_1 Post_t + \alpha_2 Post_t \times Napoleon_i + \alpha_3 Post_t \times Prot_i + \alpha_4 Post_t \times Napoleon_i \times Prot_i + \varepsilon_{it} \quad (2.2)$$

where  $u_{it}$  is urbanization rate,  $Post$  is a dummy variable that equals one if we consider a time period after the Napoleonic invasion (i.e. second half of nineteenth century),

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<sup>25</sup>The table displays the results for the male laborers in urban areas. The coefficients are virtually the same when using wage of rural male daily laborer or wage of female daily laborer. Results are available upon request.

*Napoleon* is a dummy that captures French presence in the state and *Prot* is the share of Protestants around 1800. Column 1 in Table 2.5 shows that after the Napoleonic invasion, there is a negative interaction between French institutions and Protestant share, consistent with our previous results. These findings are robust also in columns 2-3, where respectively we implement a weighted regression (weighted by total population in 1750) and an unweighted one but controlling for the level of population in 1750. Columns 4 provides similar results but using a different measure of French institutions, i.e. the number of years of French presence, while column 5 shows consistent results using year dummies. The evidence suggests that this "moderating effect" due to the negative interaction between culture and the civil code is significantly affecting the urbanization rate since 1875, i.e. 60 years after the Congress of Vienna.

## 2.5 Possible Alternative Explanations

This section investigates alternative channels proposed in the literature that might explain our findings. We investigate three possible alternative channels: human capital accumulation, religious fractionalization and diversity from neighborhood. Human capital accumulation is a significant driver of economic growth but it is also closely related to the diffusion of Protestantism, as already stressed in the existing literature.<sup>26</sup>

A potential concern is that some of the institutions brought by Napoleon had a negative impact on the human capital accumulation of the regions. Narrative evidence suggests that Napoleon's educational policies were not aimed to boost literacy but targeted higher education in order to breed well-prepared military and administrative elites. Hence, technical schools were promoted (Polytechnic, Conservatory of art and trades, etc.) and lycees introduced. Napoleon, in fact, paid very little attention to primary education - and even less to the education of girls - which was mainly managed at local level and left to religious institutions. These policies could have led to a relevant role of Catholic parishes in the invaded areas weakening Protestant human capital accumulation. We use pre-Napoleonic measures of education, the presence of schools and monasteries - relevant educational centers - in 1517 and the presence of universities before Napoleonic invasion, and their interaction with Napoleonic Code in order to test the validity of this potential channel. In column 1 of Table 2.6 we show that including these controls does not affect the significance of the interaction term. Hence, human capital cannot alternatively explain our result.

Most of the counties invaded by French troops were mainly Catholic. An alternative explanation of the negative interaction between Protestantism and institutions may be

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<sup>26</sup>For the effect of human capital on economic growth see, for example, Barro (2002) and Gennaioli et al. (2014).

Table 2.5: Difference in Difference Estimation

Dep. Var.: Urbanization Rate	(1) Baseline	(2) Weighted	(3) Initial Urbanization	(4) Years of French	(5) Napoleon × Years
Post 1850	9.925*** (2.442)	10.38*** (2.325)	8.734*** (2.861)	11.64*** (2.949)	
Napoleon × Post 1850	21.78*** (7.467)	21.23*** (4.889)	23.29*** (6.842)		
Post 1850 × Nap. × Prot. Share	-28.13*** (8.458)	-29.18*** (6.563)	-30.45*** (8.340)		
Years of French × Post 1850				1.454*** (0.272)	
Post 1850 × French Yrs. × Prot. Share				-2.233*** (0.751)	
Napoleon × 1750					10.49 (12.01)
Napoleon × 1800					20.68 (14.45)
Napoleon × 1850					19.38 (12.50)
Napoleon × 1875					37.67** (16.93)
Napoleon × 1900					50.93** (20.67)
Prot. Share × Nap. × 1750					-12.46 (14.67)
Prot. Share × Nap. × 1800					-24.65 (16.57)
Prot. Share × Nap. × 1850					-24.65 (15.06)
Prot. Share × Nap. × 1875					-47.80** (18.84)
Prot. Share × Nap. × 1900					-62.55** (21.95)
Constant	8.526*** (0.832)	9.012*** (0.712)	8.505*** (0.826)	8.524*** (0.851)	5.531*** (1.611)
Number of id	19	19	19	19	19
$R^2$	0.506	0.530	0.509	0.503	0.878
Obs.	109	109	109	109	109

*Notes:* All regressions have territory and year fixed effects.

Robust standard errors clustered by territory.

Weighted regressions are weighted by territories total population in 1750.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

that those counties with a higher share of Protestants were also highly fractionalized. A potential concern is that the interaction term reflects the effects of religious diversity. Several papers have investigated the cost and the benefits of diversity, whether racial, ethnic, religious, or linguistic.<sup>27</sup> Fragmented societies are often more prone to poor policy management and pose more politico-economic challenges than homogenous ones; however, a diverse cultural or ethnic mix also brings variety in abilities and experiences that may be productive and lead to innovation and creativity. A highly fractionalized area can be a better recipient of French institutions if the diversity fosters open-mindedness and ability to adapt to changes. Furthermore if religious heterogeneity is correlated with political instability, French domination might have both a sharper or a weaker effect in those counties that are more heterogeneous. We construct a Herfindal Index using the shares of three biggest religious groups (Protestants, Catholics and Jews) and we use this measure and its interaction with the Napoleonic dummy to test this alternative explanation. Column 2 shows that our results are robust even when we include a measure of religious fragmentation.

Another concern may be that counties that display internal religious homogeneity might be very diverse from their neighboring counties and thus economically and politically disadvantaged. Since Protestant counties in the western part of the sample are a minority among a Catholic majority, this issue could drive our main results. We create a measure of religious distance with neighboring counties as the difference between Protestant share of the county and the average Protestant share of the neighbouring counties. Column 3 confirms that the negative interaction term is not determined by religious distance from the Catholic neighborhood. Finally, column 4 includes all the alternative explanations, we implement a horseshoe, and findings support our hypothesis that cultural incompatibility drives the negative coefficient between Protestant share and institutions. Our results are robust across the different alternative explanations and these confirm the fact that culture plays a relevant role in law transplants.

## 2.6 Discussion: The Relevance of Cultural Commonality

Summing up: our results are robust to possible measurement issues, we devote this section to investigate whether Protestant areas are characterized by other cultural features and different institutional qualities that can explain the negative interaction in our findings. In particular, we want to stress that the weaker impact of French institution on Prussian economy is mainly driven by the clash with local culture. We construct alternative measures of cultural commonality and use them in our specifications.

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<sup>27</sup>For example Alesina and La Ferrara (2005)

Table 2.6: Alternative Channels

Log average wage male elementary school teacher 1886	(1) Education	(2) Rel. Frag.	(3) Rel. Distance	(4) Horserace
Napoleon	-0.420 (0.833)	-0.524 (0.853)	-0.290 (0.860)	-0.311 (0.848)
Protestant Share	0.279*** (0.0252)	0.239*** (0.0243)	0.250*** (0.0274)	0.227*** (0.0266)
Napoleon × Protestant Share	-0.245*** (0.0362)	-0.209*** (0.0352)	-0.214*** (0.0381)	-0.187*** (0.0378)
Universities Holy Roman Empire	-0.0439 (0.0425)			-0.0401 (0.0444)
Napoleon × Universities HRE	0.0735 (0.0599)			0.0778 (0.0604)
Monasteries or Schools in HRE	0.116 (0.0722)			0.0866 (0.0702)
Napoleon × Monasteries or Schools in HRE	-0.0396 (0.0809)			-0.0109 (0.0790)
Religious Fragmentation		0.203*** (0.0418)		0.169*** (0.0438)
Napoleon × Religious Fragmentation		-0.350*** (0.0820)		-0.316*** (0.0859)
Rel. Dist. from Neighbours			-0.163*** (0.0463)	-0.110** (0.0463)
Napoleon × Rel. Dist. from Neighbours			0.223*** (0.0801)	0.117 (0.0816)
Constant	9.279*** (0.402)	9.171*** (0.395)	9.055*** (0.424)	9.129*** (0.419)
Geographic Controls	yes	yes	yes	yes
Historical Controls	yes	yes	yes	yes
Economic Controls	yes	yes	yes	yes
Education controls	yes	yes	yes	yes
Hist & Geo Interactions	yes	yes	yes	yes
$R^2$	0.523	0.532	0.521	0.546
Obs.	447	447	431	431

*Notes:* *Geographic Controls:* latitude, area of the county (log), distance from the district capital and polish speaking area. *Historical controls:* year of annexation to Prussia, population in 1500 and Hanseatic or Imperial cities. *Economic controls:* total population size (log), percentage of county population in urban areas 1871, percentage of labor force in mining 1882 and number of farms 1882 (log). *Education controls:* percentage of pupils with distance to school over 3 km, total number of pupils 1886 (log), total number of teachers 1886 (log) and number of free apartments for male teachers 1886.

Robust standard errors in parenthesis. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 2.7: The Effect of Cultural Commonality

Log average wage male elementary school teacher 1886	French Ties		Pro-French		Institutional Proximity		Horserace	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Napoleon	0.0777** (0.0378)	-2.463*** (0.880)	-0.246*** (0.0576)	-3.052*** (0.515)	-0.198*** (0.0617)	-2.254*** (0.567)	-2.590*** (0.564)	-2.752*** (0.460)
Protestant Share	0.206*** (0.0448)	0.243*** (0.0458)	0.147*** (0.0445)	0.191*** (0.0415)	0.147*** (0.0479)	0.178*** (0.0479)	0.190*** (0.0454)	0.191*** (0.0400)
Napoleon × Protestant Share	-0.148** (0.0616)	-0.248*** (0.0657)	-0.0634 (0.0463)	-0.184*** (0.0459)	-0.0758 (0.0464)	-0.160*** (0.0522)	-0.169*** (0.0521)	-0.187*** (0.0437)
French Ties	-0.0164 (0.0354)	-0.0188 (0.0266)					-0.00675 (0.0197)	
Napoleon × French Ties	0.0719* (0.0390)	0.0685* (0.0386)					0.0712* (0.0379)	
Pro-French			-0.495*** (0.0632)	-0.529*** (0.0645)				-1.971*** (0.127)
Napoleon × Pro-French			0.666*** (0.0738)	0.755*** (0.0631)				2.193*** (0.134)
Institutional Proximity					-0.312*** (0.0584)	-0.338*** (0.0673)	-0.327*** (0.0643)	0.880*** (0.0753)
Napoleon × Inst. Proximity					0.354*** (0.0614)	0.386*** (0.0669)	0.391*** (0.0619)	-0.877*** (0.0803)
Constant	6.093*** (0.648)	7.207*** (0.631)	7.214*** (0.463)	8.141*** (0.390)	7.246*** (0.470)	8.105*** (0.423)	8.108*** (0.390)	7.853*** (0.393)
Historical Controls	yes	yes	yes	yes	yes	yes	yes	yes
Geographic Controls	yes	yes	yes	yes	yes	yes	yes	yes
Economic Controls	yes	yes	yes	yes	yes	yes	yes	yes
Education controls	yes	yes	yes	yes	yes	yes	yes	yes
Hist & Geo Interactions	no	yes	no	yes	no	yes	yes	yes
R <sup>2</sup>	0.650	0.677	0.710	0.756	0.706	0.733	0.739	0.764
Obs.	430	430	426	426	447	447	430	426

Notes: Standard errors, clustered at the pre-Napoleon-reign level, in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

First we introduce our proxies of alternative cultural dimensions since French institutions might be better received in those areas with historical higher exposure to French culture, through protracted huguenots' presence or family connections. Then we control whether territories characterized by more liberal rulers who enacted progressive reforms in the eighteenth century, might have been more willing to accept Napoleonic institutions. Hence, we want to disentangle the effect of institutional proximity from the one of cultural commonality on the growth effect of the institutional transplant. To this purpose, as we discussed above, we construct a measure of institutional reforms based on judicial, administrative and educational progressive reforms implemented in the eighteenth century (see Section 2.3). Table 2.7 presents our results. In columns 1-4 we show that other dimensions of culture have a positive and significant effect on the transplant. We obtain similar results when we use French Ties or the Pro-French dummy. Columns 5-6 show that the pre-existing liberal institutions amplify the effect of Napoleonic Code but they do not delete the effect of cultural similarity. This suggests that the cultural environment is important for the effectiveness of French institutions and that Catholic territories might have had a more favorable attitude towards French culture. When running our different cultural and institutional measures against each other (columns 7-8) we find that the effect is explained by both dimensions. This appears to support the hypothesis that a reign that was historically more exposed to liberal and enlightened ideas was more prone to accept and implement Napoleonic institutions, but also that culture commonality played a relevant role. Earlier connections and links with the exporter have a positive impact on the reception and the effectiveness of the transferred institutions. Finally, the interaction term between Napoleonic Code and Protestant share has a lower magnitude, supporting the fact that religious beliefs are not the only cultural dimension important for economic transplant.

## 2.7 Concluding Remarks

This paper is the first attempt to investigate the heterogeneous effect of a law transplant on economic performance exploiting cultural diversity across territories.

Nineteenth-century Prussia provides a very suitable context to test this hypothesis as it allows us to exploit a quasi-natural experiment, the Napoleonic military campaign, in an environment characterized by a rich variety of cultural traits. All our evidence points to the importance of culture as a mediating factor in the reception of foreign institutions. Specifically, we find no effect of historically French institutions on economic performance due to the absence of cultural similarity. Indeed, the positive effect of radical institutional reforms brought by the French empire in territories either sharing religious beliefs or having experienced previous contact with France is almost double compared to *culturally*

*distant* areas. Our results survive even when controlling for a measure of institutional proximity between pre-existing institutions and the new imported ones.

Although we analyze a very specific historical environment and extrapolation to other contexts might be hazardous, our findings call for extreme care when deciding to export seemingly good institutions, for the transplant may fail when it conflicts with local culture and pre-existing institutions.





## Chapter 3

# In Difference We Trust: Heterogamous Marriages and Cultural Transmission

### 3.1 Introduction

There is an extensive pattern of works in economics providing evidence that cultural traits and values, such as trust and attitude toward cooperation, matter for a large variety of economic outcomes. Much less is known about the formation of these preferences. Social scientists usually consider the family as a relevant determinant of cultural values. In particular, preferences, beliefs, and norms that govern human behavior are partly formed as the result of heritable genetic traits, and are partly transmitted through generations and acquired by learning and other forms of social interaction. Therefore, cultural transmission is an object of study of several social sciences, such as evolutionary anthropology, sociology, social psychology, and economics. It certainly plays a central role in the formation of cultural traits, social norms, and ideological tenets, like e.g., attitudes towards family and fertility practices, and attitudes in the job market.

Although in economics the theoretical literature on intergenerational cultural transmission is quite pervasive, the empirical literature on parenting is still incomplete. Dohmen et al. (2012) provide evidence of an intergenerational transmission of risk aversion and trust, while Cipriani et al. (2012) do not find evidence of a correlation in prosocial values between parents and sons using experimental data. A recent emerging empirical literature investigates the origin of cultural persistence (see Giuliano and Nunn 2015) and the different speed of evolution of cultural traits. Giavazzi et al. (2014) investigate the different degree of persistence across the cultural traits, their findings suggest that some values, such as religious and political ones, are very slow-moving.

Albeit an increasing number of interethnic and interracial weddings in US <sup>1</sup>, often between people with different cultural background, evidence on the transmission in those couples that share different cultures is almost nonexistent. What is missing in the existing literature is a clear-cut theory and empirical evidence that there is cultural transmission also in those couples in which spouses share mixed cultural traits. Following Bisin and Verdier's works, I will define homogamous those families in which parents share the same cultural traits and heterogamous the one in which they do not.

The novel contribution of this work is providing a stylized model and empirical evidence that support the existence of vertical cultural transmission also in heterogamous couple. I provide a stylized model of cultural transmission in order to describe the interaction between the two parents and the incentives in parenting decisions. One of the main prediction of this model is that the higher the distance in values between parents the higher the incentive to put more effort from each parent's perspective. In the empirical part, I study whether there is evidence supporting vertical transmission. Specifically, I estimate if there is correlation between one of the two parents' values and the son's ones using European Social Survey data and considering only second generation immigrants.

My findings suggest a strong correlation between one of the two parents' value, proxied by the average level of the specific trait in the country of origin, and the child. This evidence supports the hypothesis of cultural transmission also in those couples from different nationalities. Besides my results provide evidence that the dominant spouse in transmission depends on the trait considered and also the gender of the receiver influences the reception of the trait. The former result is consistent with Cavalli Sforza and Feldman's seminal work. They claimed that the dominant transmitter depends on the trait (ex. fathers are usually associated with traits concerning politics and mothers the ones of sociality). In addition, using data on time use, findings suggests that heterogamous couples provide more effort in children socialization, consistently with the theoretical model.

This paper contributes to several streams of research broadly focusing on socialization and culture transmission, which characterizes also other social sciences (i.e. psychology, sociology, etc.). The first strand is the cross-fields literature on cultural transmission. The first who exploit a quantitative approach for cultural transmission were Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1985). They provide stylized and very elegant models using tools from evolutionary biology. In particular the former were the ones who provide the clear terminology I will refer to. Bisin and Verdier (2000, 2001) introduce parental socialization in Cavalli-Sforza and Feldman's framework. They formalize cultural transmission using the traditional toolkit of economists. They build a model of intergenerational cultural transmission that is sustained by the concept of imperfect empathy. This friction is "a form of altruism biased towards the parents' own cultural

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<sup>1</sup>See, for example, "Interracial Marriage In The U.S. Climbs To New High, Study Finds" in Huffington Post.

traits” (Bisin and Verdier 2001). Tabellini (2008b) studies the cultural transmission of a norm which generates benefits when an individual does play cooperatively. Some implications of these models have also been tested empirically. Ljunge (2014) provides evidence on significant transmission of trust studying second generation immigrants. Moreover he also finds a stronger transmission from mothers’ side than fathers’ one. Doepke and Zilibotti (2008) proposes a model to explain the success of the middle class during the British Industrial Revolution and provide empirical evidence. Bisin et al. (2004) provide a structural estimation of their cultural transmission model along religious intermarriages in US. What characterizes this stream of literature is that parents, more or less implicitly, agree on the value to transmit. In fact usually scholars deal with parental socialization or unitary household decision. This paper enlarges the scope of the research focusing on those couple that may suffer an internal conflict in the cultural transmission process.

The second strand of literature that motivates my research is the one providing evidence that culture affects economic outcomes.<sup>2</sup> Some scholars use historical cases (e.g. changes in social norms, natural disasters, etc.) to stress the close relationship between culture and socioeconomic outcomes. Botticini and Eckstein (2005, 2012) exploit radical change in social norms to explain economic prosperity and the occupational selection of the Jews. Voigtlander and Voth (2013) find a strong correlation between the Black Death in Europe and the following increased need for labor which implied a shift in marriage age in some parts of Europe. Nunn and Wantchekon (2011) underline the effect of slave trade on the actual level of mistrust in Africa.<sup>3</sup> Another approach consists in using values and beliefs expressed by individuals in survey-data on several topics related to culture and finding the correlation with economic outcomes (ex. Tabellini 2010, Guiso et al. 2009). The last methodology extensively used in this literature is the one based on the use of survey data. The other popular approach is the epidemiological one that is very often based on the behavior of first/second generation immigrants. A good example is Fernandez and Fogli (2006) focus on the fertility and work behavior of married second-generation American women while Giuliano (2007) studies the cultural transmission of family living arrangements.<sup>4</sup>

The next section of the paper provides a stylized model of cultural transmission, Section 3.2 describes data, Section 3.4 illustrates the empirical strategy and provides the main empirical results, Section 3.5 discusses the potential transmission channels and finally Section 3.6 concludes.

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<sup>2</sup>For a review of this literature see Fernandez (2011) and Alesina and Giuliano (2015).

<sup>3</sup>See also Alesina et al. (2013), Nunn (2009) and Voigtlander and Voth (2012)

<sup>4</sup>See also Alesina and Giuliano (2010) and Grosjean (2014)

## 3.2 Model

Culture is usually acquired from people around us and pass it on, in turn, to others. An important distinction between modes of cultural transmission has been pointed out by Cavalli Sforza in several works.<sup>5</sup> He borrowed terms from epidemiology to describe the two principal ways of transmission: vertical and horizontal transmission. The former refers to the passage of information from parent to child. It is a very slow process of evolution since the time unit is one generation and it resembles genetic inheritance. The latter, instead, includes all the other form of socialization from unrelated individuals (e.g. teachers, friends, etc.). Differently from the vertical one, horizontal transmission can occur very rapidly, sometimes resembling an epidemic disease. It occurs between two individuals of the same or different generations. In social sciences, cultural transmission is then modeled as a mechanism combining socialization inside the family and socialization forces outside the household.

To guide the empirical analysis, this section provides a basic conceptual framework for understanding how cultural transmission affects children's traits when parents share different cultural traits. The model partially builds on Bisin and Verdier (2001, 2011), differently from existing literature it allows cultural heterogeneity among parents. In particular I assume that heterogamous couples are able to vertically socialize and the probability of success is endogenous.<sup>6</sup> This is an extreme assumption that is supported by the empirical evidence I will discuss in the next sections. All that is needed for my results is existence of a socialization mechanism in these particular couples, without any claim on the efficiency of this process. In line with the empirical evidence that homogamous families are associated with higher socialization rates. Following the previous works, I assume that children are born without defined preferences or cultural traits, and are first exposed to their family socialization effort. If this attempt of socialization fails the child is exposed to and influenced by the people around him/her (friends, peers, teachers, etc.).

### 3.2.1 General Case

I want to formalize cultural transmission as a time/resources allocation problem between the two parents (transmitters). Families care about their children's cultural traits but socialization requires parental resources (e.g. time spent with children, private school tuition, church contributions, etc.). Hence parents can put efforts in order to socialize and costs increase in the probability of success. I do not focus on the horizontal transmission mechanism since it goes beyond the scope of this paper but I formalize the case in which

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<sup>5</sup>For example Cavalli-Sforza and Feldman (1981) and Cavalli-Sforza (2001).

<sup>6</sup>In Bisin et al. (2004) heterogamous couples are able to socialize but probability of success is exogenous and symmetric between partners.

parents fail in directly socializing their child. Besides I assume that horizontal socialization matters when vertical one fails, following the existing literature (e.g. Bisin and Verdier 2000). Another important assumption, consistent with the literature, is imperfect empathy. Parents are altruistic to their children but they are biased towards their own cultural traits. In my model there are 2 parents, they have to choose how much effort to put in order to socialize their children and they do not cooperate. I assume there are more than 2 cultural traits in the society. Parents have different cultural traits within the family:  $X, Y$  and  $X \neq Y$ . Let  $x$  and  $y$  denote the amount of effort spent in order to socialize to the relative trait. The probability of transmitting one of the traits depends on the effort spent. Each agent has a utility function  $W^i$  where  $i = X, Y$ .

Suppose that there are 2 players and they have to choose how much effort to put in order to socialize to their children. Let  $x$  and  $y$  denote the amount of effort spent in each trait. The probability of transmitting his own trait depend on the effort spent. Each agent has a utility function  $W^i$  where  $i = X, Y$ . If parent  $i$  succeeds in socializing the child he gets a utility  $V^{ii}$ ,  $V^{ij}$  (with  $j \neq i$ ) otherwise. Using the concept of imperfect empathy we assume a weaker condition:  $V^{ii} \geq V^{ij}$

Let's define

$$\pi^X(x, y) = \text{Probability}(\text{socialization} = X|x, y)$$

and

$$\pi_x^X(x, y) > 0, \pi_y^X(x, y) < 0$$

$$\pi^Y(x, y) = \text{Probability}(\text{socialization} = Y|x, y)$$

and

$$\pi_x^Y(x, y) < 0, \pi_y^Y(x, y) > 0$$

Finally

$$\pi^0(x, y) = \text{Probability}(\text{socialization} \neq X, Y|x, y)$$

and

$$\pi_x^0(x, y) < 0, \pi_y^0(x, y) < 0$$

So the utility of an agent with trait  $X$  becomes:

$$W^X = \pi^X(x, y)V^{XX} + \pi^Y(x, y)V^{XY} + \pi^0(x, y)V^{X0} - C(x) \quad (3.1)$$

subject to

$$\pi^X(x, y) + \pi^Y(x, y) + \pi^0(x, y) = 1 \quad (3.2)$$

Let's assume

$$\lim_{x \rightarrow 0} C'(x) = 0$$

where  $C(x)$  is a convex function in parent's effort.

Assuming for simplicity quadratic socialization costs  $C(x) = \frac{1}{2}x^2$  we obtain

$$x = \pi_x^Y(x, y)(V^{XY} - V^{XX}) + \pi_x^0(x, y)(V^{X0} - V^{XX}) \quad (3.3)$$

This result states that effort is increasing in the *cultural intolerance* with respect to the partner ( $V^{XX} - V^{XY}$ ) and with respect to a failure in vertical socialization ( $V^{XX} - V^{X0}$ ). A possible interpretation is that a parent puts more effort when he/she really cares about his cultural trait, while he will put additional effort when the value deriving from the other partner's socialization or with no vertical socialization is low.

### 3.2.2 Example

Now let's assume we have a particular probability function. Let's define the winning probability for agent X,

$$\pi^X(x, y) = \frac{x}{x + y + z}$$

$$\pi^Y(x, y) = \frac{y}{x + y + z}$$

The probability of failing in vertical socialization is determined by parameter z which reflects exposure to interactions with peers, role models, or other cultural partners in society. The utility of an agent with trait X becomes:

$$W^X = \frac{x}{x + y + z}V^{XX} + \frac{y}{x + y + z}V^{XY} + \frac{z}{x + y + z}V^{X0} - C(x) \quad (3.4)$$

Assuming quadratic socialization cost, the FOC becomes

$$x(x + y + z)^2 = y(V^{XX} - V^{XY}) + z(V^{XX} - V^{X0}) \quad (3.5)$$

Utility maximization for an agent with trait Y is:

$$y(x + y + z)^2 = x(V^{YY} - V^{YX}) + z(V^{YY} - V^{Y0}) \quad (3.6)$$

Hence the ratio of efforts of the two agents is:

$$\frac{x}{y} = \frac{y(V^{XX} - V^{XY}) + z(V^{XX} - V^{X0})}{x(V^{YY} - V^{YX}) + z(V^{YY} - V^{Y0})} \quad (3.7)$$

This condition states that the relative effort that each parent will put in order to socialize the child is higher the higher the partner's effort and the higher the disutility generated by not socializing him/her.

### 3.2.3 Homogamous Couples

This is a special case with partners sharing the same cultural traits implying

$$V^{XX} = V^{XY}$$

So the utility of an agent with trait  $i$ , using BV notation, becomes:

$$W^X = [1 - \pi^0(x, y)]V^{XX} + \pi^0(x, y)V^{X0} - C(x) \quad (3.8)$$

So now the FOC, for both agents, becomes:

$$-\pi_x^0(x, y)(V^{XX} - V^{X0}) = C_x(x) \quad (3.9)$$

In this case the effort depends exclusively on the cost function and on the disutility from not socializing the child. This conclusion resembles those by Bisin and Verdier (2000).

## 3.3 Data

European Social Survey (ESS) is my main source of data. This survey covers a broad range of questions on social, political, and economic conditions, as well as demographic variables. The most critic advantage with respect to other sources is that this survey reports information about the country of birth of the respondent as well as the country of birth of both parents. Data from the second to sixth rounds of the ESS are used since the first round does not include information on parental birth country. The survey is administered biannually, starting in year 2002, in a wide range of European countries. I use only immigrants sample in my analysis in order to better disentangle the horizontal from the vertical effect. But we know that culture is an ambiguous word. I used different variable to capture the concept of cultural value. In particular *Trust* (ppltrst) - Most people can be trusted or you can't be too careful, *Redistribution* (ginclif) - Government should reduce differences in income levels, *Woman and Labor Market* (mnrjtjb) - Men should have more right to job than women when jobs are scarce. Trust has been extensively used in economics, following studies of sociologist as Platteau (2000), Banfield (1958) and Putnam (1993). Tabellini (2010) uses trust to show that well functioning institutions are often observed in countries or regions where individual values are consistent with generalized morality. Guiso et al. (2006) instead use it to determine how culture affects economic performances. Preferences for redistribution have been extensively investigated by a series of paper by Alesina and Giuliano.<sup>7</sup> Finally, the perception of role of women in

<sup>7</sup>For example Alesina and Giuliano (2011).



Table 3.1: Summary Statistics

Respondent's Characteristics	Homogamous	Heterogamous	Difference
Age	47.5	45.1	2.40
Children at Home	0.397	0.403	-0.006
Married	0.26	0.24	-0.02
Highest level of Education	3.39	3.59	-0.20
Mother's highest level of education	2.31	2.71	-0.4***
Father's highest level of education	2.54	2.99	-0.45***

the labor market has been used by Giavazzi et al. (2013) and Fogli and Veldkamp (2011). The summary statistics are presented in Table 3.1.

### 3.4 Empirical Specification

This section investigates the main results. I first present the empirical model testing my central hypothesis that we observe cultural transmission in heterogamous couple. In section 4.2 I estimate the effect on cultural outcomes of father's and mother's traits and provide the main results. I also run the main specification and a series of robustness checks to validate my findings.

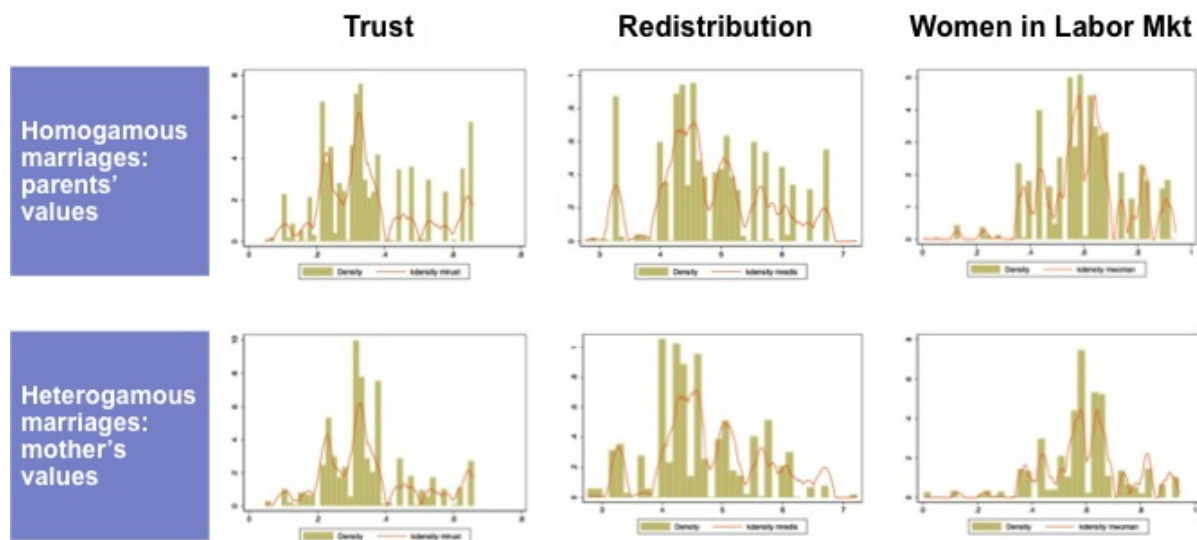
#### 3.4.1 Main Specification

My basic reduced-form regression model is an ordered logit as follows:

$$y_{it} = \beta_0 + \beta_1 X_{it}^{FC} + \beta_2 X_{it}^{MC} + \mathbf{Z}_i \beta_3 + \gamma_i + \delta_t + \varepsilon_i$$

where  $y_{it}$  is a cultural measure (e.g. Trust), it is an ordinal variable with a range between 1 and 10 where a higher value measures higher trust as it signals a stronger agreement with the statement that most people can be trusted, of individual  $i$  in wave  $t$ .  $X_{it}^{FC}$  and  $X_{it}^{MC}$  denotes father's and mother's country of origin average of the cultural proxy for individual  $i$ ,  $\mathbf{Z}_i$  is a vector of socio-demographic controls,  $\gamma_i$  and  $\delta_t$  are respectively country and wave's fixed effect. Finally  $\varepsilon_i$  is an error term. The key variables of interest are the mother's and father's cultural traits. I expect the coefficient  $\beta_1$  and  $\beta_2$  to be significantly different from zero and, in particular, that at least one of them has a positive effect on respondent's traits. My identification strategy relies on the assumption that the average cultural trait in his/her country of origin is a good proxy of his own trait for an individual.

Figure 3.1: Distribution of Mother's Values Across Different Marriages

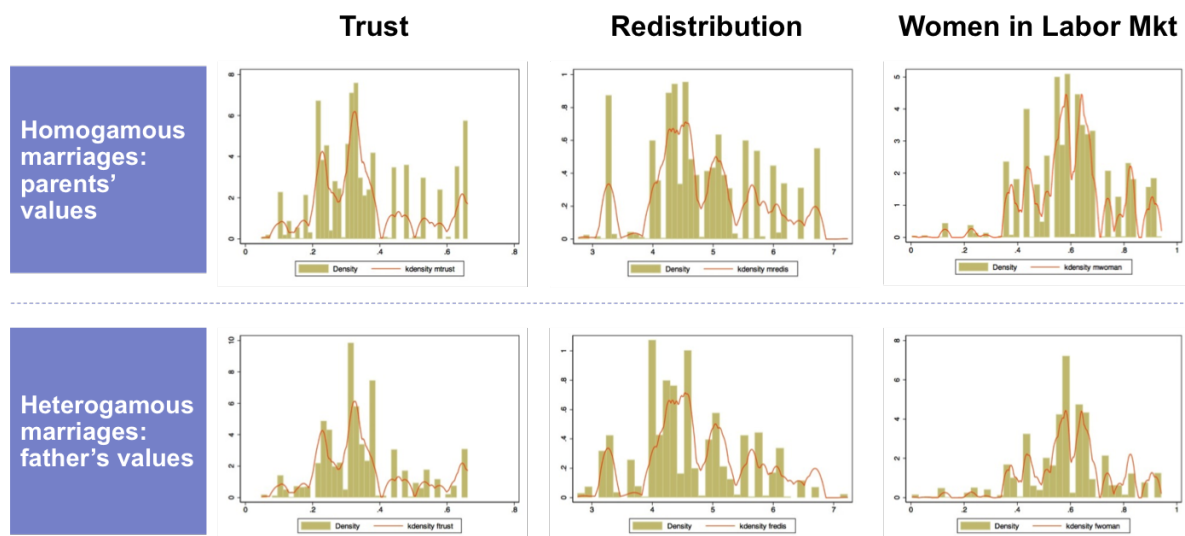


Previous works claim that trust of first generation immigrants is strongly related to trust in their ancestral countries (see Ljunge 2014). Moreover this empirical approach rules out the concerns of reverse causality. The main advantage of this empirical model is that parental trust measure is not endogenous to individual  $i$ 's trait. One concern when studying self-reported cultural value of both the child and the parent is that they could affect each other through daily interaction, which may induce a positive correlation between the child's and the parent's trait. Hence a significant estimate of  $\beta_{1,2}$  would guarantee no reverse causality concerns since it reflects the effect of the trait in the country of ancestry on the individual's trait and not the other way round. Another potential concern is that heterogamous partners may not reflect the "average" culture in the country of origin. Figures 3.1 and 3.2 reports distributions of values in both heterogamous and homogamous couples (by gender) and the evidence suggest there is significant difference between the two.

### 3.4.2 Main Findings

I start testing the impact of the mean trust in the mother's country of birth on the trust level of the respondent in my entire sample. Table 3.2 shows a significant and positive effect, suggesting that people with a mother from high trusting countries tend to have higher trust levels than other individuals. In column 2, I run a similar empirical specification including a proxy of father's trust instead of mother's one. Results are consistent with previous one, supporting the idea of parents' vertical socialization. I test this assumption in column 3, where I consider only those couples where parents are

Figure 3.2: Distribution of Father's Values Across Different Marriages



from the same country and the correlation with respondent's trust is very strong and positive. In column 4, I run my baseline model to capture potential correlation with parents from different countries, hence with different cultural backgrounds. Findings suggest that there is a strong relation between mother's trust, proxied by the average in the country of origin, and his son/daughter's one. A potential concern might be that individuals with heterogamous parents have different features affecting trust. I consider this potential bias and I always control for a series of characteristics that the literature has shown to be important. Specifically my controls include: age (linear and quadratic term), marital status, gender, number of children at home, income and if the respondent belongs to a minority group.

In Table 3.3-3.4 I run the same specification but using different traits. Results are consistent with vertical transmission in both homogamous and heterogamous couples.

In both tables findings support a strong correlation with father's cultural traits. In particular preferences for redistribution and attitudes toward the role of women in the labor market are positively associated with mean values in the father's country of birth. These results seem to confirm the existence of vertical cultural transmission. Parents have a strong incentive to transmit their cultural traits, I provide the evidence that, at least in three cultural dimensions, there is a strong positive correlation between parents and child. My results are robust also to some alternative specifications including an additional set of controls. Table 3.5 reports the results including controls for birth country cultural values in order to capture horizontal transmission, these are measured as average across the oldest waves of World Value Survey since it is usually the closest to the birth date.

Table 3.2: Cultural Transmission: Trust

	(1)	(2)	(3)	(4)
	Trust	Trust	Trust	Trust
Mother Trust	1.282*** (0.123)		1.300*** (0.129)	0.942** (0.456)
Father Trust		1.207*** (0.124)		-0.177 (0.477)
Age	0.00835* (0.00457)	0.00954** (0.00459)	0.00890* (0.00480)	0.00280 (0.0164)
Age Squared	-8.17e-05* (4.58e-05)	-9.24e-05** (4.60e-05)	-9.00e-05* (4.81e-05)	4.03e-05 (0.000167)
Male	0.0570** (0.0281)	0.0551* (0.0282)	0.0647** (0.0296)	-0.0464 (0.100)
Children Living at Home or Not	-0.0265 (0.0316)	-0.0309 (0.0317)	-0.0358 (0.0331)	0.0868 (0.116)
Married	0.142*** (0.0395)	0.137*** (0.0397)	0.152*** (0.0417)	-0.0237 (0.133)
Belong to Minority Ethnic Group in Country	-0.0220 (0.0352)	-0.0201 (0.0354)	-0.0330 (0.0368)	0.190 (0.134)
Middle Income				0.0770 (0.165)
High Income				0.246 (0.162)
Constant	3.109*** (0.315)	3.106*** (0.310)	2.810*** (0.345)	4.590*** (0.674)
Wave Fixed Effects	yes	yes	yes	yes
Country Fixed Effects	yes	yes	yes	yes
Marriages	All	All	Homogamous	Heterogamous
Pseudo- $R^2$	0.0159	0.0157	0.0161	0.0202
Obs.	15835	15706	14335	1371

Notes: Robust standard errors in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.3: Cultural Transmission: Preferences for Redistribution

	(1)	(2)	(3)	(4)
	Redistribution	Redistribution	Redistribution	Redistribution
Mother Preferences	0.0472*** (0.0180)		0.0487** (0.0189)	0.0339 (0.0678)
Father Preferences		0.0567*** (0.0182)		0.171** (0.0734)
Age	0.0180*** (0.00489)	0.0181*** (0.00491)	0.0180*** (0.00517)	0.0305* (0.0171)
Age Squared	-0.000107** (4.84e-05)	-0.000110** (4.85e-05)	-0.000108** (5.09e-05)	-0.000269 (0.000174)
Male	-0.149*** (0.0306)	-0.150*** (0.0307)	-0.146*** (0.0322)	-0.122 (0.108)
Children Living at Home or Not	-0.0253 (0.0343)	-0.0264 (0.0345)	-0.0141 (0.0361)	-0.144 (0.126)
Married	-0.105** (0.0417)	-0.114*** (0.0418)	-0.125*** (0.0441)	0.00683 (0.142)
Belong to Minority Ethnic Group in Country	0.105*** (0.0382)	0.103*** (0.0384)	0.112*** (0.0401)	0.0197 (0.140)
Middle Income				-0.0905 (0.168)
High Income				-0.515*** (0.169)
Constant	1.532*** (0.411)	1.556*** (0.407)	1.525*** (0.479)	1.948** (0.871)
Wave Fixed Effects	yes	yes	yes	yes
Country Fixed Effects	yes	yes	yes	yes
Marriages	All	All	Homogamous	Heterogamous
Pseudo- $R^2$	0.0397	0.0396	0.0404	0.0498
Obs.	15258	15124	13802	1313

Notes: Robust standard errors in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 3.4: Cultural Transmission: Role of Women in the Labor Market

	(1)	(2)	(3)	(4)
	Role of Women	Role of Women	Role of Women	Role of Women
Mother Preferences	1.721*** (0.136)		1.856*** (0.142)	0.0296 (0.515)
Father Preferences		1.827*** (0.136)		1.413*** (0.503)
Age	0.0177*** (0.00635)	0.0173*** (0.00638)	0.0170** (0.00664)	0.0206 (0.0248)
Age Squared	-0.000344*** (6.28e-05)	-0.000345*** (6.30e-05)	-0.000341*** (6.55e-05)	-0.000349 (0.000257)
Male	-0.405*** (0.0380)	-0.405*** (0.0382)	-0.409*** (0.0399)	-0.451*** (0.142)
Children Living at Home or Not	-0.0971** (0.0413)	-0.0985** (0.0415)	-0.0957** (0.0433)	-0.0578 (0.157)
Married	-0.195*** (0.0680)	-0.202*** (0.0683)	-0.174** (0.0719)	-0.722*** (0.241)
Belong to Minority Ethnic Group in Country	-0.324*** (0.0483)	-0.324*** (0.0485)	-0.342*** (0.0504)	-0.0695 (0.192)
Middle Income				0.313 (0.226)
High Income				0.791*** (0.232)
Constant	2.003*** (0.186)	2.039*** (0.186)	2.081*** (0.195)	2.345*** (0.732)
Wave Fixed Effects	yes	yes	yes	yes
Country Fixed Effects	yes	yes	yes	yes
Marriages	All	All	All	All
Pseudo- $R^2$	0.0491	0.0502	0.0518	0.0614
Obs.	9293	9226	8491	734

Notes: Robust standard errors in parenthesis.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Hence, in column 2 the average trust in the country of birth is added, in columns 3-4 respondent's and parents' education respectively since educational attainments are very significant for the level of trust and of the other traits considered. Mother's trust is still the most important variable in cultural transmission. Furthermore the average trust in the country of origin of the respondent has a positive and significant correlation with the level of trust. This is in line with the prediction of horizontal cultural transmission.

Similar results also when we test vertical transmission of the other cultural traits. Table 3.6 reports the result when preferences for redistribution are considered. Father's preferences are strongly significant but also education and income are relevant. Higher levels of income and higher education are intuitively associated with less demand for redistribution, while age is positively correlated with more redistribution.

Table 3.7 provides evidence on the correlation when the preferences for the role of women in the labor market are analyzed. Columns 1-3 suggest that father's trait plays an important role for preferences formation. This results does not hold when parents' work status and educational attainments are added in the specification (Column 4). This finding reflects the role of parents' education already stressed in the literature (see Fernandez et al. 2004).

Finally, in Table 3.8 I investigate heterogeneity across gender in reception. The main specification, including the average cultural trait in the country of origin, is implemented by gender of the recipient. The evidence suggests that girls are more receptive in trust and preferences for redistribution transmission.

### 3.5 Transmission Channels: Discussion

Having shown that there is cultural transmission also in heterogamous couples, it is important to delve more and understand the mechanisms and potential channels. A possible explanation, in line with my model predictions, is that parents put more effort in socializing the children. If we assume a weaker socialization technology, due to the heterogeneous environment in which the child is grown up, effort should compensate it. I test this hypothesis exploiting time diaries from US. In particular I focus my analysis on childcaring activities. I defined *childcaring* those activities in the following categories: caring for and helping household children (ex. Reading/Playing to or with the child, etc.), activities related to household children's education (ex. Helping in homeworks, etc.) and activities related to household children's health (ex. Sitting with sick household child). Following codification of data, household members are considered children if under the age of 18, so I will consider only those households with at least one person under 18 in the household. In American Time Use Survey (ATUS) only one person age 15 or over, randomly chosen from the household, answers questions about his or her time use.

Table 3.5: Cultural Transmission: Trust (including additional controls)

	(1)	(2)	(3)	(4)
	Trust	Trust	Trust	Trust
Mother Trust	0.942** (0.456)	0.942** (0.456)	0.970** (0.456)	0.903* (0.495)
Father Trust	-0.177 (0.477)	-0.177 (0.477)	.97036 (0.456)	0.059 (0.498)
Age	0.00280 (0.0164)	0.00280 (0.0164)	-0.00221 (0.0166)	-0.0126 (0.0188)
Age Squared	4.03e-05 (0.000167)	4.03e-05 (0.000167)	8.73e-05 (0.000169)	0.000186 (0.000196)
Male	-0.0464 (0.100)	-0.0464 (0.100)	-0.0344 (0.100)	0.00429 (0.107)
Children Living at Home or Not	0.0868 (0.116)	0.0868 (0.116)	0.0883 (0.116)	0.0490 (0.127)
Married	-0.0237 (0.133)	-0.0237 (0.133)	-0.0162 (0.134)	0.0645 (0.148)
Belong to Minority Ethnic Group in Country	0.190 (0.134)	0.190 (0.134)	0.164 (0.134)	0.270* (0.144)
Middle Income	0.0770 (0.165)	0.0770 (0.165)	0.0524 (0.166)	-0.0118 (0.182)
High Income	0.246 (0.162)	0.246 (0.162)	0.207 (0.163)	0.182 (0.180)
Average Trust		-1.005 (3.307)	-1.197 (3.348)	4.500** (1.776)
Primary Education			-0.239 (0.291)	-0.316 (0.340)
Secondary Education			-0.257** (0.122)	-0.297** (0.134)
Ethnic Fragmentation				2.092* (1.263)
Constant	4.590*** (0.674)	4.152*** (1.073)	3.925*** (1.081)	6.940*** (0.854)
Parents' Education and Work Status	No	No	No	Yes
Pseudo- $R^2$	0.0202	0.0202	0.0209	0.0247
Obs.	1371	1371	1371	1200

Notes: Country and Wave fixed effects in all specifications. Robust standard errors in parentheses.  
 \*\*\* p<0.01, \*\* p<0.05, \* p<0.1



Table 3.6: Cultural Transmission: Preferences for Redistribution (including additional controls)

	(1)	(2)	(3)	(4)
	Redistribution	Redistribution	Redistribution	Redistribution
Mother Preferences	0.0339 (0.0678)	0.0407 (0.0703)	0.0409 (0.0700)	0.0168 (0.0742)
Father Preferences	0.171** (0.0734)	0.160** (0.0750)	0.172** (0.0743)	0.149* (0.0798)
Age	0.0305* (0.0171)	0.0286* (0.0172)	0.0366** (0.0174)	0.0349* (0.0196)
Age Squared	-0.000269 (0.000174)	-0.000255 (0.000175)	-0.000334* (0.000177)	-0.000331* (0.000200)
Male	-0.122 (0.108)	-0.137 (0.109)	-0.153 (0.109)	-0.173 (0.119)
Children Living at Home or Not	-0.144 (0.126)	-0.150 (0.127)	-0.153 (0.127)	-0.115 (0.139)
Married	0.00683 (0.142)	0.0137 (0.143)	0.00988 (0.144)	-0.0724 (0.160)
Belong to Minority Ethnic Group in Country	0.0197 (0.140)	0.0221 (0.143)	0.0548 (0.142)	0.111 (0.155)
Middle Income	-0.0905 (0.168)	-0.0912 (0.170)	-0.0663 (0.170)	-0.0302 (0.193)
High Income	-0.515*** (0.169)	-0.492*** (0.171)	-0.441** (0.172)	-0.360* (0.196)
Average Preferences		0.166 (0.691)	0.278 (0.702)	0.142 (0.690)
Primary Education			0.793** (0.359)	0.419 (0.432)
Secondary Education			0.339** (0.143)	0.302* (0.164)
Constant	1.948** (0.871)	2.770 (3.204)	3.638 (3.251)	2.038 (3.265)
Parents'education and Work Status	No	No	No	Yes
Pseudo- $R^2$	0.0498	0.0477	0.0505	0.0547
Obs.	1313	1287	1287	1124

Notes: Country and Wave fixed effects in all specifications. Robust standard errors in parentheses.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 3.7: Cultural Transmission: Role of Women in the Labor Market (including additional controls)

	(1)	(2)	(3)	(4)
	Role of Women	Role of Women	Role of Women	Role of Women
Mother Preferences	0.0296 (0.515)	-0.196 (0.606)	-0.226 (0.601)	-0.196 (0.666)
Father Preferences	1.413*** (0.503)	1.471** (0.621)	1.100* (0.619)	0.308 (0.677)
Age	0.0206 (0.0248)	0.0525* (0.0284)	0.0296 (0.0302)	0.00694 (0.0323)
Age Squared	-0.000349 (0.000257)	-0.000729** (0.000307)	-0.000489 (0.000328)	-0.000205 (0.000358)
Male	-0.451*** (0.142)	-0.516*** (0.158)	-0.444*** (0.160)	-0.360** (0.178)
Children Living at Home or Not	-0.0578 (0.157)	0.0921 (0.176)	0.0885 (0.179)	0.0589 (0.186)
Married	-0.722*** (0.241)	-0.977*** (0.323)	-0.931*** (0.327)	-0.765** (0.340)
Belong to Minority Ethnic Group in Country	-0.0695 (0.192)	-0.141 (0.207)	-0.243 (0.209)	-0.148 (0.227)
Middle Income	0.313 (0.226)	0.172 (0.272)	0.146 (0.276)	
High Income	0.791*** (0.232)	0.550** (0.277)	0.437 (0.281)	
Primary Education			-1.511*** (0.351)	-1.771*** (0.404)
Secondary Education			-0.611*** (0.170)	-0.573*** (0.197)
Constant	2.345*** (0.732)	2.627*** (0.804)	1.251 (0.871)	-0.127 (1.003)
Parents'education and Work Status	No	No	No	Yes
Pseudo- $R^2$	0.0614	0.0698	0.0830	0.0887
Obs.	734	592	592	509

Notes: Country and Wave fixed effects in all specifications. Robust standard errors in parentheses.

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 3.8: Cultural Transmission by Gender

	(1)	(2)	(3)	(4)	(5)	(6)
	Trust	Trust	Redistribution	Redistribution	Role of Women	Role of Women
Mother Trust	0.818 (0.778)	1.148** (0.585)				
Father Trust	-0.619 (0.734)	-0.121 (0.634)				
Mother Redistribution			-0.0810 (0.107)	0.140 (0.0994)		
Father Redistribution			0.0901 (0.106)	0.248** (0.108)		
Mother Role of Women					0.703 (0.982)	-1.276 (0.990)
Father Role of Women					2.569*** (0.919)	-0.439 (0.909)
Age	-0.0219 (0.0253)	0.00869 (0.0233)	0.0291 -0.000285	0.0449* -0.000386	0.0250 (0.0499)	0.0378 (0.0410)
Age Squared	0.000307 (0.000257)	-1.86e-05 (0.000235)	-0.000285 (0.000262)	-0.000386 (0.000262)	-0.000422 (0.000564)	-0.000627 (0.000421)
Children at Home	0.265 (0.187)	-0.0204 (0.157)	-0.174 (0.204)	-0.0825 (0.177)	0.504* (0.275)	-0.334 (0.273)
Married	-0.292 (0.223)	0.169 (0.173)	-0.112 (0.236)	0.0514 (0.195)	-0.579 (0.499)	-1.485*** (0.567)
Minority Group	0.103 (0.202)	0.205 (0.189)	0.0759 (0.213)	0.00114 (0.205)	-0.758** (0.347)	0.122 (0.338)
Middle Income	0.112 (0.299)	0.0824 (0.208)	0.260 (0.299)	-0.284 (0.222)	-0.291 (0.552)	0.345 (0.375)
High Income	0.107 (0.294)	0.314 (0.207)	-0.0340 (0.293)	-0.707*** (0.221)	-0.164 (0.534)	0.793* (0.410)
Avg. Trust	9.584*** (3.515)	-1.412 (3.410)				
Avg. Redistribution			0.935* (0.520)	0.0128 (0.905)		
Avg. Role of Women					-53.11*** (4.765)	0.213 (2.435)
Constant	6.560*** (0.842)	4.043*** (1.269)				
Gender	Male	Female	Male	Female	Male	Male
Pseudo- $R^2$	0.0267	0.0281	0.0585	0.0609	0.127	0.102
Obs.	606	765	571	716	272	320

Notes: Country and Wave fixed effects in all specifications. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

I match data from CPS in order to determine heterogamous couples with data (ATUS). I restrict my sample only to those respondents whose partner can be clearly identified in the CPS. My main specification is an OLS regression where the most relevant coefficient for my analysis is the one capturing the effect of heterogamous couples on the amount of minutes spent in childcaring activities. I define *Heterogamous couple* as a dummy variable that equals one if the partners are from different nationalities. Table 3.9 reports the results on time diaries data. The coefficient on the dummy *Heterogamous couple* suggests that these couples spend more minutes with their child. In line with the theoretical model, we expect parents with different values to spend more time in socialization. In this particular specification we are considering all the couples in the sample, with no restrictions on country of origin (i.e. not only second generation immigrants or foreigners are considered).

Column 1 provides evidence that heterogamous couples invest more time in childcaring activities, controlling for gender, age, age squared, the number of people living in the household, whether the respondent is American native or is an immigrant (or a second generation immigrant) and information about job status and income. In column 2, I control whether the children of the respondent have the opportunity to have their lunch at school, this might determine less effort for the parents. Finally Column 3 includes dummies for the educational attainments of the respondent. The estimated coefficient of the heterogamous couple dummy does not change and does not lose statistical significance across specifications.

In particular the estimation is between 5 and 9 minutes, a significant amount if we consider that the average daily childcaring activities takes about 80 minutes in a homogamous couple (Table 3.10). A potential concern might be that my proxy for heterogamous couple does not fully capture cultural diversity. Different nationality might not always be a good proxy for cultural differences, some countries may share similar cultural background. Then, I use genetic distance data (Spolaore and Wacziarg 2009) as a proxy of cultural distance in order to obtain an alternative measure to capture heterogeneity between parents. Table 3.10 reports a comparison of means of childcaring activities between those couples with no genetic distance and those with positive distance. The evidence suggest there is a statistically significant difference.

Following the prediction of my model, I restrict my analysis only to those respondents born in US, this should shut down the channel of differences with local cultural environment (i.e. the horizontal channel). We should observe a higher effort in those couples where the partner has a different nationality, and the findings may be interpreted as the result of cultural difference only with respect to the partner. Table 3.11 provides the result of the main specification restricting the sample only to the American respondents. Empirical evidence suggests that there is higher effort in heterogamous couple. The magnitude of the effect is even higher than the one considering the entire sample.

Table 3.9: Time Allocation: Childcaring Activities

	(1)	(2)	(3)
	Childcaring Activities	Childcaring Activities	Childcaring Activities
Heterogamous couple	5.208*	9.894**	7.642*
	(2.923)	(4.481)	(4.359)
Number of People in HH	2.190	4.934	5.918
	(1.954)	(4.125)	(3.980)
High Income	13.46***	11.91***	5.463**
	(1.669)	(2.472)	(2.682)
Age	0.0305	-0.425	-1.292
	(1.104)	(2.068)	(2.045)
Age Squared	-0.0180	-0.0125	-0.00317
	(0.0121)	(0.0228)	(0.0226)
Female	23.21***	24.34***	22.92***
	(1.816)	(2.468)	(2.398)
Full time/Part time Employment Status	-29.82***	-28.87***	-29.15***
	(2.812)	(4.042)	(4.025)
Native	16.12***	18.13***	13.80***
	(2.251)	(3.361)	(3.712)
Lunch at School		-6.482*	-5.277
		(3.354)	(3.309)
Secondary Education			1.437
			(13.12)
Tertiary Education			25.62**
			(11.91)
Constant	44.57*	42.67	45.55
	(22.90)	(38.56)	(44.34)
$R^2$	0.146	0.158	0.171
Obs.	18815	8021	8021

Notes: Country and Year fixed effects in all specifications. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.10: Comparison of Means: Childcaring Activities

Homogamous	Heterogamous	Diff
81.63	90.17	-8.54***
(.751)	(2.33)	(2.40)
Genetic Distance=0	Genetic Distance $\neq 0$	Diff
82.07	87.45	-5.38**
(.743)	(2.63)	(2.74)

Notes: Standard errors in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.11: Time Allocation: Childcaring Activities only for US Born Respondents

	(1) Childcaring Activities	(2) Childcaring Activities	(3) Childcaring Activities
Heterogamous couple	2.889 (4.764)	12.66** (6.346)	11.55* (6.239)
Number of people in HH	0.128 (0.966)	-0.293 (1.187)	0.502 (1.164)
High Income	12.16*** (1.827)	8.350*** (2.598)	2.668 (2.794)
Age	1.412 (0.884)	2.784** (1.202)	2.063* (1.200)
Age Squared	-0.0341*** (0.00962)	-0.0479*** (0.0132)	-0.0403*** (0.0132)
Female	23.72*** (2.024)	25.05*** (2.635)	23.87*** (2.588)
Full time/Part time Employment Status	-31.18*** (3.080)	-30.50*** (4.014)	-30.87*** (3.984)
Lunch at School		-3.376 (2.625)	-2.343 (2.587)
Secondary Education			21.73* (12.74)
Tertiary Education			43.92*** (12.76)
Native	2.882 (6.620)	12.22 (7.742)	11.15 (7.766)
Constant	43.34* (22.61)	-2.446 (30.95)	-24.03 (34.61)
$R^2$	0.156	0.172	0.184
Obs.	15539	6649	6649

Notes: Country and Year fixed effects in all specifications. Only respondents born in US are considered. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 3.12: Time Allocation: Childcaring Activities using Genetic Distance

	(1) Childcaring Activities	(2) Childcaring Activities	(3) Childcaring Activities
Genetic Distance	2.503 (11.39)	37.56* (19.36)	41.20** (19.28)
Number of people in HH	-7.345*** (2.087)	-6.931** (3.376)	-5.759* (3.481)
High Income	25.95*** (6.511)	16.47* (9.225)	9.527 (9.435)
Age	4.072* (2.301)	5.048 (3.229)	3.443 (3.361)
Age Squared	-0.0576** (0.0274)	-0.0713* (0.0401)	-0.0520 (0.0413)
Female	21.46*** (6.368)	17.21** (8.388)	17.11** (8.568)
Full time/Part time Employment Status	-38.47*** (10.50)	-51.69*** (15.18)	-47.98*** (15.44)
Lunch at school		-14.69 (9.534)	-13.33 (9.607)
Secondary Education			25.55 (16.36)
Tertiary Education			51.13*** (16.30)
Native	-2.889 (6.257)	9.268 (9.297)	6.343 (9.280)
Constant	-54.38 (51.52)	45.92 (72.77)	30.41 (77.14)
$R^2$	0.197	0.298	0.317
Obs.	1283	528	528

Notes: Country and Year fixed effects in all specifications. Only respondents born in US are considered. Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

When I analyze cultural distance in CPS data more than 20 percent of heterogamous couple in this sample have 0 genetic distance. Hence I want to control that my results are not driven by couples with very little cultural heterogeneity, i.e. couples that are similar to homogamous ones. In that case findings may just be driven by *assortative mating*. I run the same specification of Table 3.10 but using genetic distance instead of a dummy variable for heterogeneous couples. Table 3.12 shows that higher cultural distance implies higher effort in childcaring activities in the subsample of couples with positive cultural distance, consistent with my previous results and theoretical predictions. These findings suggest that cultural diversity implies higher effort among partners, supporting the main prediction of the theoretical model.

### 3.6 Concluding Remarks

Are parents sharing different cultures able to socialize their children? Are these children only influenced by the surrounding environment? This question is becoming more relevant since interethnic marriages are becoming more and more significant in US population. I examine cultural vertical transmission in second generation immigrants, born in families with parents from different countries. This work provides both a theoretical framework and empirical evidence to study this phenomenon. In the theoretical part the main prediction suggests that differences among partners generate higher disutility for those who fails in socializing their child implying higher effort in cultural transmission. In the empirical part, using survey data and time-diary ones, findings suggest that : (i) there is evidence of vertical transmission in heterogamous couples, (ii) the dominant transmitter depends on the trait transmitted (iii) heterogamous couples put more effort in socialization than homogamous ones (iv) higher cultural distance is associated with higher effort.





## Chapter 4

# Turmoil after Death: Leadership, Protests, and Growth

### 4.1 Introduction

In the past decade economists have turned their attention to the study of the effect of leaders on economic outcomes. Political institutions affect economic performance, so many scholars have investigated the political economy of institutional design. A relevant aspect of this stream of research is how power a society should delegate to its leaders.<sup>1</sup> The following natural step to ask is whether a national leader, who is a crucial player in the formal institution, has a personal impact on economic growth. There is, in fact, a growing body of literature on how the policymakers and their characteristics matter for policy outcomes. One of the most relevant is the work by Jones and Olken (2005) providing evidence that the quality of leaders matters for growth. A natural way of interpreting these results is to argue that some leaders are more competent than others and hence better able to make sensible economic policy choices which lead to better performance. This paper investigates whether in a leader transition there are other drivers, others than the mere personal skills, that may explain these differences in economic outcome in the short term or confounding factors that bias the magnitude of ascribed leaders' effect. In particular, an unexpected transition generates a power vacuum that generates political instability. Historically, the collapse or the death of a national leader determines regime switches or political opportunities for his competitors. Furthermore the vacancy of a leader has, in some circumstances, generated turmoils and protests.

Political instability and social unrest may be strongly detrimental for economic growth, hence they should not be ignored in an empirical analysis of leaders' changes. Our novel findings suggest that leader's effect is sharper in those countries with no social unrests. We do find the importance of a leader for economic performance but we show that collective

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<sup>1</sup>See for example Alesina et al. (2004)

actions may partly explain the differences in economic growth that previous works have found around a leader's transition. In the empirical analysis we also document a significant increase of social unrests, on average, around the leader transition in less democratic countries. This evidence corroborates our findings on economic growth, while we find no evidence on increasing protests in democratic nations. We use an innovative and transparent statistical methodology to address our analysis, the Synthetic Control Method in order to compute an artificial control group to isolate leader's effect. Our results provide evidence that this generated social and political instability is reflected also in economic variables. In particular the effect of the leader change on economic outcome is distorted by these confounding factors in the short term.

Our paper contributes to an emerging attention to the role of leaders in the context of economic growth strand of literature. The seminal work of Olken and Jones (2005) provides evidence of the relevance of national leaders for economic growth. They analyze natural and accidental deaths among world leaders and their findings suggest, on average, growth significantly changes after leaders die. Olken and Jones (2009) analyze assassination and their results provide evidence of a higher probability of a transition to democracy when autocratic leaders are assassinated. Beasley et al. (2011) exploit the heterogeneity in educational attainments among leaders and find a strong correlation between highly educated leaders and better economic performance. In a similar fashion, but focusing on executive power in the private sector, Bertrand and Schoar (2003) provide evidence on the importance of CEO on economic performance of the firms, they stress how manager fixed effects matter for a wide range of corporate decisions. In a more recent paper Kaplan et al. (2012) investigate CEO characteristics and their subsequent performances.

Finally, we touch upon the literature analyzing the link between political instability and economic performance. Alesina et al. (1996) find a significant correlation between political instability and lower economic growth in a cross-country analysis. Alesina and Perotti (1996) provide evidence that political unrests have a negative effect on investment and savings. The next section of the paper describes data, Section 4.3 illustrates synthetic control group method and provides the main empirical results using this methodology, Section 4.4 discusses findings using panel data and finally Section 4.5 concludes.

## 4.2 Data and Variables

We build a novel dataset containing combining different sources. The data set includes every country in the Penn World Tables (Heston, Summers, and Aten 2011) for which there are sufficient data to estimate. The total number of countries included in the database is 205. We identify leader's change using Jones and Olken (2005) data. They consider only leaders with "exogenous death", those who died in office, either by natural causes or by

Table 4.1: Summary statistics: Means All Collective Actions by Regime

Regime	Before Death	Around Death	After Death
Transition	3.75	9.2	9.33
Full Autocracy	2.268	2.709	2.964
Weak Autocracy	1.944	4.624	2.774
Weak Democracy	4.026	8.464	3.637
Full Democracy	0.928	2	2.143

accident. In this paper the subsample of 77 deaths is considered, 65 leaders who died due to natural causes and 12 died in accidents.<sup>2</sup>

We use Polity IV project database (Marshall and Jaggers 2010) to construct our measures of democracy. We first follow the existing literature<sup>3</sup> and define as *Democratic* those countries with a positive score in Polity2. We also make some refinements in these definition differentiating between full/weak democracy exploiting differences in the scores. In particular we define *Full Autocracy* those nations with a score between -10 and -6; *Weak Autocracy* a score between -5 and -1; *Weak Democracy* a score between 0 and 6 and *Full Democracy* a score higher than 6. Countries that underwent through a political transition are coded with different scores (ex. It's the case of Spain that went through a democratic transition after Francisco Franco's death). Finally we use Banks and Wilson (2012) data to measure social unrests. These data include violent episodes (assassination, etc.) and nonviolent ones, lawful and unlawful collective actions against the national political authority and local players. In particular they provide information about: assassinations, general strikes, guerrilla warfare, government crises, purges, riots and revolutions. Table 4.1 provides some descriptive statistics using the sum of all unrests for which we have information. The means reported are computed on three-year periods, the year in which the leader died, the year before and the year after are defined as *Around Death*. We consider the average of collective actions two, three and four years before/after the leader change, respectively defined as *Before Death* and *After Death*. The evidence suggest that there is an increase in social unrests in the presence of a leader change due to natural or unexpected causes. The biggest increase, in relative terms, is observed in weak autocracies (excluding transition countries).

We then focus on two specific examples of violent and nonviolent unrests. First, we use *General Strikes*, defined as "Any strike of 1,000 or more industrial or service workers that involves more than one employer and that is aimed at national government

<sup>2</sup>In some specifications the sample might be smaller according to economic and political data availability

<sup>3</sup>For example, see Persson and Tabellini (2003, 2009)

policies or authority". For the violent measure we use *Riots* measured as "Any violent demonstration or clash of more than 100 citizens involving the use of physical force". Table 4.2 provides the average number of general strikes by type of regime in the three different time windows. The empirical evidence suggests that these nonviolent protests tend to be higher in democratic environments, while we observe no increase in autocratic ones. Table 4.3 reports a similar analysis for riots in those countries where we observe the national leader death. We observe an opposite trend compared with the previous results. Descriptive statistics suggest that riots increase only in autocratic countries while they do not in democratic countries. This might be motivated by new opportunities for political opponents or by the perspective of a regime switch. These preliminary results suggest that a leader vacancy, even when uncorrelated with the underlying economic conditions, may determine politically motivated violence and social instability.

We, then, focus our analysis on the years close to leader's death since data show a higher social and political instability. In particular we compare the average of collective actions in the year before the "shock" and the year of death. When we consider all social unrest available in the data we observe that there is a significant increase on average in the year of death (Table 4.4). We observe a similar pattern also when we restrict our attention only to a violent unrest (riots) and to a nonviolent one (antigovernment demonstration). The former comparison is not statistically different than zero, while antigovernment demonstration are significantly higher. They are more than double in the year of the leader's change. In our sample, *Antigovernment Demonstrations* are defined as "Any peaceful public gathering of at least 100 people for the primary purpose of displaying or voicing their opposition to government policies or authority".

We observe these increasing trends also when we try to distinguish unrests' patterns by democratic or autocratic countries. Table 4.5 reports comparison of means by type of regime. The sum of collective action increases from about 2.4 to 3.5 in the year of the death in democracy. Also violent and peaceful collective actions increase but all these variations are not statistically significant. Autocratic countries show a significant increase on average in two dimensions. The sum of social unrests more than triple and also peaceful demonstrations register a remarkable increase. Only riots are decreasing in the year of death. Descriptive statistics support the idea that political instability following the death of a national leader induces social unrests. These unrests are more frequent in those countries where there are not democratic institutions. This finding becomes crucial for the analysis of leaders' effect on economic performance since estimated effect might be affected by significant confounding effects generated by social unrests. This is particularly important in autocratic countries since previous works found a stronger economic effect in less democratic nations.<sup>4</sup>

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<sup>4</sup>See Jones and Olken (2005).

Table 4.2: Summary statistics: Means General Strikes by Regime

Regime	Before Death	Around Death	After Death
Transition	0	1	1
Full Autocracy	0.179	0.091	0.127
Weak Autocracy	0.071	0.065	0.031
Weak Democracy	0.075	0.125	0.125
Full Democracy	0.071	0.1	0.143

## 4.3 Empirical Analysis

### 4.3.1 Synthetic Control Method

This section presents the novel methodology implemented to evaluate the impact of leaders on economic performances. The Synthetic Control Method is an empirical approach used for comparative case studied. It has been developed by Abadie and Gardeazabal (2003) and extended in Abadie et al.(2010), but it has been used in different contexts. The former used this methodology for the analysis of the effect of conflicts on economic performance exploiting Basque Country as a case study. In particular they used "Spanish regions to construct a "synthetic" control region which resembles relevant economic characteristics of the Basque Country before the outset of Basque political terrorism in the late 1960's". So they generate an artificial "counterfactual" for the territories they analyzed. Billmeier and Nannicini (2013) investigate the impact of economic liberalization on real GDP in different nations and find that liberalizing the economy had a positive effect in most regions.

The main advantage of this approach is that, using a weighted combination of potential control countries, it is possible to replicate the most relevant characteristics of the "treated" country. After the country analyzed get the treatment, the synthetic control group can be used to compute the artificial outcome of the same country under the sce-

Table 4.3: Summary statistics: Means Riots by Regime

Regime	Before Death	Around Death	After Death
Transition	0.25	2.8	2
Full Autocracy	0.375	0.672	.491
Weak Autocracy	0.142	0.258	0.152
Weak Democracy	0.725	0.4	0.708
Full Democracy	0.0714	0	0

Table 4.4: Comparisons of Means: Unrests Around the Death

	Year Before Death	Year of Death	Difference
All Collective Actions	1.7	3.6	1.9*
Riots	0.51	0.81	0.30
Antigovernment Demonstrations	0.30	0.70	0.40**

Table 4.5: Comparisons of Means: Unrests Around the Death by Regime

	Democratic			Autocratic		
	Bef. Death	Death	Diff.	Bef. Death	Death	Diff.
All Coll. Actions	2.38	3.5	1.12	1.33	4.12	2.78*
Riots	0.73	1.14	0.41	0.64	0.39	0.25
Antigov. Demonstrations	0.5	0.64	0.14	0.15	0.85	0.7**

nario of no treatment. In our specification we consider as "treated" those countries that have been hit by a leader shock. We then create a synthetic control group, we choose the pool of potential comparison to be composed by all those countries that do not have leaders' death in the matching period. Our choice to include all countries in the potential control group increases sample size and the power of test to the detriment of a common support between treated and comparison countries that might have been guaranteed by geography or cultural dimensions. The time span we consider for the pre-treatment is 10 years, while the post-treatment analysis is over the following 5 years. We match our countries on real per capita GDP in PPP.<sup>5</sup>

### 4.3.2 Main Findings

This section reports our findings using Synthetic Control Method. Figure 4.1 displays results for three countries with a relevant number of unrests during the transition. We start our analysis with India which was characterized by two leader's changes in three years. Jawaharlal Nehru, who was the first Prime Minister of India since 1947 died in office in 1964. Lal Bahadur Shastri became prime minister for less than 48 months. He died in 1966 due to heart attack. According to our data in the following year there were several episodes of protests. Specifically more than 50 episodes of social unrests between 67-69 were reported, with a peak in 67 of 36 episodes. In particular, 29 violent demonstrations and 2 assassinations were reported in that year. Figure 4.1 reports our Synthetic Control Method (SCM) output on India. The pre-treatment real per capita

<sup>5</sup>Our results are robust adding political controls (i.e. democracy, etc.).

GDP has a good fit, the evidence suggests that political shock had not a clear impact in the short term. India's performance diverges from the control group in 1970.

Johannes Gerhardus Strijdom, prime minister of South Africa, was in power for almost four years when he died in 1958. Just 5 episodes of social unrests were reported in 1958 but we observe a peak of 16 ones, including 8 riots, in 1960. SCM analysis suggests that new leader (positive) effect starts in 1960, where we observe a higher trend compared to the artificial control group.

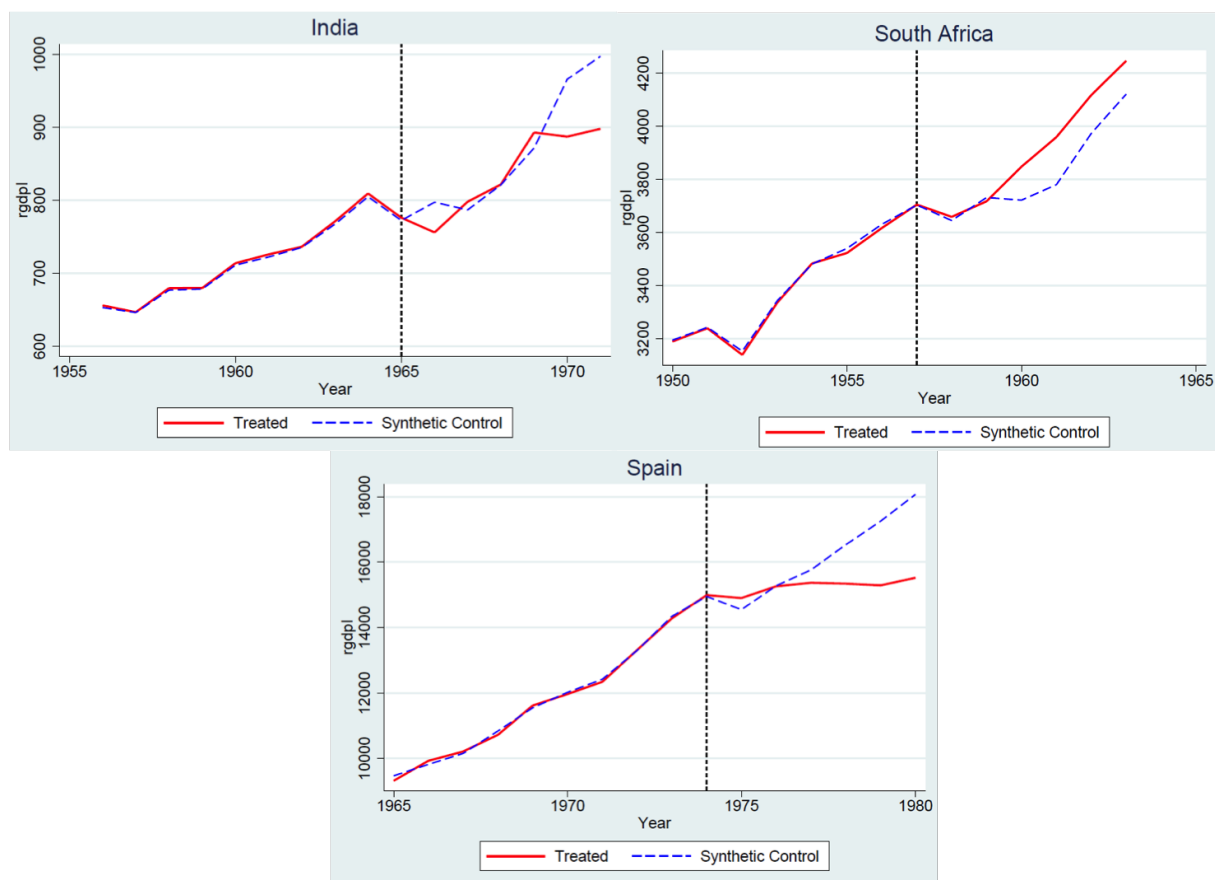
Finally we analyze Spanish democratic transition. Francisco Franco, who had the executive power, died in 1975 after 36 years of government. After his death monarchy was restored and Spanish Constitution of 1978 reestablished a constitutional monarchy as the form of government for Spain. During this transition more than 20 episodes per year, on average, were reported. In particular many episodes of riots and antigovernment demonstration took place. Our analysis confirm that Spanish performance diverges from the control group only few years later, hence the effect of the institutional change has been delayed.

Our findings suggest that in presence of collective actions the effect of the new leader on economic performance is shortly delayed. We then focus on those countries that show (almost) no social unrests (Figure 4.2). We start focusing on Angola where Antonio Agostinho Neto who was the first President of Angola and the leader of the Popular Movement for the Liberation of Angola in the war for independence died in 1979 due to cancer. Jose' Eduardo dos Santos, who was a relevant figure in the party and former Minister of Foreign Affairs, took office as President of Angola. During these shift from Neto to dos Santos very few collective actions were reported. Specifically 2 episodes in 1979 and 0 the following year. When we look at SCM, the evidence suggests that leader's change had a significant and immediate effect on economic performance compared to the control group.

Keizo Obuchi was 84th Prime Minister of Japan from 1998 to 2000 when he suffered a fatal stroke. The new prime minister was elected 3 days later, there was no political uncertainty and no social or political instability is recorded. In particular just 1 episode of government crises is provided in 2001 when we analyze the following 8 years. Similar social stability has been observed in Malaysia where in 1976 Tun Abdul Razak, the Prime minister, died after five years of power. The day after Hussein Onn was appointed prime minister, he was already deputy prime minister. Very few cases of social instability are reported given the low political uncertainty, specifically just 6 episodes in 7 years were recorded. In both cases our SCM analysis confirm that leader's effect had a strong and relevant impact on economic growth after the political shock.



Figure 4.1: SCM in Countries with Unrests



We also implement some placebo tests to verify the validity of the Synthetic Control methodology. We impose an artificial death in those countries where we observed a leader's change. Figure 4.3 reports the result for two countries: Spain and Angola.

In both cases we shift the year of the death by more than five years (i.e. outside from our previous time window). In Spain we have a leader's death in 1982 (instead of 1975), during the constitutional monarchy, and in Angola the shock is in 1990 (instead of 1979). In both cases we observe that, differently from previous results, we do not observe a clear effect of the hypothetical leader's change. The treated country's performance does not sharply diverge from the control group's one and no clear discontinuity in trends after the treatment is observed. These results confirm that a change in executive power has a significant economic effect on a country.

## 4.4 Panel Data Analysis

In the previous sections our analysis provide evidence of a relative higher number of social unrests during leader's change and less sharp economic effect of a new leader in the short term. We estimate the economic effect of a leader's change using a fixed effect model. First, we compute the average growth of real GDP in the 5 years before leaders death and in the 6 years in the years after (including the year of the shock). We define a dummy variable *Post Change* to distinguish the time spans before and after leader's death. The regression implemented captures the correlation between leader's death and economic growth in the short term.

Table 4.6 reports the results of the simplest specification possible. The average growth in per capita GDP before and after leader's death is regressed on *Post Change*, in order to capture whether there is a discontinuity in economic performance at national level. In columns 3-4 we also include country fixed effects in the specification. Our results suggest that in autocratic countries there is a significant correlation between positive economic growth and the institutional change. These findings partially resembles those of Olken and Jones (2005) where the leader's effect was stronger in less democratic nations.

Previous findings might be biased by the presence of social unrests, that seem to be more frequent in non democratic countries. Table 4.7 reports the same specification including anti-government demonstrations and riots among controls. The effect of leader's switch is still significantly positive in autocratic countries even after controlling for social unrests.<sup>6</sup> Columns 1-3 report the results in the democratic countries subsample but the coefficient on *Post Change* is never statistically significant.

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<sup>6</sup>These results are consistent even including other proxies of political or social unrests (i.e. General Strikes, Government Crises, etc.)

Table 4.6: Leader's Effect: Panel Analysis

Average GDP Growth	(1)	(2)	(3)	(4)
Post Change	-0.00915 (0.00721)	0.0106* (0.00625)	-0.00943 (0.00738)	0.0116* (0.00632)
Constant	0.0285*** (0.00599)	0.0174** (0.00714)	0.0286*** (0.00376)	0.0196*** (0.00321)
Number of countries	25	30	25	30
Country Fixed Effects	no	no	yes	no
Regime	Democratic	Autocratic	Democratic	Autocratic
$R^2$	0.0633	0.107	0.0633	0.107
Obs.	55	65	55	65

Notes: Robust standard errors in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Table 4.7: Leader's Effect: Panel Analysis Controlling for Unrests

Average GDP Growth	(1)	(2)	(3)	(4)
Post Change	-0.00418 (0.00644)	0.0122** (0.00620)	-0.00469 (0.00739)	0.0139** (0.00607)
Anti-Government Demonstrations	-0.00684 (0.00438)	-0.00129 (0.00245)		
Riots			-0.000998 (0.00144)	-0.00591 (0.00431)
Constant	0.0287*** (0.00584)	0.0178** (0.00749)	0.0257*** (0.00334)	0.0222*** (0.00359)
Number of countries	23	29	23	29
Country Fixed Effects	yes	yes	yes	no
Regime	Democratic	Autocratic	Democratic	Autocratic
$R^2$	0.1999	0.1448	0.0279	0.193
Obs.	50	63	50	63

Notes: Robust standard errors in parenthesis.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Figure 4.2: SCM in Countries with No Unrests

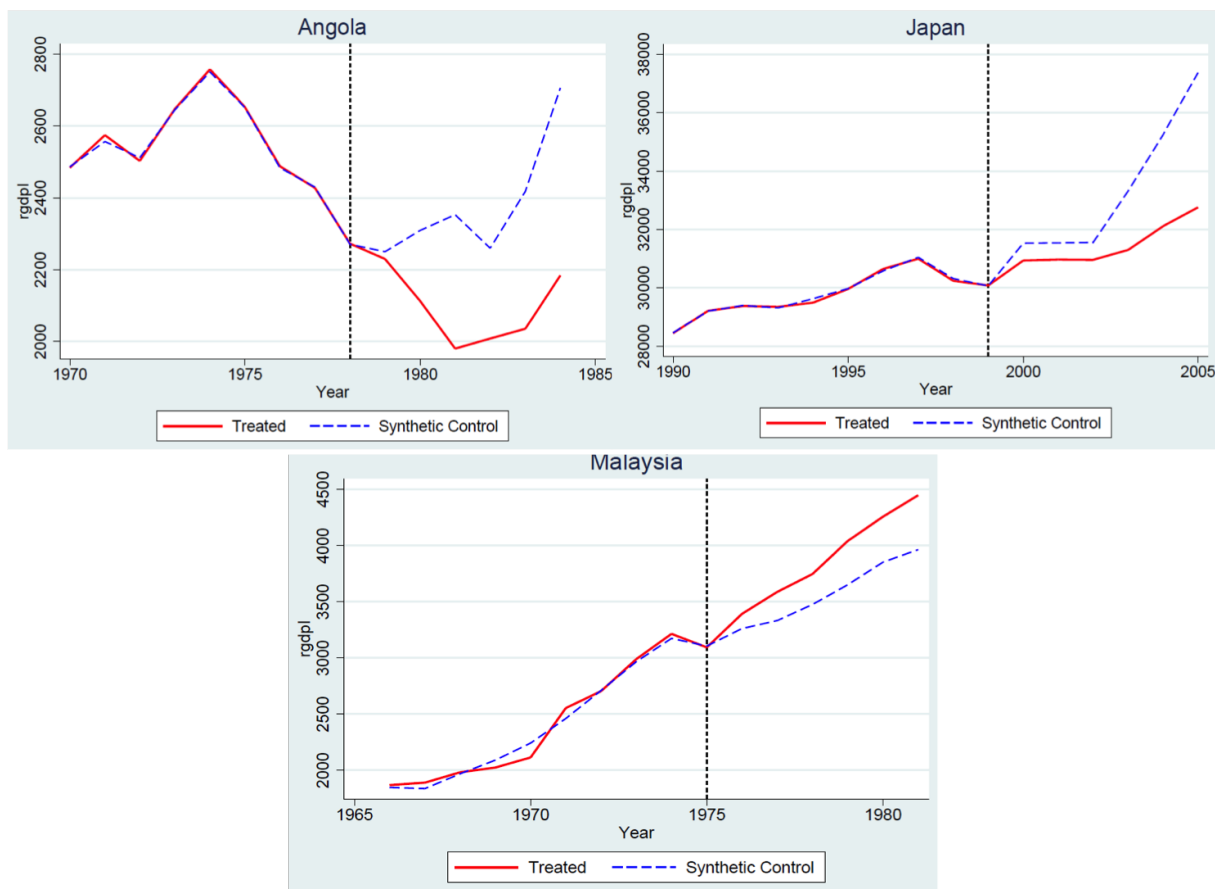
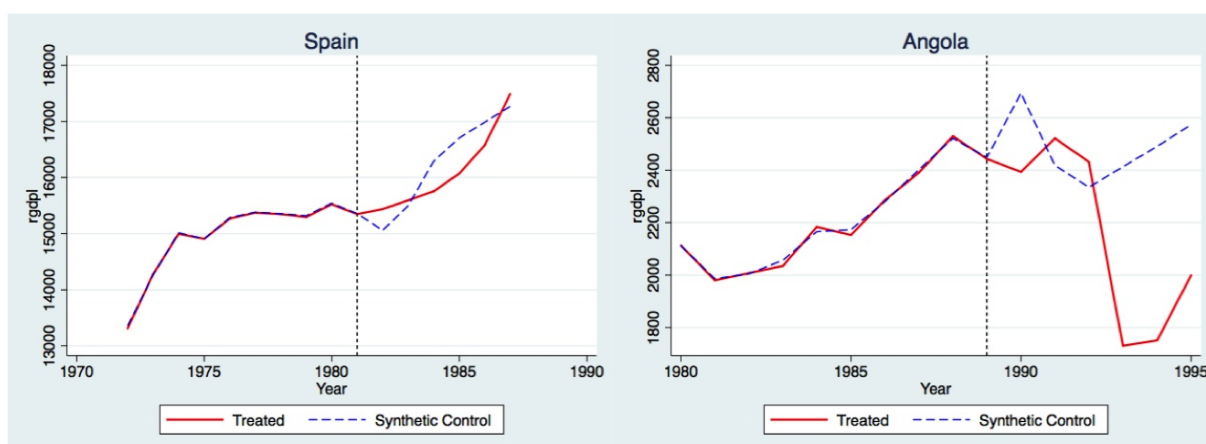


Figure 4.3: Placebo Test: SCM in Countries with No Artificial Death



## 4.5 Concluding Remarks

Are leaders important for economic growth? Economists agree on the relevance of policymakers on economic performance. Previous results underline that this effect is even stronger in less democratic countries. Our work sheds more light on the relevance of social instability, especially around political transitions. In this paper we show that previous findings are also determined by the uncertainty generated by social unrests following leader's death. In autocracies there is a significant increase in violent and nonviolent demonstrations and this is reflected in a less sharp effect of the leader on economics output in the short term. We implement a novel methodology, in this literature, creating artificial "control groups" to evaluate the effect of a leader shock.

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