Historical Development

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Abstract

This chapter surveys a growing body of evidence showing the impacts that historical events can have on current economic development. Over the past two decades historical persistence has been documented in a wide variety of time periods and locations, and over remarkably long time horizons. Although progress continues to be made identifying and understanding underlying mechanisms, the existing evidence suggests that cultural traits and formal institutions are both key in understanding historical persistence.

Keywords

Persistence, Colonialism, Institutions, Norms, Culture, Path dependence

JEL Classification Codes

H11, N00, O10, 050, P51, R58, Z13

7.1. INTRODUCTION

In recent years, a new dynamic, empirical literature has emerged examining whether historical events are important determinants of current economic performance.[1] The origins of this literature can be traced to three lines of research that began approximately a decade and a half ago: Engerman and Sokoloff (1997, 2002), La Porta et al. (1997, 1998), and Acemoglu et al. (2001, 2002). Although each line of research had different motivations, what was common to them was that each provided an analysis, and supporting evidence, for how one important historical event—Europe's colonization of the globe—was important for long-term economic growth.

Since this time, the literature has developed in a number of ways. Most notably, other important events have also been examined. These range from systems of labor coercion, Africa's slave trades, medieval long-distance trade, Atlantic trade, the Protestant Reformation, overseas missionary work, the French Revolution, the Mexican Revolution, the forced opening of China's treaty ports, the adoption of new food crops during the

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[1] See Nunn (2009) and Spolaore and Wacziarg (forthcoming) for recent reviews of this literature.

Columbian Exchange, the adoption of the plough, the invention of the printing press, the Neolithic Revolution, and various environmental catastrophes.

The typical study involves the collection and compilation of new and impressive data. Although this in and of itself is an important contribution, the real contribution is the use of the data to convincingly test hypotheses related to historical development. The most enlightening papers are able to trace the full impacts of a historical event through time, while examining specific channels and mechanisms.

This chapter provides a summary of this new literature. As we will see, once one surveys the progress made to date, it is impressive what the recent wave of quantitative historical studies has taught us about historical economic growth and development.

7.1.1 The Origins of the Literature

The origins of the historical development literature can be found in three sets of papers. What the three papers have in common is that they all examine European colonial rule. However, their motivations are very different.

The first study, written by economic historians Engerman and Sokoloff (1997), is a historical narrative, supported with descriptive statistics. In it they examine the importance of factor endowments and colonial rule for the subsequent economic development of colonies within the Americas. They argue that New World societies that were endowed with soil and climate suitable for growing lucrative, globally traded commodities, such as sugar, tobacco, and cotton, developed plantation agriculture, and with it, the use of slave labor. In the Spanish colonies, characterized by sizable indigenous populations and large reserves of gold and silver, forced labor was instituted. The use of slavery and forced labor resulted in economic and political inequality, both of which inhibited long-term economic development.

Interestingly, the other two seminal articles were not inherently interested in better understanding the history of European colonial rule. For example, the interest of Acemoglu et al. (2001) was in testing whether domestic institutions are a fundamental determinant of economic prosperity today. The interest of La Porta et al. (1997, 1998) was in identifying the causal impact of investor protection on financial development. What motivated both studies to examine colonial rule is the fact that the historical episode provides a source of variation in domestic institutions (in the case of Acemoglu et al.) and in investor protection (in the case of La Porta et al.). Both studies exploited European colonial rule as a natural experiment, focusing on a different dimension or characteristic that was argued to provide exogenous variation that they could use to identify their effect of interest.

La Porta et al. (1997, 1998) argue that because the legal tradition of the colonizer was transplanted to the colonies, the identity of the colonizer had an important impact on the legal system that evolved and, in particular, on contemporary investor protection. In particular, they show that former colonies with a legal code based on Roman civil

law—these were the colonies of France, Spain, and Portugal—had weaker investor protection and less financial development relative to former British colonies with a legal system based on common law.

Acemoglu et al. (2001) argue that a primary determinant of the form (and long-term impacts) of colonial rule was the disease environment faced by potential European settlers. In temperate areas, like Canada, Australia, and the United States, European mortality rates were moderate enough to facilitate European settlement on a large scale. In these areas, the Europeans brought with them their values and beliefs and developed European-like institutions that emphasized the protection of property rights. In areas such as sub-Saharan Africa, where European mortality was high due to diseases like malaria and yellow fever, Europeans did not settle. Instead, they engaged in an extractive strategy. Rather than settling in a location, they set out to extract natural resources without regard for the consequences. Arguably, this strategy was facilitated by a lack of property rights and other similar institutions. Motivated by this historical narrative, Acemoglu et al. used a measure of early settler mortality as an instrument for contemporary domestic institutions to estimate the causal impact of institutions on long-term economic development.

The analysis of the three lines of research showcased how insights can be gained by examining economic growth and development from a historical perspective. Specifically, they showed how historical episodes can provide econometrically useful sources of exogenous variation. More importantly, they also showed that history matters and that it can have long-term persistent impacts that continue to influence growth and development today.[2]

Following these early studies, a large number of subsequent papers have emerged examining economic growth and development from a historical perspective. In the following section, I begin an overview of this literature by first describing a number of studies that examine other dimensions and aspects of European colonial rule, the historical event that has received the most attention in the literature. In Section 7.3, I then turn to an examination of studies that have investigated the long-term impacts of other historical events. These include the Columbian Exchange; various episodes of increased trade and globalization; episodes of warfare and armed conflict; expulsions and forced population movements; religious reformations; and important technological innovations. Following this, in Section 7.4, I turn to an important insight that has emerged from the literature: geography has important impacts on development today working through its impacts on historical events.

After having surveyed the evidence for the importance of history for contemporary economic development, I then turn to causal mechanisms. In Section 7.5, I summarize

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[2] As with any seminal paper, extensions, comments, criticisms, criticisms of comments, criticisms of criticisms, etc. soon emerged. In an effort not to get lost in the weeds, I do not discuss these papers here. See for example, Easterly and Levine (2003), Glaeser (2004), Olsson (2004), Rodrik et al. (2004), Austin (2008), Albouy (2012), and Acemoglu et al. (2012).

the evidence that has been uncovered for the relative importance of various channels of persistence, including multiple equilibria and path dependence; domestic institutions; cultural values and beliefs; and genetic traits.

The final two sections of the chapter, Sections 7.6 and 7.7, discuss unresolved questions in the literature and offer concluding thoughts.

7.2. EUROPEAN COLONIAL RULE

7.2.1 Americas

The studies that examine the impacts of colonial rule in the Americas tend to focus on testing the hypothesis that initial endowments affected the extent of economic and political inequality, both of which were detrimental for long-term economic development (Engerman and Sokoloff, 1997). In a followup study, Engerman and Sokoloff (2005) provide additional evidence for their hypothesis by documenting a positive relationship between economic inequality and political inequality, measured by the inclusiveness of voting rights. Sokoloff and Zolt (2007) document a link between inequality and lower taxes on wealth and income and less spending on public goods such as education.

While the evidence put forth by Engerman and Sokoloff in support of their hypothesis primarily takes the form of historical narrative and descriptive statistics, a number of studies have undertaken more formal tests of their hypothesis. Bruhn and Gallego (2012) examine variation across 345 regions within 17 countries from North and South America. They identify a strong negative correlation between long-run development and initial colonial specialization, in what they call "bad" activities, which Engerman and Sokoloff (1997) argue display economies of scale and therefore relied heavily on exploited labor, e.g. sugar, coffee, rice, cotton, and mining. They provide additional evidence, also consistent with Engerman and Sokoloff (1997), that other activities, like subsistence farming, cattle raising, or manufacturing, are not negatively related to long-term development, unless there were large native populations that could potentially be exploited in the production process.

Naritomi et al. (2012) provide evidence consistent with Bruhn and Gallego (2012), but focus on Brazil and two commodities, gold and sugar. They examine variation across approximately 5000 Brazilian municipalities and quantify each municipality's historical involvement in the gold boom (during the 1700s) and the sugarcane boom (1530–1760). The authors show that the municipalities that experienced the sugar boom have greater land inequality today, while municipalities that experienced the gold boom have worse domestic institutions today.

The key mechanism in Engerman and Sokoloff's hypothesis is inequality, both economic and political. A number of studies provide evidence that calls into question their assertion that greater economic inequality is associated with greater political inequality and less development. Dell (2010) examines the *mita* forced labor system, which was instituted by the Spanish in Peru and Bolivia between 1573 and 1812. The *mita* system

required that over 200 communities supply one seventh of their adult male population to work in the silver mines of Potosí and mercury mines of Huancavelica. The study combines contemporary household survey data, geographic data, and data from historical records; and uses a regression discontinuity estimation strategy to estimate the long-term impacts of the *mita* system. Dell's study exploits the fact that the boundary of the *mita* conscription area was clearly defined and that other relevant factors likely vary smoothly close to the *mita* boundary. Because of this, comparing the outcomes of *mita* and non-*mita* districts very close to the border provides an unbiased estimate of the long-term effects of the *mita*. The study finds that the *mita* system had an adverse effect on long-term economic development. All else equal, former *mita* districts now have an average level of household consumption that is approximately 25% lower than households in former non-*mita* districts. The study finds that a significant proportion of the difference can be explained by lower levels of education and less developed road networks.

Dell argues that the underdevelopment of *mita* districts was due to an absence of large haciendas. These haciendas lobbied the crown for public goods, like education and roads, and provided these goods directly. Therefore, in contrast to the Engerman–Sokoloff hypothesis, she finds better long-run development outcomes in locations with large haciendas and greater inequality (not less).

Acemoglu et al. (2008) also question Engerman–Sokoloff's inequality hypothesis. The authors first examine municipalities within Cundinamarca, Colombia and show that late 19th century land inequality is positively associated with late 20th century secondary school enrollment. They further question the presumption that economic and political inequality go hand in hand. After constructing a measure of political inequality using data on the identity of mayors for 4763 appointments held by 2300 different individuals between 1875 and 1895, they show that economic inequality and political inequality are not positively correlated. In fact, they argue that greater land inequality was better for long-term development because the landowners provided greater checks on the actions of the political elite.

Examining variation across US states and counties and across countries within the Americas, Nunn (2008b) also considers the role of inequality. Although he does find that, consistent with Engerman and Sokoloff, there is a negative relationship between slave use and current income, he fails to find evidence that inequality is the intervening channel. Although past slave use is positively correlated with historical and current inequality, controlling for historical land inequality does not reduce the negative impact of slavery on current income. Further, there is no relationship, either in the past or today, between inequality and income.

7.2.2 Asia

Early European contact with India occurred through overseas trade, beginning in 1613. Colonization of the subcontinent occurred through a number of battles. Beginning with the Battle of Plassey in 1757, the British East India Company (EIC) gained control
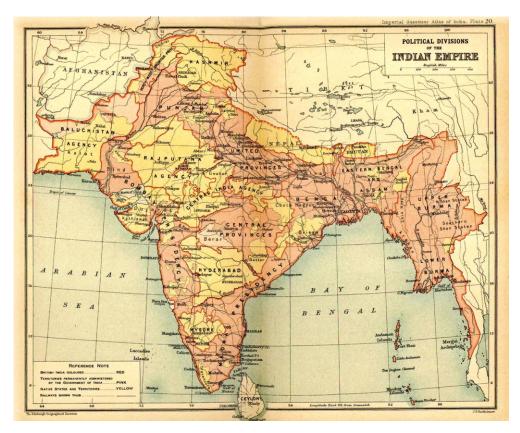
Figure 7.1 Directly ruled British districts and princely states within the Indian Empire. *Source: Imperial Gazeteer Atlas of India, Plate 20.*

of Bengal and Bihar, and by the early 19th century, the British controlled large parts of the Indian subcontinent, the other portions being the "princely states." The British EIC continued to annex the princely states during the 19th century until the mutiny of the British EIC's army (the Sepoy Mutiny) in 1857. After this, the British government ruled the subcontinent, establishing the British Raj.

The long-term impacts of British control on the Indian subcontinent have been examined empirically in a series of recent papers. Iyer (2010) examines the long-term impacts of direct British rule versus indirect rule—i.e. the princely states. The portions of the subcontinent under the two forms of rule (in 1909) are shown in Figure 7.1.

Looking across 415 districts, Iyer (2010) estimates the effect of direct British rule versus indirect British rule on investment in agriculture and agricultural productivity today. To help uncover causal estimates, she exploits the Doctrine of Lapse, a British policy that was in place between 1848 and 1856, that stated that a native ruler's adopted heirs were not to be recognized by the British government. This allowed the British to

annex several states where the native ruler died without a natural heir. Iyer instruments for direct British rule using a district-specific indicator variable that equals one if the ruler died without a natural heir between 1848 and 1856, the period when the Doctrine of Lapse was in place. Examining the subset of states that had not yet been annexed by 1848, she shows that the IV procedure estimates no statistically significant difference between directly ruled districts and the princely states. This is in contrast to the OLS estimates which suggest that direct British rule is positively associated with agricultural investment and productivity. The most likely explanation for the difference is that the British annexed the most productive parts of the continent, which also had the greatest growth prospects.

In subsequent analysis, Iyer (2010) examines other contemporary outcomes, including the availability of public goods such as health, education, and roads. She continues to find that the IV estimates of the impact of direct British rule on public goods provision are lower than the OLS estimates, again suggesting that the British selected the "better" states, with greater long-run growth potential. In addition, for many of the public goods outcome variables, the IV estimates suggest that British rule actually exerted a negative long-term effect, a finding that is consistent with earlier research by Banerjee et al. (2005) who examine an even larger set of 27 different public good measures.

Other research, rather than examining differences between directly and indirectly ruled districts, looks at variation within the directly ruled districts of India. Banerjee and Iyer (2005) show that differences in the institutions initially implemented by the British had long-term growth effects. In particular, they examine the different revenue collection systems that were established and compare districts where revenue was collected directly by British officials to those where revenue was collected by native landlords. They find that after independence, districts with non-landlord systems have higher levels of health, education, and agricultural technology investments relative to landlord systems.

To determine the extent to which this correlation is causal, the authors exploit the fact that in the parts of India conquered between 1820 and 1856, non-landlord revenue collection was implemented. They argue that the historical determinants of the form of revenue collection are orthogonal to district characteristics and determined primarily by the date of British conquest, which they use as an instrument for the revenue collection system. Their IV estimates are consistent with the OLS estimates.

Overall, the existing body of evidence for India suggests that British control of the subcontinent, through the extent to which colonial policies took the form of direct rule vs. indirect rule, had lasting impacts on long-term economic growth.

7.2.3 Island Colonies

In a novel study, Feyrer and Sacerdote (2009) examine the experience of European colonial islands of the Pacific, Indian, and Atlantic Oceans. Although one could argue this is a somewhat obscure set of colonies to examine, the question they attempt to answer is

of general interest. Their motive for looking at their particular sample stems from their interest in the obvious, but difficult-to-answer question of whether colonial rule, on average, was good or bad. In particular, is a longer period of colonial rule associated with better or worse long-term economic growth?

Feyrer and Sacerdote (2009) argue that, for islands, the date of discovery was determined in part by its location relative to prevailing wind patterns and that these wind patterns most likely do not affect long-term development through channels other than the island's date of discovery. They argue that the wind vectors surrounding an island can be used as instruments to estimate the causal effect of the length of colonial rule on subsequent development. Their baseline set of instruments, which are constructed from satellite imagery data, reported monthly on a one-degree by one-degree global grid, include the annual mean and variance of monthly east–west wind vectors.

Their first-stage estimates show that stronger westerly winds are associated with earlier discovery and more years under colonial rule. According to their 2SLS estimates, the length of colonial rule has a positive effect on per capita income in 2000. In other words, conditional on being a colony (within their sample), a longer period of colonial rule was better for economic development. They are quick to point out, however, that their results cannot address the question of whether or not the island colonies are better off because they were colonized.

7.2.4 Africa

A number of studies that examine the impacts of colonial rule within Africa find evidence of long-term impacts that persist until today. This is perhaps surprising since, for the vast majority of the continent, the period of colonial rule was short relative to the rest of the world. Africa was the last continent to be colonized, with the Berlin Conference of 1884/1885 marking the beginning of large-scale colonial rule within Africa.

An important source of evidence documenting the long-term impacts of colonial rule within Africa is Huillery (2009). In the study, her analysis combines data from historical documents from archives in Paris and Dakar with household surveys from the 1990s. She shows that looking across districts in French West Africa, there is a positive relationship between early colonial investments in education, health, and infrastructure and current levels of schooling, health outcomes, and access to electricity, water, and fuel. Most interestingly, she provides evidence of persistence that is specific to a particular public good and outcome. In other words, she finds that greater education spending during the colonial period is associated with more education in the post-colonial period, but not better health outcomes or more infrastructure. Similarly, she finds more infrastructure investment during the colonial period is associated with greater access to infrastructure today, but not with the other outcomes; and more health investments during the colonial period are associated with better health outcomes today, but not with the other outcomes.

While the exact mechanisms behind this somewhat extreme form of persistence are not yet well understood, she does provide evidence that early investments subsequently lead to more of the same investments. An alternative explanation is that persistent omitted factors, which have impacts that are public-good specific, are driving the results. However, her analysis undertakes a number of strategies to rule out this explanation, including matching districts based on geographic proximity.

A commonly cited adverse consequence of European colonial rule in Africa is that it resulted in the creation of country boundaries that paid little or no attention to pre-existing kingdoms, states, or ethnic groups. During the Berlin Conference of 1884/1885, the European powers divided among themselves lands that they had yet to explore, and lakes, rivers, and mountains that they had yet to discover. Although it has long been hypothesized that one of the legacies of colonial rule in Africa may be the artificial nature of national boundaries that it created, it was not until recently that this assertion was tested formally. Michalopoulos and Pappaioannou (2011) combine information on the pre-colonial locations of 834 ethnic groups from Murdock (1959) with the current boundaries of nation states and test for differences between ethnic groups that were partitioned by a country's border and those that were not. The authors create, for each ethnicity, two indicator variables. The first equals "1" if the ethnicity was partitioned by a border and greater than 10% of the area of the group lies on both sides of the border. The second equals "1" if the ethnicity was partitioned by a border but less than 10% of the area of the group is located on one side of the border. The examination of the two partition measures is motivated by potential measurement error due to imprecision in the location of ethnic group as mapped by Murdock (1959). Even if borders do not split ethnic groups, measurement error will generate splitting. This form of partitioning is more likely to occur in the second (less than 10%) measure.

The authors examine two sets of outcomes at the ethnicity level: economic development, measured by the density of night-time lights, and the number of civil conflicts between 1970 and 2005. They find that partitioned ethnic groups are associated with lower economic development (as measured by lower light density) and more civil war. Both partition measures are statistically significant, although the magnitude of the less than 10% measure is often smaller, which is consistent with this variable being measured with greater error. Therefore, their findings confirm the conventional belief that colonial rule, because of the way it artificially divided up the continent between European powers, had detrimental impacts.

Another potentially adverse consequence of colonial rule—particularly the policy of indirect rule—was that it often resulted in heightened hostilities between ethnic groups. In Rwanda, colonial policies intentionally deepened racial differences between the Hutus and Tutsis. The Census of 1933–1934 institutionalized the Hutu distinction, creating identity cards that reported individual ethnicity. In addition, an educational system with

separate streams for Hutus and Tutsis was implemented. Prior to the arrival of the Europeans, the distinction between Hutus and Tutsis was more one of class than of race, and with much movement between the two groups. This is illustrated by the fact that it was actually quite difficult for the Belgians to group individuals neatly into one of the two groups. As a result, they developed the "Ten Cow Rule". When there was doubt, if an individual had more than ten cows, they were designated "Tutsi"; otherwise, they were "Hutu."

Many scholars, and perhaps most notably Mamdani (2001), have argued that the ethnic hostilities between the Hutus and Tutsis, culminating in the 1994 genocide, have their roots in Belgian colonial rule. However, there is far from full consensus on this issue. Vansina (2004), relying primarily on oral evidence and early written accounts, argues against this view. He instead argues that Hutu and Tutsi identities arose in the 17th century and became further entrenched during the 19th century, both of which occurred before the colonial period.

7.3. OTHER IMPORTANT HISTORICAL EVENTS

The literature's initial focus on European colonial rule was perfectly natural given that the event was one of the most important in human history and arguably the single most important for shaping the current distribution of the world's income. However, more recently, researchers have begun to turn to other important historical events to empirically examine their long-term impacts and importance for economic development today. I now turn to a discussion of these studies.

7.3.1 The Columbian Exchange

The Columbian Exchange refers to the transfer of crops, disease, ideas, and people between the Americas and the rest of the world following Christopher Columbus's voyage to the New World in 1492. The exchange brought diseases that decimated the Native American populations. It introduced the Eastern Hemisphere to a variety of new plants that were widely adopted, including tomatoes, the white potato, the sweet potato, cassava, corn, chillis, peppers, cacao, vanilla, and tobacco. In addition, Europeans were introduced to the chincona tree, which produces quinine, a prophylactic against malaria. The New World also provided abundant fertile land that could grow valuable Old World commodities, such as sugar and cotton.[3]

A number of papers have documented the impacts of the transfer of new foods from the Americas to the rest of the world. Nunn and Qian (2011) estimate the impact of the introduction of the potato to Europe, Asia, and Africa. Since the potato was calorically

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[3] See Grennes (2007), Nunn and Qian (2010), and Mann (2011) for further descriptions of the Columbian Exchange.

and nutritionally superior to Old World staples like wheat, barley, rye, and rice, for the parts of the Old World that were able to adopt the potato, its diffusion from the New World resulted in a large positive shock to agricultural productivity. Using a difference-in-differences estimation strategy, the authors compare differences in population growth, urbanization, and adult heights before introduction relative to the population growth after introduction between locations that were able to adopt potatoes and those that were not. A location's ability to cultivate potatoes is measured using GIS-based climate and soil data from the FAO.

At the country level, they find that the introduction of the potato had a positive impact on total population and urbanization rates. Consistent with their urbanization finding, they also find that city growth, both globally and within Europe, was positively impacted by the potato. In an attempt to examine mechanisms more closely, the authors examine height data from France. They show that after the diffusion of the potato to France, individuals born in villages that could cultivate potatoes were between one-half and three quarters of an inch taller as adults.[4]

Other studies have also examined the impacts of the post-1492 diffusion of other food crops from the Americas. Chen and Kung (2012) examine the introduction of maize to China and find that although maize had a large positive impact on population, there is no evidence that it spurred urbanization rates. Jia (forthcoming) examines the diffusion of the sweet potato in China. One characteristic of the sweet potato is that it is much more drought resistant than the pre-existing staple crops in China, rice and wheat. Her analysis shows that prior to the sweet potato, there is a close relationship between the occurrence of drought and peasant uprisings. After the diffusion of the drought resistant sweet potato, this relationship weakened significantly.[5]

The Columbian Exchange not only brought New World crops to the Old World, but it also brought Old World crops to the New World. For many crops the soils and climates in the Americas were much more suitable for cultivation than in the Old World. The prime example is sugar. Hersch and Voth (2009) calculate the welfare gains in Europe from the increased supply of sugar that resulted from its large-scale cultivation in the Americas. They also consider the welfare gains from the introduction of tobacco, the highly popular New World crop, to Europe. They calculate that by 1850, the increased availability of sugar and tobacco had increased English welfare by approximately 6% and 4%, respectively. These results have important implications for our understanding of European well-being over time. It is generally presumed, based on real wage figures that do not account for new goods, that English welfare did not begin to improve until after

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[4] Cook (2013b) provides evidence of a complementarity between milk and potatoes. He finds that the population effects of Nunn and Qian (2011) are greater among populations that exhibit lactase persistence (i.e. are lactose tolerant).

[5] This finding is particularly interesting because it shows that the impacts of weather shocks differ depending on the historical environment. This is a point that I return to below.

1800 (Clark, 2005). However, according to Hersch and Voth (2009) welfare increased significantly before this time from the availability of "new" goods that were a result of the Columbian Exchange.

7.3.2 International Trade and Globalization

A number of studies have traced the impacts of increased international trade in various periods of time. An important insight that has emerged from this literature is that international trade, by altering the evolution of domestic institutions, can have important effects for long-term growth.[6]

The seminal papers making this point are Greif (1993 and 1994), where it is shown how the development paths of two long-distance trading groups, the Maghribi and Genoese, have their origins in the manner in which trading contracts were enforced. Among the Maghribi, merchants relied on a collective enforcement strategy, where all merchants collectively punished any agent who had cheated; while among the Genoese, enforcement was achieved through an individual punishment strategy. These contracting institutions led to the development of different institutions outside of the trading environment. While the Genoese developed a formal legal system and formal organizations to facilitate exchange; the Maghribis continued to rely on collective informal enforcement mechanisms like group punishment.

A number of papers have empirically examined the long-term impacts of increased international trade and domestic institutions and long-term economic growth. The existing evidence seems to suggest that trade can have very different impacts depending on initial conditions and the specifics of the environment. The heterogeneous impacts of international trade are clearly illustrated in the study by Puga and Trefler (2012), which examines medieval trade in Venice between 800 and 1350. They show that trade initially changed the balance of power, which enabled new merchants to push for greater political openness (e.g. the end of the hereditary Dogeship and the begining of the Venetian parliament) and better contracting institutions (e.g. the colleganza). These institutional improvements led to economic growth. However, over time, wealth was increasingly concentrated in the hands of a relatively small number of merchants and this power was used to block further institutional reforms and limit political access. Therefore, international trade first led to the rise and then decline of growth-promoting inclusive institutions and economic growth.

The heterogeneous impacts of international trade can also be seen in the cross-section. For some parts of the world, evidence suggests that increased trade had beneficial impacts. Jha (2008) considers medieval India and shows that looking across cities within India, participation in overseas trade is associated with less religious conflict during the late 19th and early 20th centuries. Jha addresses the endogeneity of the selection of medieval

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[6] On this point, see the recent survey by Nunn and Trefler (forthcoming).

ports by using the existence of natural harbors as an instrument for whether a coastal city was a trading port and by using propensity score matching techniques.

According to his estimates, being a town that was a medieval trading port made it less likely that the town later experienced Hindu–Muslim riots. Using historical evidence, Jha argues that because Muslims provided access to the markets of the Middle East, the returns to Hindu–Muslim cooperation were much higher in the towns connected to this overseas trade. As a result, institutions that supported exchange and a peaceful coexistence between Hindus and Muslims were developed.

The existing evidence suggests that international trade was also beneficial within Europe. Acemoglu et al. (2005) examine the impacts of the Atlantic three-corner trade on European institutions. They first show that the rise of Western Europe after the 16th century was driven by the economic growth of countries (and port cities) heavily involved in Atlantic trade. They argue that the primary benefit of the trade was not a direct benefit of the profits from the trade but an indirect impact that worked through domestic institutions. Profits from the trade shifted political power toward commercial interests and resulted in the development of growth-promoting institutions. They provide support for their hypothesis by showing that the Atlantic trade also resulted in better institutions, measured using an index of a country's "constraints on its executive." They also show empirically that among countries with access to the Atlantic trade, only for those that had non-absolutist institutions initially (i.e. in the 15th and 16th centuries) did trade generate improved institutions. If the monarchy was too strong, initially, it simply monopolized the trade—as in Spain and Portugal—and this limited the benefits to the commercial class and therefore limited institutional change.[7]

Beneficial impacts of international trade have also been estimated in 19th century China. Jia (forthcoming) examines the impacts of increased trade due to the forced opening to trade first imposed by Britain and later by the United States. The Treaty of Nanking (1842), which followed the Qing Dynasty's defeat by Britain during the First Opium War, named five cities as treaty ports: Guangzhou, Shanghai, Fuzhou, Ningbo and Xiamen (Fairbank, 1953). By 1896, 16 more treaty ports were added to the original five, with 28 more added between 1896 and 1911 (Tai, 1918; Wang, 1998).

Jia (forthcoming) examines a sample of 57 prefectures all with geographic access to overseas trade over 11 periods between 1776 and 2000. She estimates a difference-in-

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[7] Another interesting source of heterogeneity related to the Atlantic trade is shown by Dittmar (2011). He examines the growth of port cities in Europe and shows that port cities that adopted the printing press by the late 15th century grew significantly faster than those that did not. According to his estimates, once one accounts for the importance of the printing press, Atlantic port cities no longer appear to grow faster than non-Atlantic port cities. These findings are consistent with Dittmar's hypothesis that the printing press, by making print media more widely available, fostered numeracy, literacy, and innovations in bookkeeping and accounting, all of which were particularly valuable in cities with significant commercial opportunities due to overseas trade.

difference specification, controlling for prefecture fixed effects and time period fixed effects. She finds that on average, prefectures with treaty ports experienced faster population growth during this period. The population increase occured prior to the Communist revolution of 1949, as well as after China's more recent period of increased openness after 1980. Between 1958 and 1980, when China's economy was heavily regulated, treaty ports did not experience faster growth.

The clear exception to the beneficial impacts of trade and institutional and economic development lies in the experiences of Africa and (arguably) Latin America, following the Age of Discovery. As we have seen, in the Americas, specialization of production in commodities that Bruhn and Gallego (2012) classify as "bad" or "ugly" (recall Section 7.2) led to long-term underdevelopment. Further, as we discuss below, the impacts of the Atlantic trade within Africa were extremely detrimental. Within Africa, participation in trade meant warfare, theft, and banditry to supply slaves for export to the Americas. As shown by Nunn (2008a) and Nunn and Wantchekon (2011), participation in the slave trade had long-term adverse consequences. The parts of Africa that were heavily involved in the trade today are poorer, have worse domestic institutions, and exhibit lower levels of trust. We discuss these impacts in further detail below.

7.3.3 Warfare and Conflict

History is filled with episodes of warfare and conflict. A number of recent studies show that many instances of violence have had important effects on human history. The most well-known hypothesis regarding warfare and long-term development is Tilly's (1990) hypothesis that an important determinant of the rise of Europe was interstate warfare which promoted the development of strong states. According to Tilly, beginning in the early-modern period, warfare and interstate competition resulted in the development of centralized governments and institutions that were able to raise sufficient capital and maintain large populations that could be used to wage war. In other words, according to Tilly, war made states.

While Tilly's argument has been very influential, very few studies have actually formally tested any version of the Tilly hypothesis. Aghion et al. (2012) provide evidence, which is very much in the spirit of Tilly, that in the modern period an increased threat of warfare is associated with increased education. The authors examine a yearly panel of 137 countries from 1830 to 2001. Controlling for country fixed effects and year fixed effects, they show that education, measured by primary school enrollment and education reforms, is positively associated with conflict in the previous 10 years and with a contemporaneous measure of the existence of a military rivalry with another country. In other words, they find evidence that war made education.

Proponents of the Tilly hypothesis have argued that it may also apply outside of Europe. For example, Bates (forthcoming) and Reid (2013) argue that interstate conflict bred larger, more centralized states. Bates (forthcoming) shows that among the African

societies documented in the Standard Cross Cultural Sample (SCCS), there is a positive relationship between rates of warfare and the degree of political centralization.

Other evidence suggests that a history of warfare can also have negative long-term impacts. An innovative paper by Jancec (2012) provides evidence that interstate conflict has a long-term adverse impact on trust in the political system today. Using individual-level data from Slovenia, Croatia, Serbia, Montenegro, Romania, and Ukraine, the author shows that individuals living in regions that experienced more frequent changes in the ruling nation-state between 1450 and 1945 have lower levels of trust in political institutions today. In other words, populations whose ancestors more regularly experienced conquest trust the government less today. In addition, Jancec (2012) also finds that frequent border change is associated with greater identification with an individual's locality rather than with the nation, and with less participation in national politics, as measured by voting. Since Jancec's (2012) analysis always controls for broad region effects, he is able to rule out worse governance as the explanation for the findings. All estimates are derived holding national institutions constant. The most likely explanation is that a history of conquest generated less identification with the nation-state and less trust for national leaders and institutions.

A theme that has developed in the literature highlights important historical links between warfare and religion. For example, Botticini and Eckstein (2005, 2007) argue that the burning of the Second Jewish Temple by the Romans in 70AD had lasting important consequences for the Jewish religion and subsequent economic development. After the burning of the temple, the Jewish religion was transformed from one that centered around religious sacrifices in the Temple to one that required all Jewish males to read the Torah and teach their sons to do the same in the synagog. According to Botticini and Eckstein (2005), the literacy and numeracy generated by this religious requirement resulted in the migration of Jewish farmers to cities, beginning in the fifth and sixth centuries, where they engaged in urban occupations. In Babylon, Jews moved into urban centers and engaged in shopkeeping and artisanal activities such as tanning; linen and silk production; dyeing; and glassware-making. Jewish migration continued in the Muslim empire between the mid-8th and early-9th centuries, with Jews entering a variety of skilled occupations, including handicrafts and jewelry production; ship building; money lending; and long-distance trading. Overall, their analysis provides compelling evidence that one important violent event—the Roman burning of the Jewish Temple—had impacts that affected subsequent human capital accumulation and the trajectory of economic prosperity of the Jewish people.

Another example is the link between warfare with the Ottoman Empire and the rise of Protestantism in Europe. Iyigun (2008) tests the established hypothesis that the Ottoman military incursions into continental Europe from the mid-15th to late 16th centuries allowed Protestantism to develop. Chronologically, a cursory examination of the dates of Ottoman and counter-reformation conflicts is consistent with the hypothesis. For

example, the deadliest of all religious wars, the Thirty Years War (1618–1648), followed the decline of the Ottoman Empire, marked by the Battle of Lepanto (1571) where the Holy League (a coalition of Catholic maritime states organized by Pope St. Pius V) defeated the Ottoman Empire's primary naval fleet. Iyigun shows that the hypothesis receives support when examined more rigorously. He analyzes annual data from 1450 to 1700 and shows that in years with more European-Ottoman conflict there is less conflict between countries within continental Europe, and there are less conflicts due to Catholic-Protestant religious differences.

Acemoglu et al. (2011a) examine the beneficial impacts of one of the most important episodes of European history: the French Revolution. Within a few short years (1789–1799), the revolution displaced traditional values regarding order and hierarchy with new enlightenment values of equality, citizenship, and inalienable rights. In 1792, the new republic declared war on Austria and its allies, including Prussia. Acemoglu et al. show that the institutional reforms that were imposed on conquered territories had lasting impacts in Germany and Prussia. Examining 19 regions at six different points in time between 1700 and 1900, the authors show that regions that experienced longer periods of French occupation between 1793 and 1815, subsequently experienced faster economic development, measured by urbanization rates. Constructing an index of reforms that quantifies the abolition of feudalism and guilds, and the implementation of the French civil code, they provide evidence consistent with these institutional reforms being the source of the increased urbanization rates. Locations that experienced longer French occupation also had more intensive reforms.

7.3.4 Expulsions and Forced Population Movements

Closely related to warfare and conflict are expulsions and forced population movements. The most dramatic example of forced population movement is the export of African slaves during the trans-Atlantic, trans-Saharan, Indian Ocean, and Red Sea slave trades. Slaves were captured through kidnappings, raids, and warfare. Historical accounts suggest that the pervasive insecurity, violence, and warfare had detrimental impacts on state formation, inter- and intra-group co-operation, and institutional, social, and economic development generally (e.g. Inikori, 2000, 2003).

The most illustrative example of this is the experience of the Kongo Kingdom, which was discovered in 1493 by Diogo Cão. Initially, a diverse array of products were traded between Kongo and the Portuguese, including copper, textiles, ivory, and slaves. The first slaves that were traded were prisoners of war and criminals. However, the increasing external demand for slaves, the presence of Portuguese slave traders, and competition for the throne within the Kingdom all resulted in a dramatic and uncontrollable increase in slave capture and raiding throughout the Kingdom. As early as 1514, King Afonso was already writing to the Portuguese to complain of Portuguese merchants colluding with noblemen to enslave Kongo citizens. In 1526, Afonso asked for the removal of all

Portuguese merchants and the end of trade. This attempt was unsuccessful and through the 16th century the process continued, culminating in the Jaga invasion of 1568–1570. The large-scale civil war from 1665 to 1709 resulted in the complete collapse of the Kingdom (Heywood, 2009).

Nunn (2008a) empirically examines the impacts the slave trades had on the long-term development of the African continent. Combining information from historical shipping records with information from a variety of historical sources—plantation inventories, marriage records, death records, slave runaway notices, etc.—that report the ethnic identity of the slaves shipped from Africa, Nunn constructs estimates of the total number of slaves shipped from modern-day African countries during each of the four slave trades.

The study finds that the parts of Africa from which the largest number of slaves were taken are the poorest today. The core issue in interpreting this correlation is selection into the slave trades. If, for example, the societies with the most poorly functioning institutions and the poorest future growth prospects selected into the slave trades, then this would explain the negative relationship even if the external trade in slave trades had no direct impact on societies within Africa. Nunn tests whether selection is driving the results by looking at the evidence on the nature of selection during the slave trades. He finds that the descriptive and quantitative evidence suggest that it was not the least developed societies that selected into the slave trade, but it was actually the more developed and more densely populated societies that supplied the largest numbers of slaves. Nunn also constructs instruments based on the distance of each country from the external locations of demand for the slaves. He argues that although the location of the demand for slaves influenced the location of supply, the reverse was not true. The IV estimates provide estimates consistent with the OLS estimates. Nunn concludes that the empirical evidence suggests that Africa's external trade in slaves did have a significant negative impact on the economic development of regions within Africa.

Subsequent studies have documented other important impacts of Africa's slave trades. Nunn and Wantchekon (2011) provide evidence that the slave trades adversely affected subsequent levels of trust within Africa. They show that the lower levels of trust arise through two channels: a deterioration of domestic institutions that enforce trustworthy behavior and an increase in the prevalence of cultural norms of distrust. They estimate that quantitatively the second determinant is about twice as important as the former.[8]

Dalton and Leung (2011) and Fenske (2012) provide evidence that the trans-Atlantic slave trade resulted in a long-term increase in the prevalence of polygamy. This is due to

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[8] Deconinck and Verpoorten (forthcoming) update the results of Nunn and Wantchekon (2011) using the more recent (2008) round of the Afrobarometer survey. This increases the sample by two additional countries (from 17 to 19) and expands the number of ethnic groups from 185 to 228. With the more recent and expanded sample, they find estimates that are very similar to Nunn and Wantchekon (2011). Also see Pierce and Snyder (2012) who show that in countries that were more impacted by the slave trades, firms have less access to external financing today, whether it be through formal or informal means.

the fact that primarily males were captured and shipped to the Americas, which resulted in a shortage of men within Africa. Interestingly, there is no evidence of such an impact for the Indian Ocean slave trade, where there was not a strong preference for male slaves. Dalton and Leung (2011) conclude that Africa's history of the slave trades is the primary explanation for why polygamy is much more prevalent in West Africa than in East Africa, today.

Within Europe, studies have also found evidence of large persistent impacts of forced migration. Acemoglu et al. (2011b) examine the long-term impacts of the mass movement and murder of Jewish populations in Russia during World War II. Examining variation across 278 cities, the authors show that Jewish depopulation during the holocaust is associated with significantly slower population growth, which was still detectable 50 years later in 1989, the last year of their sample. The authors confirm these results by looking across 48 oblasts, identifying a relationship between Jewish depopulation and lower per capita income in 2002.

A number of studies have also examined the persistent impacts of the 1609 expulsion of approximately 300,000 Moriscos (Spanish Muslims) from the Iberian Peninsula. Chaney (2008) and Chaney and Hornbeck (2013) examine the effects in the Kingdom of Valencia, where 130,000 Muslims—equal to one-third of its total population—were expelled. Chaney and Hornbeck (2013) show that after the expulsion, total output responded quickly although total population did not, resulting in higher per capita incomes in districts where a greater share of the population had been expelled. The persistently higher output per capita is potentially explained by the presence of more extractive institutions with a higher tax rate that inhibited population growth. Chaney (2008) also examines the impacts of the 1609 expulsion in Valencia, but considers spillover impacts on neighboring districts as low-skilled migrants moved to newly available land.

Forced movements of indigenous populations were also common in the Americas. Dippel (2011) examines the long-term development impacts of forced integration of different tribal bands onto the same reservation in the 19th century. He measures forced integration by combining information on the indigenous integration of the bands within a tribe (specifically, whether bands within a tribe were politically integrated prior to the 19th century) with information on which bands were subsequently forced to live on the same reservation. Forced integration occurs when bands that were previously independent were forced to live on the same reservation. He finds that reservations that experienced forced integration have 30 percent lower per capita GDP in 2000. He provides convincing evidence that this effect is causal and that it is due to dysfunctional political institutions.

Feir (2013) considers the impacts of the policy of forcibly removing indigenous children from their homes and sending them to residential schools. She finds that in Canada the schools were successful in their intended goal of eroding indigenous culture.

Individuals attending residential schools, as adults are 16 percent less likely to participate in traditional activities and 8 percent less likely to speak their indigenous language. Residential schools were notorious for the presence of mental, physical, and sexual abuse. Collecting data on the number of proven abuse claims by school, Feir shows that attendance in the least abusive schools is associated with increased educational attainment and more employment. On the other hand, attending the most abusive residential schools is not associated with increased education, but is associated with lower employment, lower rates of marriage, and increased alcohol consumption.

7.3.5 Religion

A number of studies provide evidence of the persistent long-run impacts of important religious historical events. The episode that has received the most attention in the literature is the Protestant Reformation, whose origin dates back to October 31, 1517 when Martin Luther posted the *Ninety-Five Theses on the Power and Efficacy of Indulgences* on the doors of All Saints' Church in Wittenberg. He objected to corruption in the Catholic Church, and in particular, to the selling of indulgences. His teachings quickly spread, partly facilitated by the recent invention of the printing press (Rubin, 2011).

According to Weber (1930), the new religion that emerged, Protestantism, was significant because, in contrast to Catholicism, it approved the virtues of hard work and the accumulation of wealth and that these values provided the moral foundation that spurred the transition to a modern market-based industrial economy. Another significant feature of the Protestant religion is its emphasis on the ability of individuals to read the Bible. With this came a belief in the importance of education.

A large number of studies have examined the historical and persistent impacts of the Protestant religion. Becker and Woessmann (2009) examine the two potential impacts of Protestantism, namely increased education and a change in values related to accumulation, thrift, and hard work. Their analysis examines variation in the intensity of Protestant and Catholic denominations across 452 counties in late 19th century Prussia. They find that the Protestant religion is associated with higher literacy. To better understand whether the correlations reflect a causal impact of the Protestant religion, they use a county's distance from Wittenberg, the origins of the Reformation, as an instrument for the share of the population that is Protestant in 1871.[9] Using the same empirical structure, the authors also identify a positive impact of Protestantism on various measures of economic development. This finding is consistent both with Protestantism increasing education which increases income, and with Protestantism affecting beliefs and values which increase income. The authors attempt to disentangle the two by estimating the impact of Protestantism on income after netting out the level of income explained by education (which they estimate

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[9] The determinants and dynamics of the adoption of Protestantism are an interesting subject of analysis in its own right. For more on this, see Rubin (2011) and Cantoni (2012).

directly and take from previous studies). The findings from this procedure indicate that Protestantism's positive impact on income can be almost fully explained by its impact on education.

The link between Protestantism and education also receives support from studies examining the long-term impacts of missionary activities outside of Europe. A large literature has emerged documenting this relationship in various locations and time periods. An early contribution is provided by Woodberry (2004), who documents a positive relationship between measures of the historical presence of missionaries and current per capita income and democracy across former non-settler colonies. According to Woodberry these benefits arise not only from increased education, but because missionaries, particularly Protestant missionaries, fought against injustices against native populations during colonial rule, which helped to foster better institutions, improved civil liberties, and increased democracy in the long-run (Woodberry, 2004, 2012).

Others have also examined the impact of missionary activities, but use a more micro-approach that focuses on a specific region or country. For example, Bai and Kung (2011b) look within China and examine county-level data from 1840 and 1920. They identify a positive relationship between Protestant missionary activity and economic development, measured using urbanization rates.

A recent insight within this literature is the identification of differences between religious denomination or orders within the Protestant and Catholic religions. Waldinger (2012) examines variation within colonial Mexico and shows differences in the long-term impacts of four different Catholic orders: the Franciscans, Dominicans, Augustinians, and Jesuits. She finds that the three Mendicant orders (Franciscan, Dominican, Augustinian), which shared a strong commitment to alleviating poverty and educating the poor, had a long-term impact on educational attainment. By contrast, the Jesuits, who focused their educational efforts on the colonial elites only, appear to have had long-term effects on conversion to Catholicism, but not on increased educational attainment.

Andersen et al. (2011) analyze the Catholic Order of Cisterians in England during the early modern period. One defining characteristic of the Catholic order, which after being established in France in 1098, quickly spread across England in the following century, was the belief and emphasis on a strong work ethic and promotion of thrift. Examining county-level data for England from 1377 to 1801, the authors show that counties with a greater presence of Cisterian monasteries exhibited greater population growth during this period.

Akçomak et al. (2012) empirically trace the impacts of the founding of the Brethren of the Common Life, a Roman Catholic community established by Geert Groote in the late 14th century. The movement arose because of dissatisfaction with the Catholic Church and set to reform the Church by educating citizens and enabling them to read the Bible in the vernacular. In addition to their strong emphasis on literacy and education,

the Brethren of the Common Life also promoted hard work and productive labor.[10] The authors empirically trace the historical impact of the Brethren of the Common Life within the Netherlands. Examining a sample of Dutch cities, the authors show that cities with Brethren of the Common Life communities had higher rates of literacy in 1600, more book production from 1470 to 1500, and faster population growth between 1400 and 1560. Of course, these correlations may be driven by reverse causality or omitted variables bias. The authors attempt to better understand whether the correlations are causal by using a city's distance from Deventer, the birthplace of Geert Groote and the origins of the movement.

Gender differences between the Protestant and Catholic religions are another aspect that has been examined by the literature. Because Protestants believed that reading the Bible directly was important for salvation, even for women, they placed greater importance on female education than Catholics. Using data from the first Prussian census of 1816, Becker and Woessmann (2008) show that Protestantism is associated with a smaller gender gap in education. Evidence for a greater emphasis on female education among Protestants is also found in Nunn's (forthcoming) analysis of the impacts of Catholic and Protestant colonial African missions on long–term education. He finds that although both had positive impacts on long-term education, the impact of Protestant missions was concentrated among females, while the impact of Catholic missions was concentrated among males.

7.3.6 Technological Innovation

Findings from a number of recent studies suggest a link between innovative activities in the past and subsequent economic outcomes. For example, Comin et al. (2010) document a positive correlation between the measure of a society's level of technology in the past (either 1000 BC, 0AD, or 1500AD) and either its level of technology or per capita income today. The authors hypothesize that this is driven by increasing returns to technology adoption: a higher level of technology lowers the cost of discovering new technologies. That is, a higher level of technology in the past affects the ease of accumulating subsequent technology which impacts technology in the future. Of course, their findings are also consistent with omitted persistent factors impacting both technology and development in the past and today. An example is the persistence of governance and institutional quality as has been documented by Bockstette et al. (2002).

Other studies, by zooming in on specific innovations, have been more successful at establishing persistent long-term impacts. Dittmar (2011) examines the long–term effects of the printing press, which was first established in Mainz, Germany between 1446 and 1450. He constructs a panel of European city-level data at 100-year intervals

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[10] The similarity between Protestant beliefs and the Brethren of the Common Life is not a coincidence, as Martin Luther studied under the Brethren of the Common Life at Magdeburg before attending university.

between 1300 and 1800, combining data on city populations with information on the early adoption of the printing press. His analysis shows that cities that adopted the printing press between 1450 and 1500 experienced faster population growth during the 16th to 19th centuries. The impacts he estimates are extremely large. They imply that the printing press accounts for 18% of city growth between 1500 and 1600.

Dittmar uses the panel dimension of his data to validate his cross-sectional finding, showing that cities that adopted the printing press in the late 15th century were not growing more quickly prior to adoption. This suggests that the results are not driven by unobserved time-invariant differences between cities. He also provides additional evidence for a causal interpretation of his estimates using distance from the invention of the printing press—Mainz, Germany—as an instrument for adoption in the late 15th century. The IV estimates are consistent with the OLS estimates.

In a follow-up study, Dittmar (2012) calculates the impact of the printing press on aggregate welfare. Using data from England on the price and consumption of printed books in England between the 1490s and 1700 (and assumptions about consumers' utility functions), he estimates that the printed book increased welfare by an equivalent of 4% of income; by the mid-17th century this figure was 3–7%.

Baten and van Zanden (2008) provide complementary evidence of the importance of the printed book for long-term growth. The authors construct an impressive dataset of the production of printed books in eight Western European countries every 50 years between 1450 and 1800. The authors show that book production correlates strongly with literacy, and in panel regressions with time-period fixed effects, initial per capita book production is positively associated with faster growth in real wages during the next 50 years.

Alesina et al. (2013) examine the long-term impacts of the plough, an important technological innovation used in agriculture. The tool, which was able to prepare large amounts of soil for cultivation in a shorter period of time than previous tools, was first invented between 6000 and 4000 BC in Mesopotomia (Lal et al. 2007). Although the impacts of the plough were likely vast, the authors focus on one consequence that was highlighted by Boserup (1970). Because the use of the plough required significant upper body strength, it tended to generate a gender division of labor where men worked outside the home in the fields while women specialized in home production and other domestic activities. Boserup argues that this gender division of labor resulted in deeply held beliefs about the role of women in society. In societies that traditionally use plough agriculture, less equal beliefs about the roles of men and women evolved. Alesina et al. (2013) test this hypothesis by linking ethnographic data with contemporary individual– and country-level measures of gender role attitudes. They find that traditional plough agriculture is associated, even today, with less equal beliefs about the roles of men and women in society.[11]

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[11] Also see Hansen et al. (2012), who find that a longer history of agriculture is associated with more unequal gender roles.

The findings of Alesina et al. are consistent with evidence that in the early phase of agriculture, prior to the adoption of the plough, societies tended to be matriarchal and characterized by gender equality (Gimbutas, 2007). Recent excavations from Çatalhöyük, a Neolithic town of 8000 people on the plains of central Turkey inhabited approximately 9000 years ago, provide additional evidence of the equality of the sexes during this time (Hodder, 2005). Analysis of male and female skeletal remains shows carbon deposits inside the ribs, due to indoor wood fires and a lack of ventilation in the homes. The smoke was ingested causing soot to build up in the lungs resulting in a lining of carbon inside the ribs. Hodder (2005) finds that the average amount of carbon in the ribs of men and women was equal, suggesting that men and women tended to spend roughly equal amounts of time within and outside the home. In addition, the archeological evidence from Çatalhöyük suggests that men and women had similar diets and were buried in similar positions and locations, both of which also suggest roughly equal social status.

The growth-promoting impacts of the plough have been studied by Andersen et al. (2013). Examining 316 European regions between 500 and 1300AD, the authors show that the adoption of the heavy plough is associated with greater population growth and increased urbanization. According to the authors' diff-in-diff estimates, the heavy plough accounts for 10 percent of the increase in population and urbanization during this time.

7.4. GEOGRAPHY AND HISTORY

7.4.1 The Historical Impacts of Geography

One of the important insights that has arisen from the historical development literature concerns the relationship between geography and contemporary development. Specifically, a common finding in the literature is that geography can have important impacts on current development through its persistent historical effects. Further, evidence also suggests that this historical impact of geography may be larger than its contemporaneous impact. For example, the findings from Acemoglu et al. (2001) show that the disease environment at the time of European colonization crucially affected subsequent institutional development. The authors argue that the primary impact of a country's disease environment works through this historical channel rather than through contemporary channels. The line of research by Engerman and Sokoloff (1997, 2002) also shows that small geographic differences become magnified through historical events and as a result end up having large impacts on long-term economic development. As they argue, differences in soil and climate made plantation agriculture and its reliance on slavery more or less profitable in different parts of the Americas, which in turn affected long-term economic development.

Even more dramatic examples of the long-term historical effect of geography are documented by Jared Diamond in his book *Guns, Germs and Steel*. The book is devoted to exploring the answer to the question of why Europeans colonized the rest of the world

and not the other way around. Part of Diamond's answer lies in the fact that in Eurasia, crops and animals were domesticated earlier and in more varieties than in other parts of the world.

In addition, the domestication of plants and animals quickly spread east and west throughout Eurasia, but diffused much less quickly south to the African continent. When moving east or west, the length of the day does not change, and the climate is generally not drastically different. However, this is not true when moving north or south, where the length of the day changes and the climate typically is very different. More generally, for continents with a north–south orientation, such as the Americas or Africa, domestication or technological advance tended not to spread as quickly as in Eurasia with its east–west orientation.

Because of the early domestication of animals in Eurasia (and its more rapid diffusion), humans lived in close proximity to animals. As a result of this, new animal-based diseases, such as measles, tuberculosis, influenza, and smallpox developed, and over time humans developed genetic resistances to the diseases. In contrast, the parts of the world without domesticated animals did not develop the diseases or genetic resistance. According to Diamond, this explains why European diseases decimated native populations and not the other way around. As Diamond points out, the spread of disease was as important a factor as the military for European conquest of the Americas.

Diamond's explanation for Europe's global dominance illustrates clearly the large effect that geography can have through history. The historical origins of European colonization of the globe lie in two deep determinants: (i) being endowed with wild plants and animals suitable for domestication; and (ii) being located on a continent with an east–west orientation.

Although Diamond's hypothesis is intuitive in many ways, there are reasons to be sceptical. First, having domesticated plants and animals is potentially endogenous. For example, Diamond asserts that although the horse was domesticable, its close relative the zebra was not (Diamond, 2002). However, this assertion is difficult to assess since we do not observe the wild ancestors of the horse and so cannot compare it to the zebra. All we observe is the domesticated version, which has undergone centuries of selective breeding. Perhaps there are other historical determinants—be they economic, cultural, institutional, etc.—that caused horses to become domesticated in Eurasia but not zebras in Africa. Interestingly, there are examples of Europeans attempting to tame zebras. Rosendo Ribeiro, a doctor in Kenya, made house calls on a zebra. In England, Lord Walter Rothschild, pictured in Figure 7.2, would frequently drive a carriage pulled by zebras through the streets of London. However, despite these examples, the zebra never become widely domesticated.

Olsson and Hibbs (2005) take Diamond's hypothesis to the data. Using modern countries as the unit of analysis, the authors show that consistent with Diamond's descriptive accounts, countries with richer biological and geographic environments experienced the

Figure 7.2 Lord Lionel Walter Rothschild with his zebra-drawn carriage, 1895. *source: The Picture Magazine.*

transition to agriculture at an earlier date and have higher per capita GDP in 1997. The geographic environment is measured using an index that includes the axis orientation of the continent, suitability of the climate for agriculture, latitude, and the size of the landmass within which the country is located. The measure of biological conditions is based on an index that comprises the number of annual or perennial wild grasses known to exist in prehistory and with a mean kernel weight exceeding 10 mg, as well as the number of domesticable mammals known to exist in prehistory and weighing more than 45 kg. Overall, the authors find that their estimates confirm Diamond's hypotheses.

Evidence from a wide range of empirical studies provides additional evidence of the importance of historical impacts of geography. Ashraf and Michalopoulos (2011) provide evidence that geography was an important determinant of the timing of the Neolithic Revolution, arguably the most important event in human history. Looking across countries globally, and across archaeological sites within Europe and the Middle East, they document an inverted U-shaped relationship between year-to-year variability in temperature and early adoption of agriculture.[12]

Michalopoulos (2012) shows that geography was an important determinant of the evolution of ethnic identity and hence ethnic diversity (which is known to be highly correlated with economic development today). Michalopoulos (2012) provides evidence

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[12] Because fine-grained temperature data are not available prior to 1500, the authors are forced to use post–1500 variability as a proxy. The assumption is that the rank ordering of variability after 1500 is similar to the ordering prior to 1500. They show that this is true comparing data from 1500 to 1900 and 1900 to 2000.

that the pattern of agricultural suitability and terrain slope were important determinants of the interaction between ethnic groups and their proclivity to merge into and identify as larger ethnicities. His analysis combines fine-grained geographic data with information on the locations of ethnic groups globally. The world is then divided into grid-cells that are 2.5° by 2.5°. Michalopoulos (2012) shows that grid-cells that exhibit greater variation in soil quality and in elevation are also more linguistically diverse. The most likely explanation for the finding is that greater geographic variation prevented trade and migration between societies, and conquest of one society over others, all of which have homogenizing impacts.

Interestingly, Michalopoulos (2012) shows that the link between geography and ethnic diversity is due to geography's impact prior to 1500. Among the parts of the world that witness significant population changes after 1500 (due to death and voluntary and involuntary migrations), there is no relationship between geographic diversity and linguistic diversity.

Durante (2010) provides evidence that within Europe, historical variability in weather conditions created greater benefits for cooperation, which increased the level of cooperation in societies. He hypothesizes that greater spatial variability in temperature and precipitation generates output shocks that are less correlated, providing an increased incentive for trade, thus increasing trust and cooperation. As well, greater temporal variability of weather increases the benefits to large storage facilities and irrigation, which require large-scale cooperation. Durante therefore argues that locations characterized by greater spatial and temporal variability may have higher levels of trust and cooperation today. He tests these predictions using monthly historical climatic data from 1500 to 2000, measured across grid-cells within Europe. He finds that greater year-to-year variability in both temperature and precipitation is associated with higher levels of trust today, and that less correlated weather shocks over space is also associated with more trust today.

Of course, there are a number of potential alternative explanations for these correlations. Therefore, as a further test of his channel, Durante measures variability in growing season months and months outside of the growing season. He finds that only historical variability during the growing season is correlated with current trust. He also examines weather variability from 1500 to 1750, which was prior to the industrial revolution when Europe was primarily agricultural, and from 1900 to 2000, which is after industrialization. He finds that only weather variability during the agricultural period is correlated with trust today.[13]

Recent findings from Alsan (2012) suggests that geography also had important historical impacts within Africa. A large literature attributes many of Africa's unique

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[13] A subsequent study by Ager and Ciccone (2012) raises the questions of whether the increased trust found in Durante (2010) is due, in part, to increased religiosity. Although in a different context—the 19th century United States—Ager and Ciccone (2012) show that increased variability in annual rainfall (looking across counties) is associated with increased church membership.

characteristics to the fact that it is land abundant and labor scarce. Alsan (2012) considers a potential explanation for this: the tsetse fly. The fly, which is unique to Africa, transmits the parasite *trypanosomiasis*, which causes sleeping sickness in humans and nagana in domesticated animals. The tsetse fly, both directly through its impact on humans, and indirectly through its impact on domesticated animals, may be responsible for Africa's low population densities historically.

The author uses 19th century climate data measured at the grid-cell level to construct a measure of the historical suitability of each cell for the tsetse fly. The index is a highly non-linear function of temperature and humidity. Examining variation across ethnic groups within Africa, she shows that ethnicities with climates more suitable for the tsetse fly, at the end of the 19th century, were less likely to use draft animals for trade and agriculture, were less likely to use the plough, and were more likely to use shifting cultivation rather than more intensive agricultural techniques. Because tsetse-suitable areas did not develop plough agriculture, women were more likely to participate in agriculture, and because the use of animals was not feasible, slaves were more likely to be used. Additionally, the less intensive agricultural techniques resulted in lower population densities, fewer urban centers, and less developed states. Her findings provide strong evidence that geographic suitability for the tsetse fly had a formative impact on the nature and prosperity of societies within Africa.

Because the tsetse fly did not exist outside of Africa, Alsan is able to undertake a falsification test by examining the correlation between tsetse suitability and the outcome of interest in the other parts of the world. If her estimates are really capturing the causal impact of the tsetse fly on long-term development, then in the parts of the world where there was no fly, we should not observe the same correlations. This is indeed what she finds. The tsetse suitability index has no predictive power outside of Africa. Overall, her findings provide strong evidence that the tsetse fly, by inhibiting the development of intensive agriculture using draft animals, resulted in lower populations, less urbanization, and less state development.

Fenske (2011) also considers the question of how geographic conditions affected the history of state development in Africa. The author tests the hypothesis that ecological diversity, by increasing the benefits of peaceful exchange between locations, increased the need of a state to provide the institutional setting to facilitate trade. This in turn resulted in the development of larger more developed states. Combining data on the boundaries of African ethnic groups in the 19th century with information on 18 ecological zones within Africa, Fenske constructs a measure of each ethnic group's ecological diversity. He finds that ethnic groups that were more ecologically diverse also had larger and more developed states.

A large number of studies also examine historical weather shocks and show that they had important historical impacts, many of which continue to be felt today. For example, Fenske and Kala (2013) show that during the slave trade, cooler temperatures near the slave

ports were associated with increased slave exports. Therefore, due to the persistent impacts of the slave trade, temperature fluctuations during this time period had long-term impacts. Bai and Kung (2011a) examine the impacts of rainfall on Sino-Nomadic attacks in Han China between 220BCE and 1839CE. They identify a negative relationship between conflict and precipitation showing that climate was also an important determinant of conflict in the region.

Chaney (forthcoming) shows that in Ancient Egypt deviant Nile floods had important politcial impacts. Because deviant floods increased social unrest, this increased the bargaining power of the religious leaders relative to military leaders. Consistent with this, Chaney (forthcoming) shows that from 641 to 1437CE, deviant floods are associated with higher food prices, more conflict, less turnover of the highest ranking religious leader, and more construction of religious structures (relative to secular ones).

Haber and Menaldo (2010) also argue that climate can have important political effects. They show that there exists an inverted U-shaped relationship between average rainfall and democracy. They argue that this relationship is explained by the non-linear relationship between rainfall and suitability of a location for sedentary agriculture, which they argue provides a foundation more suitable for democracy than nomadic modes of subsistence. Bentzen et al. (2012) also argue for a link between geography/climate and modern political institutions, but, motivated by Wittfogel (1957), focus on the extent to which a location's agricultural output is increased by investments in irrigation. They argue that the large-scale investment and coordination needed for irrigation promoted strong authoritarian leadership and autocratic institutions, and this has persistent impacts even today. Using data from the FAO on yields with and without irrigation, the authors construct a measure of irrigation potential. Looking across 160 countries, they find greater irrigation potential is associated with less democracy today. Bentzen et al. (2012) show that in their specification the non-linear effect found in Haber and Menaldo (2010) no longer exists once one controls for their measure of irrigation potential.

Overall, there is a large body of evidence—only some of which is reviewed here—that suggests that a significant effect of geography—if not the largest effect of geography—on current economic development arises due to its influence on past events rather than through its direct effect on economic outcomes today.

7.4.2 Geography's Changing Impact Over Time and Space

Once one recognizes the fact that geography had important impacts historically as well as today, it is natural to ask whether the impacts of geography have been roughly constant throughout time or whether its impact varies in a systematic manner across time and/or space. This is a point also addressed in Acemoglu et al. (2001). Their empirical and historical narrative is that the disease environment generally, and in particular today, does not have large impacts on economic development. However, during the period of

European colonization of much of the globe it had a crucial impact. In locations with a disease environment that threatened European survival, Europeans did not migrate and did not establish growth-promoting institutions. Acemoglu et al.'s (2001) assumption that this disease environment only mattered during this specific historical episode is what allows them to use initial settler mortality as an instrument for a country's domestic institutions in explaining current per capita income. According to them, this particular geographic characteristic—the severity of the disease environment for Europeans—only had impacts during the colonial period.

Along similar lines, a number of papers find evidence that weather shocks can have significant long-term impacts during specific windows of time and no long-term effects during others. For example, Dell (2012) shows that within Mexico, drought experienced by municipalities between 1906 and 1910 had a large positive impact on violence and insurgency during the Mexican Revolution (1910–1918), resulting in a greater prevalence of *ejidos* (communal farms), which are less economically developed today. This implies that drought experienced between 1906 and 1910 had a long-term persistent impact on underdevelopment in Mexico. She shows that drought in other periods (between 1960 and 1995) are uncorrelated with long-term development.

Osafo-Kwaako (2012) also finds evidence of weather shocks mattering during a specific window of time. He shows that within Tanzania and during the early process of the government's establishment of development villages in the early 1970s, drought provided a motivation for peasants to agree to the villagization process. One therefore observes a positive relationship between droughts in 1973–1975 and the subsequent extent of villagization. The author then documents the persistent impacts of villagization. Although it increased education levels, political awareness, and community participation, it has also led to increased poverty and lower consumption today. Like Dell, Osafo-Kwaako also shows that the long-term impacts of drought are specific to this one narrow window.

Fenske and Kala (2013), in their study of the link between climate and slave exports in 18th and 19th century Africa, also provide some suggestive evidence of climate being particularly important during the height of the slave trade. They estimate the cross-sectional relationship between contemporary light density (a commonly used measure of economic development at the sub-national level) and historical weather shocks. Their findings provide evidence of the greater importance of temperature shocks during the height of the trans-Atlantic slave trade, which is consistent with the shocks having a large impact on contemporary development through their historical impacts on the supply of slaves.

Nunn and Puga (2012) focus on geography and provide an example of its impact varying over both time and space. They show that for most of the world, terrain ruggedness has a negative contemporaneous impact on economic development. All else equal, rugged terrain makes it more difficult to build buildings, roads, bridges, and other infrastructure;

agriculture and irrigation is also more difficult; and trade is more costly. They further show that within Africa, ruggedness had very different impacts than outside. Within Africa, greater ruggedness is associated with higher incomes, not lower.

The authors argue and provide evidence that this can be explained by an indirect historical impact of geography that was specific to Africa because of its history of the slave trades. During the slave trades, societies were able to use rugged terrain to protect and hide from slave raiders and kidnappers. This allowed individuals, villages, and societies to partially defend against the negative effects of the slave trades documented in Nunn (2008a). Therefore, for the African continent, which was exposed to the slave trade, ruggedness also had a historical indirect positive effect on income. Ruggedness allowed certain areas to evade the slave trade, thereby increasing long-term economic growth.

Nunn and Qian's (2011) study of the introduction of the potato to the Old World during the Columbian Exchange directly exploits the fact that the importance of geography changes over time. Specifically, their analysis relies on the fact that having climate and soil suitable for cultivating potatoes was important only after the potato was introduced from the Americas. Despite not having spatially or temporally extensive data on potato production or consumption, they infer the impacts of the potato by comparing the evolution of populations, city sizes, urbanization rates, and adult heights, before and after the adoption of the potato, in the places suitable for potato cultivation relative to unsuitable locations. Their estimates show that after the introduction of the potato, the places suitable for cultivation witnessed significant population growth, city growth, increased urbanization rates, and increased heights.

Overall, evidence continues to accumulate suggesting that geography can have very different impacts at different points in time and in different locations. The impacts of geography depend crucially on the particular historical context.

7.5. MECHANISMS UNDERLYING HISTORICAL PERSISTENCE

I next turn to the important question of why historical events have persistent impacts. In particular, I discuss the existing evidence for path dependence, culture, institutions, and genetic traits as important channels underlying historical persistence.

7.5.1 Multiple Equilibria and Path Dependence

Although it is far from obvious why historical events have persistent impacts, particularly in the long-run, once one acknowledges the possibility of multiple equilibria, then historical events can have long-term impacts if they move the society from one equilibrium to another. A large number of models show how easily multiple equilibria arise, even in very simple environments. See, for example, Murphy et al. (1993), Acemoglu (1995), Mehlum et al. (2003), and Nunn (2007).

Less formally, many examples of multiple equilibria in daily life have been identified, the most well known being the adoption of the less-efficient QWERTY keyboard over other more efficient configurations like the DVORAK keyboard (David, 1985). The QWERTY keyboard design was developed by Christopher Sholes and patented in 1873. That same year, it was sold to Remington, which used the configuration for their typewriters. The configuration was chosen because it separated the most commonly used keys, which kept the arms of the typewriter from jamming. In other words, the format was chosen because it effectively reduced typing speeds.[14]

A number of studies have undertaken the task of formally testing for the existence of multiple equilibria. A common strategy that has been employed is to examine cases where there has been an extremely large temporary shock to an equilibrium. The studies then test whether the temporary shock causes a permanent movement to a new equilibrium. If so, this is evidence for the existence of multiple equilibria.

Davis and Weinstein (2002, 2008) examine the effect of bombings on 114 Japanese cities during World War II and show that after the bombings, the cities returned to their pre-bombing populations, regained their shares in total manufacturing output, and most surprisingly, also regained their pre-existing industrial composition. Overall, the results point toward the existence of a unique stable equilibrium of production, rather than the existence of multiple equilibria.

Although these results appear to suggest the existence of one unique equilibrium, a second possibility is that the shock was not sufficient to move the society away from the current equilibrium. The US bombings during WWII were dramatic and severe, but they did not alter property rights or the ownership of assets. It is likely that these are the fundamental determinants of where people live and where production occurs.

The findings in Miguel and Roland's (2011) analysis of the long-term effects of the US bombings in Vietnam are consistent with the finding from Davis and Weinstein (2002, 2008). The authors find that the bombings had no long-term effects on populations, poverty, or consumption 25 years later. However, in this case, the authors show that the return can be explained by reconstruction efforts intentionally aimed at rebuilding the hardest hit parts of the country. In other words, policy intentionally helped the country return to its original equilibrium.

An innovative study by Redding et al. (2011) tests for the existence of multiple equilibria in a very different setting. The study examines the location of airport hubs in Germany before and after the division of Germany following World War II. It is shown that after division, the location of West Germany's primary airport hub switched

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[14] Liebowitz and Margolis (1990) argue that the efficiency difference between the QWERTY and DVO-RAK keyboards is lower than argued in David (1985). The authors provide some evidence for this. However, even if the efficiency gap is lower than previously thought as they contend, the QWERTY keyboard still provides a clear example of multiple equilibria and path dependence, which is the central point of David's (1985) original argument.

from Berlin to Frankfurt. After reunification in 1990, the location of the hub did not switch back to Berlin. Redding et al. show that this shift cannot be explained by changes in fundamentals over the time period. Thus, the evidence suggests that the temporary division of Germany resulted in a permanent movement of the location of Germany's largest airport hub.

Bleakely and Lin (2012) examine a very specific and seemingly innocuous geographic characteristic and show that even though it only mattered for a narrow window of time, it had lasting and important impacts on urban development within the United States. The characteristic they examine is the existence of rapids or falls, which occur when a river crosses a fault line. In these locations, river transport required hauling goods and boats over land. This is known as portage. These locations were a focal point for commercial activity and entrepot trade.

The shipment of goods by boat was a dominant form of transportation until the early to mid-19th century, when canals and railways were developed. Combining geographic data with population at the census tract level, the authors show that today, looking either along rivers or along fault lines, populations are concentrated where rivers cross fault lines—i.e. at historical portage sites. The authors then turn to historical populations, examining the relationship between portage and population density from 1790 to 2000. The authors show that after 1850 (and the decline in the use of water transport and portage), the population actually became more (not less) concentrated at portage sites. Their findings are consistent with portage sites serving as a focal point that helped determine the location of early cities (i.e. the equilibrium population distribution) among a large set of possible multiple equilibria.

7.5.2 Domestic Institutions

Even without the existence of multiple equilibria, historical events can still affect economic development in the long-run if they alter deep determinants of long-term economic growth. The determinant that has received the greatest attention in the literature is domestic institutions. This focus is illustrated by the fact that in each of the seminal papers by Acemoglu et al. (2001, 2002), Engerman and Sokoloff (1997, 2002), and La Porta et al. (1997, 1998), the mechanism through which colonial rule affects current development is institutions.

The focus on institutions as a causal mechanism has also continued in subsequent research. An example of this is Acemoglu et al.'s (2005) study of the effect that early Atlantic trade had in Europe. The authors argue that in countries with access to the lucrative Atlantic three-corner trade, economic and political power shifted toward commercial interests. As the merchant class became more powerful, they were able to alter domestic institutions to protect their interests against the interests of the royalty, and these institutional changes in turn had a positive effect on long-term prosperity. Using data on historical urbanization rates and per capita incomes, the study first shows that the rise of

Europe was actually a rise of nations with access to the lucrative Atlantic trade, namely Britain, France, the Netherlands, Portugal, and Spain.

The authors argue that profits alone are not able to explain the divergent growth of Atlantic traders and that the evolution of domestic institutions played an important role in the process.[15] To test this hypothesis, the authors extend the Polity IV data back to 1350 and show that Atlantic trade increased the quality of domestic institutions as measured by an index of the constraints on the executive. They further hypothesize that the process of institutional change could only occur in countries that initially had non–absolutist political institutions. They show that the data are also consistent with this. The increase in economic growth generated by Atlantic trade was higher for countries with better initial domestic institutions, again measured by the constraint on the executive.

Other examples of studies documenting the persistent importance of historical institutions include Dell's (2010) analysis of the impact of the early forced labor institutions in colonial Peru and Bolivia, as well as Banerjee and Iyer's (2005, 2008) studies of the effects of early land tenure institutions in colonial India.

The recent study by Gennaioli and Rainer (2007) also provides evidence of the persistence of early institutions, but within the African context. The authors use ethnographic data to construct a measure of the level of state development in pre-colonial African societies. Their OLS estimates show that there is a positive correlation between pre-colonial political development and the provision of public goods today. More recently, Michalopoulos and Pappaioannou (2013) combine the same ethnographic data used in Gennaioli and Rainer (2007) with satellite data on night–light density. Examining within-country variation, the authors find that the only robust correlate of night–light density is an ethnicity's pre-colonial level of political development. This finding echoes Gennaioli and Rainer's finding of the importance of this variable.

These results can be combined with evidence from Nunn (2008a) showing that the parts of Africa from which more slaves were taken had less developed political systems after the slave trade (and before official colonial rule).[16] Although the evidence for both relationships is based on correlations and therefore one must be cautious when drawing conclusions, the combined evidence from Gennaioli and Rainer (2007), Michalopoulos and Pappaioannou (2013), and Nunn (2008a) is consistent with a chain of causality where the slave trade resulted in a deterioration of domestic political institutions, which in turn had a long-term adverse impact on the provision of public goods. Therefore, the body of evidence provides support for the notion that history can matter through the evolution and persistence of early institutions.

Overall, the literature since Acemoglu et al. (2001) has succeeded at providing additional evidence showing that institutions are an important channel through which history

[15] See Inikori (2002) for the alternative view that the profits that accrued by Western Europe during the three-corner Atlantic trade explain much of its growth during that time.

[16] Also see Whatley (forthcoming) for micro-level evidence for this relationship.

matters. However, much work remains to be done before we have a clear understand-ing of the effect that historical events have on the formation of early institutions and their persistence and importance for long-term development. For example, in past stud-ies (typically at the macro-level) institutions have been conceptualized and measured as a broad cluster of institutions. The result of this is that, by-and-large, institutions have remained a black box that we do not clearly understand the details of.[17] As empirical research continues to examine specific examples of institutional change and persistence at the micro-level, our understanding of the causes and consequences of specific institutions will naturally improve.

7.5.3 Cultural Norms of Behavior

Another way in which historical events can have long-term impacts is if these past events permanently affect culture or norms of behavior. While in economics the notion of culture often remains vague, other disciplines place much more emphasis on precisely defining culture. For example, evolutionary anthropologists have long recognized that there are clear micro-foundations that explain the existence of a phenomenon like cul-ture (e.g. Cavalli-Sforza and Feldman, 1981; Boyd and Richerson, 1985). If information acquisition is either imperfect or costly, then selection favors short-cuts to learning. Indi-viduals, rather than using scarce resources to acquire all of the information needed for every decision to be made, will instead develop "rules-of-thumb". These short-cuts then become internalized as individuals come to believe that certain behaviors are the "right" behaviors in certain situations.[18] For a fuller exposition of this definition of culture see Nunn (2012).

The idea that norms of behavior may be a channel through which history can affect long-term economic development is not new. One of the most famous links between history, culture, and development is Max Weber's (1930) hypothesis that the Protestant Reformation was instrumental in facilitating the rise of industrial capitalism in Western Europe. He argues that Protestantism, in contrast to Catholicism, approved the virtues of hard work and the accumulation of wealth, and that these values, referred to as the

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[17] An exception is the study by Acemoglu and Johnson (2004), where the authors distinguish "property rights institutions" from "contracting institutions." According to their definitions, property rights institutions protect individuals from theft or expropriation by the government or elites, and contracting institutions enforce private contracts written between individuals. They find that property rights institutions have a positive and significant effect on income, investment, and financial development. On the other hand, contracting institutions appear to have a much more limited impact, only affecting the form of financial intermediation.

[18] Within economics, examples of models of cultural evolution include Verdier (2000, 2001) and Tabellini (2008).

"Protestant work ethic," provided the moral foundation that spurred the transition to a modern market-based industrial economy.[19]

One of the earliest studies empirically examining the possibility that cultural norms may be historically determined was undertaken by a group of social psychologists (Cohen et al. 1996). The authors test whether there is a culture of honor in the US south, where a special importance is placed in defending one's reputation and honor, even if this requires aggression and violence. Their explanation for why this culture exists in the US south and not the north lies in the different histories of settlement in the two areas. The north was settled by groups with a farming background, while the south was settled primarily by the Celts who had been herders since prehistorical times and had never engaged in large-scale agriculture. They argue that in herding cultures, with their low population densities and weak states, protection of one's property was left to the individual and therefore norms of aggressive behavior developed as a means to protect one's herd.

To test the culture of honor hypothesis, Cohen et al. (1996) conducted a series of experiments involving white males from the US north and US south. In the experiments, each individual was bumped by an accomplice and called an "asshole." (The participants did not know this was part of the experiment.) Cohen et al. use a number of methods including direct observation, psychological tests, and saliva tests to compare the effects of this incident on southerners relative to northerners. They find that southerners became more upset, were more likely to feel that their masculinity was threatened, became more physiologically and cognitively primed for aggression as measured by a rise in testosterone and cortisol levels, and were more likely to engage in aggressive behavior, subsequently.

A number of studies provide additional evidence for the historical origins of current cultural differences. For example, Guiso et al. (2008) empirically examine the well-known hypothesis put forth by Putnam et al. (1993) that within Italy, city states that became independent during the 1000–1300 period developed higher levels of social capital, and these higher levels of social capital continue to persist today. The authors bring Putnam et al.'s hypothesis to the data by collecting various city level measures of social capital. They show that looking across 400 Italian cities, there is a positive relationship between their measures of social capital and whether the city was free in 1176.

Nunn and Wantchekon (2011) consider the historical determinants of trust within the African context. The authors examine whether the trans-Atlantic and Indian Ocean slave trades influenced the amount of distrust within society. This is done by combining household survey data with estimates of the number of slaves taken from each ethnic group in Africa. The study finds a negative relationship between an individual's reported trust in others (either neighbors, relatives, local governments, co-ethnics, and those from

[19] A more recent example is Mokyr's (2008) argument that an important determinant of the Industrial Revolution was the development of a social norm he calls "gentlemanly culture" that emphasized honesty, commitment, and cooperation.

other ethnicities) and the number of slaves taken from the individual's ethnic group during the slave trades.

The study attempts to distinguish between the two most plausible channels through which the slave trades could have adversely affected trust. One channel is that they altered the cultural norms of the ethnic groups exposed to the trade, making them inherently less trusting. A second channel is that the slave trades resulted in a long-term deterioration of legal and political institutions, which causes individuals to be less trusting of others today.

The authors undertake a number of tests to distinguish between these two channels. One test examines individuals' trust in the local government and attempts to control for the quality of domestic institutions using the individuals' perceived quality of the local government, extent of corruption, and whether local councillors listen to their concerns, as well as measures of the quality of public goods provision.

Another test controls for a second measure of slave exports: the average number of slaves that were taken from the geographic location that each individual is currently living in. This is different from the first measure, which is the average number of slaves taken from an individual's ethnic group. The second slave export variable is motivated by the fact that when an individual relocates the individual's internal norms move with them, but the external institutional environment is left behind. In other words, institutions, which are external to the individual, are much more geographically fixed, relative to cultural beliefs which are internal to the individual. Therefore, the two variables can be used to distinguish the extent to which the slave trade affects trust through the culture channel versus through the institutions channel. If the slave trade affects trust primarily through internalized norms and cultural beliefs, which are ethnically based and internal to the individuals, then when looking across individuals, what should matter is whether their ancestors were heavily enslaved. If the slave trade affects trust primarily through its deterioration of domestic institutions, which are external to the individual and geographically immobile, then what should matter is whether the external environment the individual is living in was heavily affected by the slave trades.

The results of each of the tests indicate that the slave trades adversely affect trust through both cultural norms and institutions, but that the magnitude of the culture channel is always greater than the institutions channel.

Another cultural consequence of the slave trade that has received attention is the practice of polygamy. Because significantly more men than women were enslaved during the trans-Atlantic slave trade, the ratio of men to women in Africa was significantly affected. It has been hypothesized that this gave rise to the practice of polygamy. Combining Nunn and Wantchekon's (2011) estimates of ethnicity-level slave exports and information from household survey data, Dalton and Leung (2011) and Fenske (2012) find a positive relationship between slave exports and the prevalence of polygamy.

Other examples of evidence for the historical origins of current cultural traits include Alesina et al.'s (2013) study of the relationship between traditional plough use and current

gender roles, as well as Durante's (2010) analysis of the link between historical weather variability and current trust. Both have been described earlier in the chapter.

7.5.4 The Interplay Between Culture and Institutions

Generally, studies of the historical importance of culture and studies of the historical importance of institutions are done in isolation of each other. However, there is evidence that there are important complementarities and interdependencies between culture and institutions. I now turn to a discussion of these.

7.5.4.1 *Culture Affecting Formal Institutions*

Historically, there are many examples of culture impacting the evolution of domestic institutions. Arguably, the most obvious are the European migrant communities established around the globe after the Age of Exploration. At a macro-level, this has been illustrated by Acemoglu et al.'s (2001) colonial origins hypothesis. A more micro-level analysis of the process (at least for the United States) is provided in David Hackett Fischer's (1989) book *Albion's Seed*, where he demonstrates that the institutions and social structures initially established by European migrants arose from the values and beliefs brought with them from the Old World. In other words, the institutions first established were endogenous to the cultural beliefs of the early migrants.

Fisher documents four waves of early migration to North America—the Puritans (1629–1641), the Anglican Cavaliers (1642–1675), the Quakers (1675–1725), and the Scotch-Irish (1717–1775)—and shows how differences in the values of each immigrant wave generated differences in the institutions that were established. The Puritans, believing in the importance of universal education and in a well-functioning society, established universal education, significant taxes, sizable governments, and heavy-handed justice. The Virginia Cavaliers, who believed that inequality was natural and were primarily concerned with maintaining existing forms of hierarchy, implemented limited education, lower taxes, less government spending, and an informal system of justice based on hierarchical violence. The institutions established by the Quakers in the Delaware Valley reflected their belief in the central importance of personal freedoms. All citizens were granted equal legal rights, there was limited government involvement in personal and religious affairs, and taxes were limited. The institutions implemented by the Scotch-Irish were an outgrowth of their belief in freedom from the constraints imposed by government. This resulted in a limited formal justice system (and a reliance on ad hoc vigilante justice), limited political institutions, light taxes, and strong rights to armed resistance from authority.

European mass migration provides one episode that clearly illustrates the endogeneity of institutions to cultures. Other studies also provide similar evidence from other contexts. For example, Zerbe and Anderson (2001) document that the initial property rights institutions established during the 1848 California Gold Rush reflected the values and beliefs that miners brought with them westward. The beliefs—which included

individualism, respect for property, and the view that rewards should be commensurate with effort—first developed into collectively practiced norms of behavior (i.e. informal institutions) before being formalized as written laws.

As well, the work by Greif (1994) on the cultural differences between the Maghribi and Genoese medieval traders also illustrates the role of culture in shaping the formation of formal institutions. The Genoese developed institutions that arose from their individualist cultural beliefs, including a formal legal system as well as other formal organizations that helped to facilitate exchange. By contrast, the institutional structures of the Maghribis grew out of their collectivist cultural beliefs. Because the Maghribis continued to rely on informal enforcement mechanisms, organizations remained limited in size and scope.

7.5.4.2 Institutions Affecting Culture

There is also the possibility of feedback effects, with formal institutions affecting the evolution of cultural traits. A number of recent studies have found evidence for this. For example, Guido Tabellini (2010) explains variation across regions of Europe in levels of trust, respect, and confidence in the returns to individual effort. He identifies a strong positive relationship between the prevalence of these cultural traits and measures of the average quality of domestic institutions between 1600 and 1850. The estimates show that European regions that had less well-developed institutions in the past have less trust in others, less respect for others, and believe less in the value of individual effort today.

Evidence for the impact of institutions on culture also comes from a number of studies that use a regression discontinuity strategy, focusing on particularly important historical borders that today lie within the same country. Becker et al. (2011) examine Eastern European villages lying within the same country today, but on either side of the historical Habsburg border. They show that villages that were formerly part of the Habsburg Empire, with its greatly respected and well-functioning bureaucracy, today have greater trust in their local government. Grosjean (2011b) examines location pairs within Eastern Europe and shows that the longer a pair was under the same Empire historically, the more similar the reported social trust of the locations' citizens today. Peisakhin (2010) surveys 1,675 individuals living in 227 villages located within 25 km of the Habsburg-Russian border that divided Ukraine between 1772 and 1918. Relying on information on cultural traits based on answers to survey questions, Peisakhin (2010) documents a wide range of statistically significant cultural differences between the two groups.

7.5.4.3 Coevolution of Culture and Institutions

Tabellini (2008) provides a formal model of the interplay between culture and institutions in an environment in which both are endogenous and co-evolve. In the model, there are two potential cultural traits with one valuing cooperation (or believing cooperation

is the right thing to do) more than the other. Vertical transmission of these values is modeled explicitly with parents exerting costly effort to instill values of cooperation. One of the primary innovations of the paper is to also model the endogenous formation of institutions (which enforce cooperation) through majority voting. Tabellini shows that the co-evolution of culture and institutions generates strategic complementarity and multiple equilibria. A culture that values cooperation prefers institutions that strongly enforce cooperation, which in turn increases the returns to cooperation, reinforcing this cultural trait. Conversely, a culture that does not value cooperation prefers institutions that weakly enforce cooperation, which in turn decreases the returns to cooperation, reinforcing a culture that does not value cooperation.

Recent papers that have empirically studied contemporary institutions and culture provide evidence of interactions between culture and institutions. Aghion et al. (2011) examine contemporary labor markets and identify a negative cross-country relationship between the existence of cooperative labor relations and the severity of minimum wage regulation by the state. Similarly, Aghion et al. (2010) identify a negative cross-country relationship between general trust and government regulation.

Both studies then develop models of the interplay between institutions/policies and culture/beliefs. In both, greater government regulation crowds out beneficial behavior of citizens. In Aghion et al. (2011), higher minimum wage regulation reduces the benefits to workers of trying to cooperate with firms. Therefore, more stringent minimum wage regulations crowd out cooperation between firms and workers. In turn, less cooperative firm-worker relationships increase the demand for minimum wage regulation. Thus, this interdependence explains the observed negative relationship between minimum wage and cooperative labor relations.

In Aghion et al. (2010), a low level of civic mindedness in the economy results in a greater need for regulation to protect citizens from the negative externalities imposed by those that are not civic-minded. The high level of regulation in the economy also reinforces the low level of civic mindedness, as it is these individuals that are comfortable paying and demanding bribes. The result is that greater trust is observed in economies with lower levels of government regulation.

What the three studies described here have in common is their analysis of the two-way relationship between culture and institutions. Given this interdependence, both institutions and culture co-evolve, and this can generate multiple stable equilibria with different sets of institutions and cultural norms that are self-enforcing.

7.5.5 Genetics

It is possible that historical events that affect the distribution of individuals in different locations—i.e. through genocide, forced expulsions, or voluntary migrations—could have long-term impacts through a genetic channel. Given that genetic traits tend to be fairly

persistent over time, if they have an impact on economic outcomes, then it is theoretically possible that events that impact the genetic distribution of the population may have long-term economic impacts.

A number of recent studies provide some evidence that genetics can impact human behavior. For example, Cesarini et al. (2008) exploit variation in genetic differences between monozygotic and dizygotic twins. The authors compare differences in the actions taken in a standard trust game between monozygotic and dizygotic twins from Sweden and the United States. By assuming that similarity of twin behavior can be decomposed into a common environment, common genes, and other individual-specific variables, and that monozygotic twins share the same environment and same genes, and dizygotic twins share the same environment but have half the alleles of genes, they are able to estimate the extent to which behavior is genetically determined. They find that monozygotic twins consistently exhibit more similar behavior than dizygotic twins, and therefore, based on their assumptions, they conclude that an important part of behavior is genetically determined. The same basic procedure is repeated in Cesarini et al. (2009), but examining behavior in a dictator game and measures of individual risk aversion.

At the macro-level, a number of studies have documented relationships between genetic measures and economic outcomes. Spolaore and Wacziarg (2010) show that greater genetic relatedness has a positive impact on the probability that two populations go to war with one another. Spolaore and Wacziarg (2009) show that, across country-pairs, bilateral genetic distance is positively associated with current income differences. In other words, genetically similar countries are economically more similar.

Ashraf and Galor (2012) provide evidence that genetic diversity within a country is non-monotonically related to per capita income. There is an inverted-U relationship between the two, with income reaching a maximum at an intermediate level of diversity. Too much diversity and too little diversity are both associated with low per capita income.

Cook (2013a) also examines genetic diversity, but unlike Ashraf and Galor (2012), he considers a specific group of genes associated with resistance and susceptibility to disease, namely the major histocompatibility complex. Within humans this is a cluster of 239 genes on the 6th chromosome. Cook (2013a) measures the variation in allele frequency within this system and shows that, across countries, his measure of genetic variation is positively correlated with Olsson and Hibbs's (2005) measure of the number of domesticable animals and Putterman's (2008) measure of the time since the adoption of agriculture. It is also positively correlated with health, measured in the 1960s. Interestingly, by 1990 the health relationship no longer exists.

In a subsequent study, Cook (2013c) considers another channel through which genetics could have long-term impacts on economic development. This is through lactase persistence (i.e. the ability to digest milk after childhood). Cook hypothesizes that, historically, societies with the gene variant that resulted in lactase persistence had access to an additional source of calories, vitamins, and nutrients, which resulted in increased

population densities. The author shows that looking across countries, a greater proportion of the population with lactase persistence is associated with greater population density, measured in 1500.

7.6. UNRESOLVED QUESTIONS AND DIRECTIONS FOR FUTURE RESEARCH

7.6.1 Persistence or Reversals?

A number of studies provide evidence of the persistence in economic development over long periods of time. Societies that were more economically, technologically, or institutionally developed in the past are also the most developed today. For example, Comin et al. (2010) document a positive relationship between historical technology levels (as far back as 1000 BC) and current income per capita across different parts of the world. Along similar lines, Bockstette et al. (2002) empirically document a positive relationship between state antiquity and current economic performance today. Societies that were more politically developed in the past, are more economically developed today. At a more micro-level and over a shorter timespan, Huillery's (2011) analysis of French West Africa shows persistence of prosperity between the pre- and post–colonial period.

These findings of persistence stand in contrast to the "reversal of fortunes" documented in Acemoglu et al. (2002): among a sample of former colonies, those locations that were the most prosperous in 1500 are the most underdeveloped today. This reversal has also been confirmed in alternative studies. For example, Nunn (2008a) shows that among African countries, those that were the most developed prior to the slave trades (measured by population density in 1400) had the largest number of slaves taken and have the lowest incomes today.[20]

These two sets of findings appear to stand in contrast with one another, one showing persistence over long periods of time and the other showing a complete reversal. Which is correct? It turns out that both are, and an important part of the difference arises due to differences in the samples being examined. The persistence studies tend to examine all countries globally, while the reversal studies have samples that only include former colonies.

To illustrate this, consider the bivariate relationship between the natural log of per capita income in 1500 and the natural log of real per capita GDP in 2000. This relationship is reported in columns (1)–(3) of Table 7.1. The sample comprises 85 former colonies and 65 non-colonies examined in Comin et al. (2010). Column (1) reports the relationship among former colonies. This is analogous to the regressions estimated by Acemoglu et al. (2002). As shown, consistent with their findings, there is a negative relationship between

[20] Also related is the question of whether Africa has always been behind the rest of the world. While the conventional wisdom is that Africa has generally been the most underdeveloped continent of the world, there is evidence that this view is misplaced (Ehret, forthcoming).

population density in 1500 and per capita income today. There has been a reversal. Column (2) examines this same relationship among the rest of the sample, which are the countries that were never colonized. Here one observes a very different relationship. The two variables are positively correlated. Among this group there is persistence. Column (3) reports the relationship between the full sample, and shows that on average there is persistence. The coefficient is positive and significant at the 10 percent level. This estimate is analogous to the findings of persistence by Comin et al. (2010), Bockstette et al. (2002), and others.

Acemoglu et al. (2002) argue that among former colonies, the reversal occurred because initial prosperity impacted the institutions that were developed by Europeans. Where initial incomes were low, population was sparse, and Europeans settled, establishing protection of property rights and other growth-promoting institutions. Where initial incomes were high, Europeans undertook an extractive strategy. In some cases, they co-opted existing forced labor traditions, and in others, they promoted enslavement and the sale of indigenous populations. As a result, locations that were initially poor in 1500 today are more developed than those that were initially richer.

A similar but alternative explanation for the reversal, and one that has been stressed in the recent paper by Easterly and Levine (2012), is that the less populated places witness an in-migration of people from more prosperous countries, with higher levels of human capital, culture more conducive to economic growth, and/or other vertically transmitted traits. Therefore these locations are richer today. This alternative explanation suggests that the reversal simply reflects migration and the persistence of prosperity at the society level.

This alternative explanation can be examined using an ancestry-based measure of population density in 1500 and per capita GDP in 2000. The ancestry-based initial population measure is constructed using Putterman and Weil's (2010) *World Migration Matrix*. While the geography-based measure used in columns (1)–(3) is the average income (proxied by population density) of people living on the country's land in 1500, the ancestry-based measure is the average income in 1500 (proxied by population density) of the ancestors of those living in the country today.

The estimates from column (4) show that, all else equal, among former colonies, being descended from ancestors with a high prosperity is positively associated with per capita income today. Therefore, it is plausible that colonial migration of individuals from prosperous societies explains the reversal. Interestingly, the persistence of income along lineages (and not locations) is similarly strong among non-colonies (for which there is less migration) as among former colonies (with much greater migration).[21]

A simple way to examine whether the reversal documented in Acemoglu et al. (2002) is explained by migration combined with the persistence of prosperity across generations

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[21] Better understanding the specific transmission mechanisms underlying this persistence is the subject of ongoing research and debate. For an excellent summary of this literature see Spolaore and Wacziarg (forthcoming).

Table 7.1 Persistence and reversals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent variable: ln per capita GDP in 2000						
	Colonies	Non-colonies	Both	Colonies	Non-colonies	Colonies	Non-colonies
ln population density in 1500:							
Geography-based	−0.228***	0.276***	0.115*			−0.316***	0.003
	(0.070)	(0.090)	(0.061)			(0.058)	(0.319)
Ancestry-based				0.475***	0.319***	0.581***	0.316
				(0.098)	(0.100)	(0.086)	(0.355)
Observations	85	65	150	85	65	85	65
R-squared	0.114	0.129	0.023	0.222	0.140	0.430	0.140

Notes: The table reports coefficients from OLS estimates, with standard errors in parentheses. The dependent variable is the natural log of real per capita GDP in 2000. The independent variables are the natural log of a country's population density in 1500, measured as the historical average of the land of the country (geography-based) or the historical average of the ancestors of the population of the country (ancestry-based). The correlation between the two measures is 0.23 for colonies and 0.96 for non-colonies.

* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

is to examine the coefficient of the geography-based measure of population density in 1500, while controlling for the ancestry-based measure. This is done in column (6). The magnitude of the coefficient for the geography-based measure of 1500 prosperity does not diminish, and actually increases. The ancestry-based 1500 prosperity measure enters with a large positive and significant coefficient. This suggests the coexistence of two channels. One is the migration of populations from more prosperous societies and the other being the reversal of fortune discussed in Acemoglu et al. (2002). This finding of stronger persistence by ancestry than by location is not new and is an important point made in Putterman and Weil (2010), Comin et al. (2010), and Chanda et al. (2013).

Column (7) examines the same correlations as column (6), but among the sample of non-colonies. Because there is little migration among this group, the two population density measures are highly correlated (the correlation coefficient is 0.96). Due to this multicollinearity, both variables are insignificant. However, the estimated coefficient for the ancestry-based variable provides evidence of persistence across generations that is similar in magnitude but smaller than the estimate for the colonies sample. As expected, the coefficient for the geography-based variable shows no evidence of a reversal-of-fortunes mechanism among non-colonies.

Overall, the correlations reported in Table 7.1 are suggestive of the following facts. First, within former colonies, there has been a reversal of fortunes (looking at geographic locations as the unit of observation). Second, no such reversal exists among non-colonies. Third, there is no reversal once one uses societies (and their descendants) as the unit of observation. Instead one observes extreme persistence, both among former colonies and non-colonies, a fact that has been empirically noted by Putterman and Weil (2010) and discussed in Spolaore and Wacziarg (forthcoming). Fourth, the Acemoglu et al. (2002) reversal exists even after accounting for the migration of populations from more prosperous to less prosperous regions during the colonial period. This does not appear to fully explain the reversal.

Therefore, the existence of reversals and persistence in the data seem to be reconcilable. However, the most recent research along these lines shows a reversal that is not explained by the logic above. Olsson and Paik (2012) document a reversal within Europe from the Neolithic until now. They show that the parts of Europe that adopted agriculture earlier (and were arguably more economically developed during the Neolithic period) are less developed today. Although the authors provide an explanation, the exact reason for this reversal is far from clear. They also find evidence of a reversal within sub-Saharan Africa and East Asia. The reason behind the reversals in these regions is also unclear. Most interestingly, they show that if one looks at a global sample, there is persistence: the parts of the world that adopted agriculture earlier are more developed today. In other words, looking within-regions there are reversals, but looking across regions (and across countries generally) there is persistence.

7.6.2 When Doesn't History Persist?

To date, the primary focus of the literature has been in empirically documenting the persistence of historical shocks, typically arising due to lasting impacts through either domestic institutions or cultural traits. Little or no attention has been placed on examining when historical events *do not* have lasting impacts. This emphasis is logical given the need to first establish that history can matter, which has led to a natural focus on events that have had persistent impacts.

However, there are a few studies that provide some preliminary evidence for when history persists and when it does not. For example, Voigtlaender and Voth (2012) document the persistence of anti-Semitic values and beliefs in Germany between the 14th and 20th centuries. Their analysis examines variation across German villages and documents a remarkable relationship between the prevalence of pogroms during the Black Death (1348–1350) and a number of measures of anti-Semitic sentiment in the early 20th century. The authors then turn to an analysis of the environments in which persistence was more or less strong. One of their most interesting findings is that the persistence of this cultural trait is much weaker among Hanseatic cities, which were self-governed German cities heavily involved in lucrative long-distance trade. This finding may be due to higher rates of migration or to more dynamism arising from greater economic opportunity and growth. Voigtlaender and Voth (2012) also find that (consistent with both mechanisms) there is less persistence among cities with faster population growth, and (consistent with the second mechanism) there is less persistence among cities that were more industrialized in 1933.

Grosjean's (2011a) study of Nisbett and Cohen's (1996) "culture of honor" hypothesis shows a persistent impact of the Scotch-Irish culture of honor, but only within the Southern states of the US. The obvious explanation is that a cultural heuristic of aggression was relatively beneficial in the south, which was more lawless and with less well-developed property rights institutions. However, in the north, with a more established rule of law and better developed property rights protection, norms of aggression and violence were less beneficial, and therefore did not persist. In other words, external characteristics—in this case domestic institutions—by affecting the relative costs and benefits of different cultural norms, influence their persistence.

Another environment in which this can be seen is in Africa in the context of the slave trade. A natural hypothesis is that the detrimental impacts of the slave trades on trust will be more persistent in countries with a poorly functioning legal system. It is in these environments, where individuals are not legally constrained to act in a trustworthy manner, that norms of mistrust, initially developed by the slave trade, may continue to be relatively beneficial and to persist.

This can be tested directly by re-estimating Equation (7.1) from Nunn and Wantchekon (2011), but allowing for the impact of past slave exports on trust today to depend on the quality of country-level domestic institutions, measured at the time of the survey (2005)

using the Governance Matters "rule of law" variable. The original index ranges from -2.5 to $+2.5$, but I normalize the variable to lie between zero and one.[22] The augmented equation is:

$$\text{trust}_{i,e,d,c} = \alpha_c + \beta_1 \text{ slave exports}_e + \beta_2 \text{ slave exports}_e \times \text{rule of law}_c$$
$$+ \mathbf{X}'_{i,e,d,c}\mathbf{\Gamma} + \mathbf{X}'_{d,c}\mathbf{\Omega} + \mathbf{X}'_e\mathbf{\Phi} + \varepsilon_{i,e,d,c}, \tag{7.1}$$

where i indexes individuals, e ethnic groups, d districts, and c countries; $\text{trust}_{i,e,d,c}$ denotes one of five individual-level measures of trust that range from 0 to 3; slave exports$_e$ is a measure of the number of slaves taken from ethnic group e during the Indian Ocean and trans-Atlantic slave trades[23]; rule of law$_c$ is the 0-to-1 measure of a country's rule of law in 2005; α_c denotes country fixed effects; and $\mathbf{X}'_{i,e,d,c}$, $\mathbf{X}'_d$, and $\mathbf{X}'_e$ denote vectors of individual-, district-, and ethnicity-level control variables. See Nunn and Wantchekon (2011) for a fuller description of the variables in Equation (7.1).

Estimates of Equation (7.1) are reported in Table 7.2. The table reports estimates of β_1 and β_2. The bottom panel reports estimates of the impact of the slave trade on trust for the country with the lowest measure of rule of law (0.17) and for the country with the highest rule of law measure (0.63).[24] As shown, the estimated coefficient for the interaction term β_2 is positive in all specifications (although the precision of the estimate varies). This indicates a weaker negative impact of the slave trades on trust in countries with better domestic institutions. Further, for all trust measures, the estimated impact of the slave trades on trust is positive and significant for the lowest rule of law country but not statistically different from zero for the highest rule of law country. This is consistent with the adverse impacts of the slave trade being less persistent in countries with a better rule of law. In these countries, well-functioning institutions enforce trustworthy behavior of its citizens and therefore there is less persistence of the mistrust engendered by the slave trades.

An important shortcoming of this exercise arises due to the endogeneity of the country-level rule of law measure. In particular, it is likely endogenous to the slave trade. Ideally, estimates of this nature would rely on exogenous variation in the variable used to test for heterogeneity. However, an important point to bear in mind is that the estimates reported in Table 7.2 and Nunn and Wantchekon (2011) are estimated using within-country variation only. Any impacts that the slave trade had on country-level characteristics are controlled for directly in the regression because of the presence of country fixed effects. In other words, although the rule of law measure is an endogenous

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[22] This is done by adding 2.5 to the measure and dividing by 5.

[23] The measure is the natural log of one plus total slave exports normalized by land area.

[24] Zimbabwe is the country with the lowest rule of law measure in the Afrobarometer sample, and Botswana is the country with the highest.

Table 7.2 Testing for heterogenous impacts of the slave trade on trust in Nunn and Wantchekon (2011)

	Trust of relatives	Trust of neighbors	Trust of local council	Intra-group trust	Inter-group trust
	(1)	(2)	(3)	(4)	(5)
ln (1 + exports/area)	−0.172	−0.341***	−0.170***	−0.461***	−0.344***
	(0.141)	(0.115)	(0.064)	(0.102)	(0.082)
ln (1 + exports/area) × rule of law	0.111	0.512*	0.169	0.891***	0.695***
Index 2005	(0.360)	(0.302)	(0.173)	(0.263)	(0.208)
Individual controls	Yes	Yes	Yes	Yes	Yes
District controls	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	20,062	20,027	19,733	19,952	19,765
Number of ethnicity clusters	185	185	185	185	185
Number of district clusters	1257	1257	1283	1257	1255
Estimated impact for Afrobarometer country with lowest rule of law	−0.153*	−0.252***	−0.141***	−0.305***	−0.223***
	(0.082)	(0.066)	(0.036)	(0.059)	(0.049)
Estimated impact for Afrobarometer country with highest rule of law	−0.102	−0.018	−0.064	0.102	0.095
	(0.098)	(0.087)	(0.054)	(0.073)	(0.058)

Notes: The table reports OLS estimates. The unit of observation is an individual. ln (1 + exports/area) is the number of slaves exported normalized by land area, measured at the ethnicity level. Rule of Law Index 2005 is the Governance Matters VI rule of law measure for 2005, normalized to lie between zero and one. Standard errors are adjusted for two-way clustering at the ethnicity and district levels. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 10 education fixed effects, 18 religion fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The district controls include ethnic fractionalization in the district and the share of the district's population that is the same ethnicity as the respondent. See Nunn and Wantchekon (2011) for further details.
* Indicate significance at the 10% level.
** Indicate significance at the 5% level.
*** Indicate significance at the 1% level.

variable, its direct (linear) impacts on trust are captured by the country fixed effects in the regression.

Looking at the differences in the estimates of β_1 and β_2 across the five trust measures, it is clear that the heterogeneous impacts of the slave trades are weaker for trust of relatives and trust of the local government. This is true whether one considers the magnitude and significance of β_2 or of the high and low estimates reported in the bottom panel of the table. Interestingly, disputes between relatives and disputes between citizens and the local government are less likely to be resolved through the legal system than disputes between neighbors, co-ethnics, or citizens from different ethnic groups. Given this, we would expect that rule of law would be less successful in enforcing good behavior in these situations, and as a result would be a less important determinant of the persistence of distrust. The estimates reported in Table 7.2 are consistent with this.

7.7. CONCLUSIONS: LOOKING BACK WHILE MOVING FORWARD

This chapter has provided a broad overview of research examining comparative historical economic development. Studies have examined a wide array of historic events, including the Neolithic Revolution, colonial rule, Africa's slave trades, the Industrial Revolution, the Protestant Reformation, the French Revolution, and the Columbian Exchange.

Although the studies reviewed in this chapter have done much to identify important pieces of the larger historical puzzle, many of the pieces are yet to be uncovered. In addition, the more difficult task is understanding exactly how all of the pieces fit together. This is a step that has not been taken by the vast majority of the studies in the literature summarized here. Nearly all examine a particular event in isolation from other events, except possibly to account for other events as covariates in the empirical analysis. However, once one begins thinking of the realities of history, it is soon apparent that historical events impact other historical events in important and sometimes subtle or complicated ways. Further, there are often complex interactions between events, suggesting that the linear specifications typically assumed in studies may be inaccurate.

There are many examples of these interdependencies. For example, Europe's ability to colonize and rule the African continent depended critically on the discovery of the chincona tree in the Andes and its mass production in Asia by the British. This is because quinine, the first effective protection against malaria, is derived from the bark of the tree. Similarly, European knowledge of how to effectively process wild rubber obtained from Native Americans had important consequences for the millions of Africans that were tortured and killed in King Leopold's Congo.

Another example is the interdependence between the printing press and both the Protestant Reformation (Dittmar, 2011; Rubin, 2011) and the Atlantic trade (Dittmar,

2011). We have also seen that Catholic conflict with the Ottoman Empire helped enable the spread of the Protestant religion across Europe (Iyigun, 2008).

We have seen that the presence of the tsetse fly in Africa resulted in less intensive agriculture that did not use animals or the plough (Alsan, 2012). Because the plough was not adopted, women participated actively in agriculture, which generated norms of equality, which continue to persist today (Alesina et al. 2013). This an important explanation for the high levels of female labor force participation that is observed in Africa today.

We have seen that Africa's slave trades resulted in underdeveloped pre-colonial states (Nunn, 2008a), which in turn are associated with less post-colonial public goods provision and lower incomes (Gennaioli and Rainer, 2007; Michalopoulos and Pappaioannou, 2013).

Moving forward, the second major task for the literature to tackle is to better understand channels of causality. In the past decade, we have made significant progress empirically testing whether historical events have lasting impacts. The bulk of this survey is devoted to reviewing this evidence, which overwhelmingly shows that history does matter. What is less clear is exactly why it matters. I have reviewed here the leading candidates: multiple equilibria, cultural norms of behavior, and domestic institutions. The extent to which these mechanisms matter, and in which circumstances, is yet to be fully understood. Further, as discussed, there are also potentially important complementarities between the channels. For example, beliefs and values tend to become codified in formal institutions, which in turn feedback, affecting the evolution of these values. Complementarities between cultural traits and formal institutions are likely an important part of many instances of long-term persistence.

Overall, while much progress has been made to this point, the primary accomplishment has been in establishing the importance of studying the past for understanding current growth and development. The economic literature is increasingly coming to understand that where we are (and therefore how we best move forward) has a lot to do with how we got here.

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