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DISCUSSION PAPER SERIES

IZA DP No. 10931

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# Gender: An Historical Perspective

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JULY 2017

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## ABSTRACT

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### Gender: An Historical Perspective<sup>1</sup>

Social attitudes toward women vary significantly across societies. This chapter reviews recent empirical research on various historical determinants of contemporary differences in gender roles and gender gaps across societies, and how these differences are transmitted from parents to children and therefore persist until today. We review work on the historical origin of differences in female labor-force participation, fertility, education, marriage arrangements, competitive attitudes, domestic violence, and other forms of difference in gender norms. Most of the research illustrates that differences in cultural norms regarding gender roles emerge in response to specific historical situations, but tend to persist even after the historical conditions have changed. We also discuss the conditions under which gender norms either tend to be stable or change more quickly.

**JEL Classification:** N0, Z1, J16

**Keywords:** gender, cultural transmission, historical persistence

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## **1. Introduction**

Social attitudes toward women and their role in society show remarkable differences across countries, including those with similar institutions or economic development. Standard economic variables such as the level of development, women's education, fertility and marriage/divorce prospects, and the expansion of the service sector have been widely studied (see Goldin, 1990, for a review). Some scholars have emphasized the role played by market prices, such as the decline in child care costs (Attanasio, Low, and Sanchez-Marcos, 2008), and by technological factors such as the invention of baby formula (Albanesi and Olivetti, 2016). A recent literature has emphasized how this large variation could be the result of differences in cultural beliefs about the appropriate role of women in society (Fernandez, 2007; Fernandez and Fogli, 2009; Bertrand et al., 2015). Several new contributions have started to study the deep historical roots of these cultural differences (see Nunn, 2009, for a review).

This chapter will review the literature on the long-term historical origins of the differences in gender roles and gender gaps across societies and how they are transmitted from parents to children and therefore persist until today. We will review work on the historical origin of differences in female labor-force participation, fertility, education, marriage arrangements, competitive attitudes, domestic violence, and other forms of difference in gender norms (such as the presence of the dowry versus the bride price and differences in inheritance rules favoring women),

We will also discuss how relatively short-term historical shocks can help in understanding differences in gender roles across societies. Finally, we will discuss the conditions under which gender norms either tend to be stable or change more quickly.

## **2. Historical origin of gender roles**

In this section, we will look at seven important long-term historical determinants of gender roles: agricultural technology, language, geography, pre-industrial societal characteristics, family structures, religion, and historical shocks.

### **2.1. Agriculture and agricultural technology**

A recent literature has emphasized how differences in agricultural technology or, more simply, a long history of agriculture can have long-lasting effects on the evolution of gender-role attitudes. Alesina, Giuliano, and Nunn (2013) study the historical persistence of differences in female labor-force participation. The hypothesis for their empirical analysis comes from the seminal work of Ester Boserup (1970), in which she argued that differences in the role of women in societies originate in the different types of agricultural technology, particularly the differences between

shifting and plough agriculture. Shifting agriculture, which uses hand-held tools like the hoe and the digging stick, is labor-intensive, with women actively participating in farm work, while using a plough to prepare the soil is more capital-intensive. Unlike the hoe or digging stick, the plough requires significant upper-body strength, grip strength, and bursts of power to either pull the plough or control the animal that pulls it. Farming with the plough is also less compatible with childcare, which is almost always the responsibility of women. As a result, men in societies characterized by plough agriculture tended to specialize in agricultural work outside the home, while women specialized in activities within the home. In turn, this division of labor generated a norm that the natural place for women is in the home. This belief tends to persist even if the economy moves out of agriculture, affecting the participation of women in activities performed outside the home, including market employment, entrepreneurship, and politics.

The authors document a very strong negative correlation between traditional use of the plough and female participation in agriculture in pre-industrial societies, using the *Ethnographic Atlas*, a dataset assembled by George Peter Murdock in 1967 and containing ethnographic information for 1,265 ethnic groups covering the whole world. To investigate whether plough-based agriculture correlates with lower female participation in all agricultural tasks or only in a few (such as soil preparation), the authors report results on specific activities carried out in the field or outside the home: land clearance, soil preparation, planting, crop tending, harvesting, caring for small and large animals, milking, cooking, fuel gathering, water fetching, burden carrying, handicraft production, and trading. Their empirical analysis carefully controls for other variables that could be correlated with plough use and gender roles: the presence of large domesticated animals, a measure of economic development, the fraction of land on which the ethnic group lives defined as tropical or subtropical, and the fraction of land that is defined as suitable for agriculture. Overall, the authors find that plough use is associated with less female participation in all agricultural tasks, with the largest declines in soil preparation, planting, crop tending, and burden carrying. But they find that plough use tends not to be significantly correlated with female participation in other activities. This interpretation of the correlations is fully consistent with Boserup's hypothesis.

After looking at the correlation between agricultural technology and female participation in agriculture in pre-industrial societies, Alesina et al. (2013) study whether differences in agriculture technology still have an impact on female labor-force participation today. A correlation between female labor-force participation in agriculture and agricultural technology in the past does not necessarily imply that differences in historical agriculture technology affect female labor-force participation today. Goldin and Sokoloff (1984), for example, document that within the northeastern

United States, the low relative productivity of women and children in agriculture (and their low participation in this sector) allowed them to participate in the manufacturing sector. In this setting, initial female labor-force participation in agriculture is inversely related to subsequent participation in manufacturing, resulting in a lack of continuity of female labor-force participation over time as industrialization occurred. An interpretation based on social norms could, however, help explain long-term persistence.

At the country level<sup>2</sup>, the authors look at differences in female labor-force participation but also at two other measures that could reflect cultural attitudes and beliefs about the role of women in society: a measure of entrepreneurship (the share of firms with a woman among the principal owners) and of the presence of women in national politics (the proportion of parliamentary seats held by women). In countries with a tradition of plough use, women are less likely to participate in the labor market, own firms, and participate in national politics.<sup>3</sup>

To further limit endogeneity concerns, the authors also provide instrumental variable estimates. To construct their instrument, they exploit the variation in historic plough use that arose from differences in societies' geo-climatic conditions, which affected whether crops that potentially benefitted from the plough were cultivated. As Pryor (1985) explains, because of differences in the length of the cropping season, the amount of land required for cultivation, and the characteristics of the soil (slope, depth, rockiness, etc.), crops differ significantly in the extent to which the use of the plough improves productivity. In his study, Pryor identifies crops as being either plough-positive (cultivation greatly benefits from the plough) or plough-negative (cultivation benefits less from the plough).<sup>4</sup> The identification strategy relies on the assumption that, holding constant overall crop productivity (for which they control for) the distinction between plough-positive and plough-negative geo-climatic environments only impact gender roles through the plough). The primary concern with this strategy is that the difference between plough-positive and plough-negative environments may be correlated with geographic features that affect gender attitudes today through channels other than the

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<sup>2</sup> To show long-term persistence, Alesina, Giuliano, and Nunn (2013) look at differences in female labor-force participation, but also at beliefs about the role of women in society in 2000. To analyze contemporary female labor-force participation, they match ethnographic data to current populations using the global distribution of 7,612 language groups from the fifteenth edition of the *Ethnologue* and the global distribution of population densities from the 2000 *Landscan* database, generating a measure of the fraction of a country's ancestors who traditionally engaged in plough agriculture.

<sup>3</sup> In a companion paper (Alesina et al., 2013), the authors examine the impact of agricultural technology on fertility. They find that societies with historic plough use had lower level of fertility. The finding is consistent with the explanation that plough agriculture reduced the benefit of having children, since they were less useful in the field.

<sup>4</sup> Plough-positive crops, which typically require extensive land preparation over a large surface area and in a very short period of time, include wet rice, barley, wheat, rye, and teff. Plough-negative crops, which include crops that require little land to produce a sufficient amount of food, crops that can be grown in rocky or sloped land, and crops with seeds that easily take root (even in shallow soils), include three crops, root crops, maize, millet, and sorghum (Pryor, 1985).

plough. The authors check the robustness of their results to this concern by controlling for geographic characteristics that are potentially correlated with the suitability of the environment for plough-positive and plough-negative crops (terrain slope, soil depth, average temperature and average precipitation of locations inhabited by each country's ancestors). The IV estimates confirm the OLS results.

In addition to determining labor-force participation, differences in agricultural technology can influence social norms more broadly. Boserup (1970) indeed hints at the possibility that plough societies developed different social norms and marital arrangements compatible with a different value of women in society. Her idea was not new, as anthropologists have long posited that the origins of household formation rules relate to both technology and productivity. According to Aberle (1961), “the origins of matrilineal systems are probably to be sought in technology, division of labour, types of subsistence activities and the ecological niches in which these activities occur.” (p. 725). Goody (1976) has linked the demand for wives to the productivity of women in agriculture: in female farming communities, a man with more than one wife can cultivate more land than a man with only one wife. Therefore polygamy is expected to be more common in societies with shifting cultivation. Finally, in societies in which women do most of the agricultural work, it is the bridegroom who must pay bride-wealth, while in societies in which women are less engaged in agriculture, marriage payments usually come from the bride's family.

To explore this hypothesis, Giuliano (2015) looks at the correlation between historical plough use and whether the dowry is the most prevalent mode of marriage, whether the inheritance rule in a society is matrilineal, and if polygamy is prevalent<sup>5</sup>. She finds that in societies that used the plough, (a) inheritance rules appear to be less favorable to women—as indicated by the fact that matrilineality is less common, (b) there is less polygamy, and (c) a dowry is paid by the bride's family. After establishing a correlation for the past, the author shows that differences in agricultural technology have a persistent effect on social norms, lasting until today. Using data from the OECD Gender, Institutions and Development Database, she finds that societies that historically used the plough are characterized by higher parental authority granted to the father, by inheritance rules that favor male heirs, and by less freedom for women to move outside the house. She also finds that, in these societies, women are more likely to wear a veil in public and polygamy is less accepted or illegal.<sup>6</sup>

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<sup>5</sup> Boserup (1970) explains the lack of polygamy in plough-farming societies in terms of access to land, saying that polygamy occurs in long-fallow agricultural societies with communal land tenure and land available for expansion, where “an additional wife is an additional economic asset which helps the family to expand its production” (p. 38).

<sup>6</sup> Giuliano also looks at differences in gender attitudes using the Global Gender Gap Index, a comprehensive indicator introduced by the World Economic Forum. The index benchmarks national gender gaps on economic, political, education,



Various reasons could explain the persistent effect of differences in agricultural technology on gender outcomes today. For example, underlying cultural traits may be reinforced by policies, laws, and institutions which affect the benefits of beliefs about gender inequality. A society with traditional beliefs about gender inequality may perpetuate these beliefs by institutionalizing unequal property rights, voting rights, and so on. Beliefs about gender inequality may also cause a society to specialize in capital-intensive industries, which in turn decreases the relative cost of gender inequality norms, thereby perpetuating them. A third explanation is that cultural beliefs are inherently sticky. Alesina, Giuliano, and Nunn (2011, 2013) present evidence consistent with this last interpretation. Looking at children of immigrants in the United States and Europe, they test for a relationship between traditional plough agriculture and cultural beliefs while holding constant the external environment. They do find a high degree of persistence in cultural traits.

Additional evidence on how variation in agriculture could affect labor productivity and, subsequently, gender differences comes from Qian (2008). She studies economic reforms in China in the late 1970s that made growing cash crops more lucrative. During the Maoist era, centrally planned production targets focused on staple crops. In the early reform era (1978-1980), reforms increased the return to cash crops, which included tea and orchards. Men and women specialize in the production of different crops: women have a comparative advantage in picking tea leaves, which are delicate and grow on short bushes, whereas men, due to their height and strength, specialize in picking fruit from trees. Qian (2008) compares the impact of the economic reforms in tea-growing regions, where female labor productivity, especially, should have risen, and in regions specializing in fruit orchards, where male labor productivity should have risen most. In tea-growing regions, the reforms led to fewer so-called “missing girls,” consistent with families having fewer sex-selective abortions of female fetuses or engaging in less neglect and infanticide of girls. The mechanism Qian puts forward is that when women’s share of household income increases, their gender preferences have a higher weight in household decision making.

Rather than looking at differences in type of agriculture, Hansen et al. (2015) make a more general point about the relevance of agriculture, hypothesizing that societies with long histories of agriculture have less gender equality as a consequence of more patriarchal values and beliefs regarding the proper role of women in society. Their research is motivated by the idea that patriarchy originated in the Neolithic Revolution—the prehistoric transition from a hunter-gatherer to an

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and health criteria and is designed to measure gender-based gaps in access to resources and opportunities in individual countries rather than the actual level of the available resources and opportunities in those countries. Differences in historical agricultural practices are strongly correlated with a global measure of gender gap, as summarized by this index.

agricultural society—and that patriarchal values and beliefs have persisted and become more ingrained in countries with long histories of agriculture. Agricultural societies were more gender-biased than hunter-gatherer societies. Population growth and land scarcity made cultivation of food more labor-intensive, which created “a premium on male brawn in plowing and other heavy farm work” (Iversen and Rosenbluth, 2010, p. 32). This led to a division of labor within the family, in which the man used his physical strength in food production and the woman took care of child rearing, cooking, and other family-related duties. This increased the male’s bargaining power within the family, which, over generations, translated into norms and behavior which shaped cultural beliefs about gender roles.

An alternative mechanism builds on the work by Iversen and Rosenbluth (2010), who emphasize the task division within the household. They note that evidence suggests that hunter-gatherers societies were characterized by more independent women as compared to agricultural societies. First, some evidence from present-day hunter-gatherers indicates that the gathering activity of women provides more than half of the daily caloric intake of their communities. Second, meat, as provided by male hunting activity, may not have been strictly necessary for survival; gathered food served as an independent and more secure source of calories.

Using a world sample, a European regional sample, and a sample of children of immigrants living in the United States, the authors find a negative association between the number of years that a country had been an agrarian society in 1500 CE and contemporary measures of gender-equality, including female labor-force participation, number of years since women gained suffrage, and percentage of seats in parliament held by women.

## **2.2. Language**

Another interesting aspect of the long-term persistence of gender roles is the relation between grammatical gender-marking and female participation in the labor market, the credit market, land ownership, and politics (Gay et al., 2013). The grammatical features of a language are inherited from the distant past and the gender system is one of the most stable linguistic features, surviving for thousands of years. Gay et al. (2013) broadly follow Whorf (1956): “[One is] inclined to think of language simply as a technique of expression, and not to realize that language first of all is a classification and arrangement of the stream of sensory experience which results in a certain world-order, a certain segment of the world that is easily expressible by the type of symbolic means that language employs.” (p. 55).

In linguistics, a grammatical gender system is defined as a set of rules for agreement that

depends on nouns of different types.<sup>7</sup> Gay et al. (2013) rely on the *World Atlas of Linguistic Structures*, the most comprehensive data source of grammatical structures, and use four very stable grammatical variables related to gender: the number of genders in the language, whether the gender system is sex-based, rules for gender assignment, and gender distinctions in pronouns. The authors construct the Gender Intensity Index by summing these features for the most commonly spoken language in a country.

Using cross-country and individual-level data, they find that women speaking languages that more pervasively mark gender distinctions are less likely to participate in economic and political activities and more likely to encounter barriers in their access to land and credit. The authors also investigate a sample of immigrants living in the United States—that is, all facing the same institutional and labor-market environment—and find consistent results.

Galor et al. (2016) also study the emergence of sex-based gender systems in languages and their effects on behavior. They advance the hypothesis and establish empirically that variation in caloric suitability for plough-positive/negative crops affects the emergence of grammatical gender in a language.<sup>8</sup> They also explore the relationship between linguistic and cultural traits and test whether their coevolution contributed to the stability and persistence of cultural characteristics and their lasting effect on gender differences. Their hypothesis is that pre-industrial characteristics that were conducive to the emergence and progression of complementary cultural traits triggered an evolutionary process in language structures that has fostered the transmission of these cultural traits. In a society characterized by distinct gender roles and by gender biases, grammatical gender that fortified the existing social structure and cultural norms may have emerged and persisted over time. Moreover, agricultural characteristics that were complementary to the use of the plough and therefore to distinct gender roles in society may have fostered the emergence and prevalence of grammatical gender. Galor et al. (2016) test this hypothesis in two stages. In the initial stage, the empirical analysis explores the origins of language structures, focusing on the geographical roots of sex-based grammatical gender systems. In the second stage, the empirical analysis examines the effects of language structures on contemporary economic outcomes. The authors show that second-generation female immigrants who speak a language that has grammatical gender have a lower probability of attending college. Although the authors look at immigrants to show that there is cultural persistence over time, their identification strategy is an improvement over previous papers. Since they identify immigrants using the language

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<sup>7</sup> These are normally based on biological sex, but can also be based on social constructs such as age or social status.

<sup>8</sup> Historical caloric suitability measures the potential daily calories from cultivating the crop with maximal caloric yield during the pre-1500CE era in that specific location.

spoken at home, they can control not only for country-of-destination fixed effects but also for country-of-origin fixed effects, allowing a better identification of the importance of historical characteristics (as represented by language) to female outcomes today.

### 2.3. Geography

A long-term determinant of differences in gender roles can be found in geography. In a fascinating paper, Carranza (2014), having pointed out that soil texture, which varies exogenously, determines the workability of the soil and the technology used in land preparation, uses this as a lens to look at differences in female labor-force participation in India. She distinguishes between loamy and clayey soil textures<sup>9</sup>. Deep tillage, possible in loamy but not in clayey soil textures, reduces the need for transplanting, fertilizing, and weeding, activities typically performed by women (Basant, 1987).<sup>10</sup> In areas where deep tillage is required, the lower demand for female labor relative to the demand for male labor is expected to have a negative impact on the perceived relative value of girls to a household (Boserup, 1970).

Carranza (2014) finds that soil texture explains a large part of the variation in women's relative participation in agriculture. The author goes further and examines the impact of geography on the infant sex ratio, perhaps the most extreme indicator of gender-based discrimination. Because relatively smaller female labor contributions in loamy areas make girls relatively more costly, the ratio of girls to boys will be negatively related to the difference between the fractions of loamy and clayey soils. Sex ratios and female labor-force participation in India today show a large geographical heterogeneity, even within the same state and cultural region. These differences within the same state are not driven by alternative mechanisms, including cultural, social, economic, or policy variables (Dyson and Moore, 1983; Agnihotri, 1996).

Carranza (2014) estimates that soil texture explains 62 percent of the within-state variation in female agricultural labor-force participation and 70 percent of the variation in the sex ratio for zero- to six-year-olds. A 10-percentage-point greater fraction of loamy relative to clayey soils is associated with a 5.1-percent lower share of female agricultural laborers and a 2.7-percent lower ratio of female to male children. The relationship between soil texture, relative female labor-force participation, and the ratio of female to male children did not change significantly between 1961 and 2001.

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<sup>9</sup> According to the proportion in which small, medium, and large particles are combined in the soil, soil texture can range from very fine clay to medium loam to very coarse sand. Finer soils have higher particle density and lower pore space than coarser soils. For that reason, they are heavier, tighter and more difficult to work.

<sup>10</sup> It is interesting to note that the depth of tillage does not determine the gender-based division of labor. The strength required in land preparation is a function of the depth of tillage and the resistance offered by the soil, which are inversely related. Deep and shallow tillage have similar strength requirements. Men always prepare the land.

## **2.4. Pre-industrial societal characteristics**

Pre-industrial social characteristics can have persistent effect on gender roles. Among the most studied are the practice of matrilineality, modes of residence after marriage, and the dowry versus the bride price.

### **2.4.1. Matrilineality**

Matrilineality refers to the fact that lineage and inheritance are traced through female members. This can affect the residential patterns of married couples (in matrilineal societies, it is more common for the married couple to reside in the wife's natal home with her mother) and the inheritance of property (with property handed down from women to their daughters and granddaughters and from men to their sister's sons).

Matrilineality can improve women's outcomes for a variety of reasons. Women in matrilineal societies have greater access to land and other assets, either through direct inheritance and ownership or through greater access to the possessions of the large matriclan. This makes them less reliant on their husbands and less vulnerable in the case of a husband's death. Women in matrilineal systems have continued kin support, either by living with or near their own family after marriage or through ongoing connections maintained by matrilineal kinship. They are also likely to have greater intra-household bargaining power vis-à-vis their husbands and have greater exit options than patrilineal women. These differences are amplified when a couple resides matrilocally and a woman is surrounded by her family.

The difference between matrilineal and patrilineal kinship systems have wide implications for gender roles, including differences in competition (Gneezy et al., 2009), spatial ability (Hoffman et al., 2010), risk aversion and contribution in dictator games (Gong, Yan, and Yang, 2012, 2015), political participation (Gottlieb et al., 2016), and social interactions between family members (Lowes, 2016).

Gneezy et al. (2009) study how competitiveness among women varies between a patriarchal society—the Maasai in Tanzania—and a matrilineal and matrilocal society—the Khasi in northeast India. Amongst the Maasai, the most important distinctions between men are age-based and almost all wealth is in cattle. The age structure prevents men from marrying until they are roughly 30 and polygamy is the most common form of marriage. Therefore, the average Maasai woman is married to a much older man who has multiple wives.

For the Khasi, inheritance and clan membership always follow the female lineage. Family life is organized around the mother's house, which is headed by the grandmother, who lives with her unmarried daughters, her youngest daughter, her youngest daughter's children, and any unmarried, divorced, or widowed brothers and sons. The youngest daughter never leaves and eventually becomes

the head of the household; older daughters usually form separate households adjacent to their mother's household. Furthermore, a woman never joins the household of her husband's family and a man usually leaves his mother's household to join his wife's household. Sometimes a man practices duolocal marriage, living in both his mother's and his wife's households, but even when residing with his wife's family, he spends much of his time in his mother's or sisters' households.

These two societies' differences in societal structure are reflected in substantial differences in gender competition in an experimental setting. Maasai and Khasi subjects were given a choice to either partake in a ball-throwing game without competition or to compete with an anonymous person from the same village playing the same game, with the winner receiving all the benefits.<sup>11</sup> Among the Maasai, 50 percent of men chose to compete versus only 26 percent of women, a result similar to that in Western cultures, where patrilineal systems were historically more common. The result is reversed in the matrilineal society, where women were more competitive than men: 54 percent of Khasi women chose to compete versus only 39 percent of Khasi men.

These results shed light on the debate on whether the underlying sources of the observed gender differences in competition are attributable to nature or nurture or some combination of both. One possibility is that differences in competition are primarily attributable to the genetic differences between the sexes. An alternative hypothesis is that gender differences are culture-specific—determined by the different social and economic functions of men and women in a society. The fact that women in different environments show different propensities to compete rules out the possibility that women are naturally less competitive. Gneezy et al. (2009) consider their results broadly in line with the importance of nurture. This explanation is consistent with Boyd and Richerson (2005), who argued that social learning is the most important channel of cultural transmission compared to explicit training or socialization; individuals choose to copy successful individuals as much, if not more, than common individuals. This type of learning is called prestige-based learning. Khasi women would therefore decide to imitate older women in their household or successful women in their village. The Khasi institutions of matrilineal residence and matrilineal inheritance, in other words, could carry out the role of prestige-based learning in generating cultural transmission of differences in gender roles.

Hoffman et al. (2011) use a research approach similar to Gneezy et al. (2009) to study how differences in societal structure can influence a gender gap in spatial reasoning (measured by the time needed to solve a puzzle), a skill that has been shown to correlate with success in engineering courses as well as the decision to major in physical sciences (Humphreys et al., 1993). Spatial reasoning is

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<sup>11</sup> In the game without competition, subjects had 10 attempts and received one dollar for each basket scored. In the game with competition, subjects received three dollars for each basket in a win, but no money at all in a loss.

measured by the time needed to solve a puzzle. Hoffman et al. (2010) show that women's disadvantage disappears when they move from a patrilineal society (the Karbi) to a matrilineal society (the Khasi). Men take 36.4 percent less time than women in the patrilineal society, but are no faster than women in the matrilineal society.

Gong et al. (2012, 2015) study the importance of belonging to a matrilineal society in contributions in a dictator game and in risk aversion. The authors collect evidence on behavior for the matrilineal Mosuo and the patrilineal Yi societies.<sup>12</sup> The authors find that among the Mosuo, men contribute more in dictator games than women do—a pattern opposite to that observed in Western societies—whereas there are no gender differences in the Yi society. Men are less risk-averse in both the matrilineal Mosuo and the patriarchal Yi, with the gender gap being smaller among the Mosuo, and the Mosuo are less risk-averse than the Yi in general. These differences, according to the authors, could be the result of different family structures. The Mosuo have bigger families with more adult members; in case of disability, a Mosuo woman has her sisters, brothers, mother, and mother's siblings all living in the same household to take care of her children. A Yi woman, on the other hand, does not have such security; in case of invalidity, the next female caretakers in line for one's children will be her sisters-in-law, who are biologically unrelated to her children and live in a separate household. Such differences in family structure can be important to explaining the ethnic difference in gender differences. The ranking of education exactly mimics the ranking in risk aversion. Yi women have the least education and the gender difference in education is bigger for the Yi than for the Mosuo. Mosuo men take the least economic responsibility for the household and also are the least risk-averse.

Gottlieb et al. (2016) compare the civic and political behavior of men and women in matrilineal groups to those in patrilineal groups. They match data on political opinions from the *Afrobarometer* to information about the historical social structure of each ethnicity from the *Ethnographic Atlas*. Their cross-country analysis finds that the gender gap in political engagement, political participation, and civic participation is significantly smaller in matrilineal groups than in patrilineal ones.

In order to understand the mechanisms driving the results, the authors use data on Malawi, a country with both patrilineal (Mpezeni Ngoni and Tumbuka) and matrilineal ethnicities (Chewa,

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<sup>12</sup> In the Mosuo society, agriculture is the main form of subsistence, the head of the household is traditionally female, and women are in charge of economic decision-making in the household, while men engage more in activities beyond agriculture and the household. The Mosuo have the unique feature of “walking marriage,” in which the man and the woman in a relationship stay at their mothers' households aside from night visits at the woman's, without any economic obligation to each other. Children are raised collectively by the woman's household without the father. The Yi people were traditionally slash-and-burn farmers and their society is structured by a patrilineal exogamous lineage called *jiazhhi*. Men start their own households once married, except for the youngest son. Women have no right to inherit any property, but they are the primary work force and thus share the everyday decision-making responsibility with men in the household. Men are in charge of the most important household decisions.

Lomwe, Mapeza Ngoni, and Yao) and which presents variation in access to land and matrilocal residence, allowing the authors to investigate whether it is the short-term access to resources or the long-term expectation of resource entitlements that mostly determines female empowerment.<sup>13</sup>

After documenting differences in matrilocality and land inheritance, the authors study the effects of these factors on women's outcomes. They use three indicators for women's empowerment: marriage exit options, social independence, and financial autonomy. Marriage exit options are measured by the probability that a woman can say that she can leave her husband for a variety of reasons. Social independence is measured using two questions asking whether it is acceptable for a woman to go to the market or to the clinic without her husband's permission. Financial autonomy is measured by a question asking whether the respondent had money of her own that she could spend without her husband's knowledge. Matrilineal women were more likely to support women leaving their husbands and having financial autonomy, but they were less likely to support women's social independence.

The authors examined two aspects of matrilineality: land inheritance and matrilocal residence. Both are associated with more support for women leaving their husbands and greater financial autonomy for women, but less support for women's social independence. Between the two, however, land inheritance appears to be the main determinant of women's empowerment. In addition, the negative results on social independence disappear when the authors control for wealth and education, variables that vary substantially between the two groups.

As a final step, the authors investigate whether it is short-term access to resources or longer-term expectation of resource entitlements that most affects female empowerment. The authors find that long-term expectation of land entitlement and security has a stronger effect than simply owning land. Therefore, a history of less gender disparity in access to resources over generations may affect present outcomes, having reduced gender differences over time.

While the study constitutes a systematic, cross-national study on the importance of matrilineal kinship on the status of women, its nature remains descriptive. The identification relies on the

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<sup>13</sup> The survey did not ask respondents whether they observed matrilineal or patrilineal descent, but collected information about where they lived after marriage (in the wife's home village, the husband's home village, or another village) and whether a respondent personally owned land and, if so, how he or she had received it (inherited from own kin, inherited from spouse's kin, purchased, or received from a chief). In terms of land ownership, men report owning land at significantly higher rates than women among both the Tumbuka and the Mpezezi Ngoni. Women in matrilineal and patrilineal ethnic groups were equally likely to receive land from the chief or to have bought land, but in matrilineal groups, women were more likely to receive land from their own kin than from their husband's kin. The pattern was reversed for women in patrilineal groups. In terms of residence after marriage, a majority of the matrilineal Yao and Lomwe practices matrilocal residence, but only 41 percent of the Mapezo Ngoni and 25 percent of the Chewa do. Of the patrilineal Tumbuka and Mpezezi Ngoni, only a small fraction (around 10 percent) practices matrilocal residence.



assumption that matrilineality kinship are exogenous to the outcomes of interest. However, it may be that more gender equitable ethnic groups were more likely to adopt or retain matrilineality.

Lowes (2016) compares how matrilineal and patrilineal kinship systems affect intra-household cooperation. In matrilineal societies, the wife maintains close relations with her own lineage, rather than being incorporated into her husband's lineage. This can translate into less altruism as a result of conflicting allegiances within the household. In addition, in matrilineal societies, women maintain greater control over their children since they belong to her lineage, not to her husband's lineage. Having the children as part of a woman's lineage may increase the value of her outside option, increase her relative bargaining power, and reduce spousal cooperation. To test these hypotheses, Lowes (2016) collects data from 320 matrilineal and patrilineal couples in the Democratic Republic of the Congo, approximately 40 percent of whom were from a matrilineal ethnic group. She finds that matrilineal individuals (both men and women) cooperate less with their spouses in a household public goods game and that these results are driven by opportunities to hide income. She also finds that when matrilineal individuals are paired with their spouses, they experience greater stress responses than patrilineal individuals do, as measured by an increase in skin conductance. In addition, she also finds that matrilineal women are better able to enact their preferences. Children of matrilineal women are healthier and better educated than children of patrilineal women. Finally, matrilineal individuals give less money to their spouses than patrilineal individuals do in a dictator game. Whereas patrilineal individuals are more generous with their spouses than they are with strangers, matrilineal individuals treat their spouses much as they treat strangers. Overall, matrilineal individuals are less altruistic toward their spouses because they maintain strong allegiances to their own lineage.

#### **2.4.2. Matrilocality**

Whereas most studies look at matrilineal systems in terms of inheritance along with residence choices after marriage, others investigate patrilocality in isolation, showing that alone it can give rise to differences in gender roles. In northern India, where the social structure is more patrilocal than in the south, gender inequality is more pronounced (Jayachandran, 2015). The mechanism behind it is that when a woman gets married, she ceases to be a member of her birth family and joins her husband's family. Under this system, parents gain more returns to investment in a son's health and education because he will remain a part of their family, whereas a daughter will physically and financially leave the household upon marriage.

Levine et al. (2003) study how investment in daughters varies based on residence after marriage. When parents know that their daughters will leave to live in other villages, their private return to investment in their daughters' health or education might be expected to be lower than their

private return to investment in their sons. Levine et al. (2003) study the virilocality hypothesis using data from Indonesia, a country where there is considerable variation in post-marriage residence. Indonesian groups can practice virilocality, ambilocality (residence with either set of parents), uxoricolocality (residence with bride's family), and neolocality (residence with neither set of parents). The authors did not find a strong correlation between virilocality and differential investment in daughters. They attribute that lack of results to the fact that residential norms are not very tight in Indonesia. The other interpretation is that it is a combination of norms—of which virilocality is only one—that reduces investment in daughters.

Bau (2016) studies the interaction of residential practices with policies and how this can affect gender differences. She shows that the complementarity between the transmission of culture and the education of one's child means that the introduction and expansion of pension plans will crowd out both educating children targeted by the norm and the transmission of the norm to the next generation. She finds that the establishment of pension plans in Ghana and Indonesia and the expansion of a plan in Indonesia confirm this hypothesis. In Indonesia, matrilocal daughters who are exposed to the pension plan for longer receive less education and are less likely to live with their parents after marriage. In Ghana, patrilocal sons show the same pattern.

#### **2.4.3. The dowry versus the bride price**

Another factor that can vary substantially across cultures and have important effects on gender differences in social preferences is the presence of the dowry versus the bride price. Dowry is a payment that a bride's parents make to the couple at the time of marriage. A bride price is a transfer at the time of marriage from the groom and/or his family to the bride's family. According to Boserup (1970), these social norms emerged in societies based on their type of agriculture: where women played a lesser role in agriculture, the dowry prevailed. Evidence on the impacts of the dowry system on women's welfare is mostly anecdotal and points to a pro-male bias. In India, the prospect of paying dowry is often cited as a key factor in parents' desire to have sons rather than daughters (Das Gupta et al., 2003). The presence of dowry also reduces investment in human capital and results in newly married women sometimes being the victims of violence or, worse, dowry deaths as punishment for the dowry being deemed inadequate by the groom (Bloch and Rao, 2002).

Ashraf et al. (2016) study how the cultural practice of bride price influences the efficacy of policies aimed at increasing education. Using the Sekolah Dasar Inpres school building program in Indonesia, where 61,807 primary schools were constructed between 1974 and 1980, the authors study its impact on girls' schooling. They first confirm (similarly to Breierova and Duflo (2004)) that the program had no overall effect on education. However, they uncover an important heterogeneity: a

positive impact of the program on female education among girls from ethnic groups that traditionally engaged in bride price payments. The authors find similar effects when studying a similar school expansion program in Zambia. The bride price provides an additional reward to parental investment in a daughter's education, a reward that is absent for cultures lacking the bride price. A higher bride price is therefore a moral obligation on the part of the groom's family to compensate the bride's family for their greater educational investment in their daughters.

#### **2.4.4. Other pre-industrial societal characteristics**

Many of the studies on the relevance of historical societal characteristics are based on experimental evidence, therefore raising the question of external validity. To what extent can results from games played with small groups be used to derive general conclusions about these important gender issues? A different approach is then to look at survey evidence and control for other determinants of women's outcomes. Alesina et al. (2016) follow this second approach and use comprehensive evidence from Africa to study the role of pre-industrial societal characteristics on violence against women. To study the long-term determinants of domestic violence, they link individual-level data from contemporary Africa to historical pre-industrial characteristics obtained by Murdock's *Ethnographic Atlas*. More specifically, the authors look at productive activities prior to industrialization (agriculture, gathering, hunting, fishing, and animal husbandry); alternative types of settlement (sedentary, nomadic, compact, and isolated); modes of marriage (the dowry versus the bride-price) and living arrangements after marriage (such as virilocality); the presence of endogamy (the custom of marrying exclusively within a specific ethnic or social group); the prevalence of the stem family (an arrangement in which two generations cohabit); polygyny (a form of plural marriage in which a man is allowed to have more than one wife); and differences in land inheritance (societies in which gender equality in land inheritance was more prevalent versus matrilineal descent systems, in which a person's descent was traced through the mother and her maternal ancestors and a man's property was inherited by his sister's sons rather than by his own children and primogeniture).

The authors find that ancestral characteristics which led to different economic roles for women determine cultural attitudes that persist even today, when the initial conditions which generated them have evolved or disappeared. In societies in which women were actively involved in subsistence activities (for example, gathering), women's role is more highly regarded and violence against women is lower today. On the contrary, plough-based societies, or societies whose form of subsistence was fishing or hunting, have a higher level of violence against women today; in these societies women have less bargaining power because they do not contribute to the family income. Regarding the role of different types of settlement, the authors find that women whose ancestors lived

in nomadic and isolated settlements are exposed to a higher probability of violence today and are more prone to justify it. Men whose ancestors lived in compact settlements are less likely to justify abuses against their wives. One interpretation of these findings is that nomadic and isolated settlements were less economically-developed communities; another is that societal protection of women is more difficult within these types of living arrangements.

Past societal norms, too, are related to domestic violence today: women in societies formerly characterized by bride-price have a lower probability and lower intensity of violence today. Alesina et al.'s (2016) interpretation is that when men had to pay to marry their wives, they attributed a greater value and cared more about them, which is reflected in less domestic violence. They also find that endogamous societies (in which members marry within the same ethnic group) have more domestic violence, perhaps because beating a wife from a different ethnic group may bring about retaliation across ethnicities. They also find that when the stem family was prevalent, both men and women tend to be less favorable to violence. They do not find any effect of polygynous marriage on violence. On the one hand, to the extent that having more than one wife indicates a lower consideration of women's status, one would expect to see polygyny associated with more violence. On the other hand, some of the motives that typically instigate violence against one's wife may be alleviated by the presence of other wives. For example, if the inability of the first wife to deliver a son is compensated for by a second wife who delivers one, the husband may be less likely to beat the first wife. Virilocal residence does not have any effect on domestic violence.

## **2.5. Differences in historical family structures**

Among the historical societal characteristics, family structure has been very important in determining gender roles. Alesina and Giuliano (2014) show the historical persistence of family structures from medieval times until today and the impact of differences in family structure on various economic outcomes, including differences in gender roles.

In societies with strong family ties (Castles, 1995; Ferrera, 1996; Esping-Andersen, 1999; Korpi, 2000), family solidarity is based on an unequal division of family work between men and women—what has been called the “male-breadwinner hypothesis,” with men working full-time and women dedicating themselves to housework. Weak family ties, in contrast, will foster egalitarian gender roles with men and women participating equally in employment and housework.

Alesina and Giuliano (2010) measure the strength of family ties by combining three questions from the *World Values Survey*, capturing beliefs on the importance of the family in a person's life, the duties and responsibilities of parents and children, and the importance of love and respect for one's parents. This combined measure is used to study the effect of the strength of family ties on a variety

of outcomes, including female labor-force participation and household production. They find that societies with strong family ties have greater home production, mostly done by women, and lower female labor-force participation. They are also more traditional in terms of gender roles.

Similarly, Algan and Cahuc (2007) show that differences in family culture can explain lower female employment and Giavazzi et al. (2013) find that culture matters for women's employment rates and for hours worked. Alesina and Ichino (2009) provide an in-depth analysis of the relevance of family ties on economic outcomes with respect to Italy. Bertocchi and Bozzano (2015) investigate the determinants of the educational gender gap in Italy with a primary focus on the potential influence of family structures. They use data from the 1861-1901 period immediately following the country's unification. Their main dependent variable is the ratio of female to male enrollment rate in upper primary schools. They measure two aspects of family structure: residential habits (nuclear versus complex families) and inheritance rules (equal division versus primogeniture). They find that the most robust driver of the education gender gap was family structure, with a higher female-to-male enrollment ratio being associated with nuclear residential habits and equal division of inheritance.

Tur-Prats (2016) looks at the relationship between traditional family patterns (stem versus nuclear) and intimate-partner violence. Stem families are those in which one child stays in the parental household with spouse and children so that at least two generations live together. In these families, one son inherits all the land and remains in the parental home with his wife to continue the family line. In nuclear families, all children receive an equal share of the inheritance when leaving the parental home to start their own independent households.

Territories where the stem family was prevalent currently exhibit lower rates of domestic violence and of gender equality. The relationship between family structure and domestic violence or gender roles could be explained by the fact that the co-residence of the wife with other women reduced the burden of household work, freeing up her time for non-domestic work. This allowed a more productive role and a larger contribution to family subsistence.

To measure intimate-partner violence, the author uses data from three cross-sectional surveys of violence against women in Spain, conducted in 1999, 2002, and 2006. Women were asked whether they had encountered any of 26 situations which are related to domestic violence. To further explore the cultural transmission channel, Tur-Prats (2016) uses data from the *World Values Survey* for Spain, finding that territories that had a stem-family tradition in the past currently exhibit more gender-equal attitudes than those with a nuclear-family tradition.

Data on intimate-partner violence are linked to historical measures of family type, given by the average number of married and widowed women per household at the province level in 1860. A

unique source of exogenous variation based on the Christian conquest of the Iberian Peninsula is used as an instrument for family types. The so-called Reconquista was an almost-eight-century-long period (722-1492) during which several Christian kingdoms took control of significant parts of the Iberian Peninsula from Islamic rulers and repopulated them. Because the stronger and more centralized monarchies in the west of Spain had an interest in restricting the development of powerful landholding families, they introduced compulsory sharing of inheritance among all children, which led to nuclear families. The eastern kingdoms, on the other hand, had a more powerful feudal nobility, which wanted to maintain its landholdings intact through indivisible inheritance, which led to stem families. The instrumental variables results are consistent with the original findings.

## **2.6. Religion**

Since Max Weber, there has been debate on the impact of religion on people's economic attitudes. Religion has, in particular, a profound impact on attitudes toward gender roles. Guiso, Sapienza, and Zingales (2003) study the relevance of religion using individual-level data from the *World Values Survey*. As measures of attitudes toward women, they use responses to a variety of questions ranging from who should get a job first—a man or a woman—when jobs are scarce; whether men should have priority in obtaining university education; and whether both men and women should contribute to household income. Religious people and active churchgoers are less sympathetic to women's rights and the effect is twice as strong for Muslims as for any other religion.

The influence of religion on gender roles has also been explored by Algan and Cahuc (2006), who show that Catholics, Orthodox Christians, and Muslims are more prone to embrace the traditional male breadwinner conception than Protestants and atheists. Esping-Andersen (1990) also associates a conservative view of women and the family with Catholic countries, while Bertocchi (2011) shows that Catholicism was negatively associated with the introduction of woman suffrage in Italy from 1870 to 1930.

Two interesting papers take a historical perspective in looking at the effect of religion on gender differences: one in the context of the Protestant Reformation (Becker and Woessmann, 2008) and one in the context of missionary activity in Africa (Nunn, 2014).

Becker and Woessmann (2008) provide evidence that Protestantism was a distinctive driving force in the advancement of female education in Prussia. Martin Luther explicitly urged, solely for religious reasons, that girls as well as boys be able to read the Gospel. The authors use data on school enrollment from the Prussian Population Census in 1816 at the level of counties and towns to show that a larger share of Protestants in a county or town was indeed associated with a larger share of girls in the total school population. Instrumental variable estimates, in which each county's and town's

share of Protestants is instrumented by its distance to Wittenberg, also suggest that the effect of Protestantism can be causally interpreted. The finding that Protestantism was one factor that helped to reduce the educational gender gap in Prussia is confirmed when using county-level data on the gender gap in adult literacy in 1871. The effect of Protestantism is still visible as recently as 1970: a higher share of Protestants in the population is associated with a higher gender parity index in years of education in 1970.

Nunn (2014) uses information on the location of Catholic and Protestant missions during Africa's colonial period to investigate whether Protestant and Catholic missionaries differentially promoted the education of males and females. He uses data on 17 countries from the *Afrobarometer* and links the reported information about the ethnicity of each respondent to test whether having ancestors living closer to missions during the colonial period increased that ethnicity's educational level.

While he finds that both Catholicism and Protestantism had a long-run impact on educational attainment, the impact by gender was very different. Protestant missions had a large positive long-run impact on the education of females and a very small impact on the long-run education of males. In contrast, Catholic missions had no long-run impact on the education of females, but a large positive impact on the education of males. These findings are consistent with the Protestant belief that both men and women had to read the Bible to go to heaven. The evidence is also consistent with the arguments of Woodberry and Shah (2004) and Woodberry (2009) that because Protestant missionary activity was open to educating minorities and women, it had a particularly positive effect for these groups.

## **2.7. Natural experiments in history**

Historical shocks can alter the relative position of women in a society (for example, by increasing their relative income due to the appearance of a specific economic activity or by altering the sex ratio in the population). These shocks can therefore alter the prevailing views about the natural role of women in society. If new beliefs about the role of women persist and are transmitted across generations, a temporary shock can affect gender outcomes in the long run.

Teso (2016) exploits the demographic shock generated by the transatlantic slave trade in Africa between the fifteenth and nineteenth centuries. Male slaves outnumbered females, as they were preferred by plantation owners in the New World for their strength. This led to abnormal sex ratios in the areas from which slaves were taken: in those most affected, historical estimates suggest the presence of as few as 40-50 men per 100 women (Thorton, 1980). This demographic shock had an impact on the role of women, who had to take up traditionally male work (Manning, 1990). Although

sex ratios reverted back to the natural level shortly after the end of the slave trade, the impact of this historical event on the role of women was long-lasting because cultural beliefs and societal norms had been affected by it. To test this theory, Teso (2016) matches *Demographic and Health Surveys* data on 21 sub-Saharan countries with ethnicity-level data from Nunn and Wantchekon (2011) on the number of slaves taken during the slave trade. Exploiting variation in the degree to which different ethnic groups were affected by the trade, he shows that women whose ancestors were more exposed to the slave trade are today significantly more likely to be in the labor force and to be employed in a higher-ranked occupation. The author also finds that women belonging to ethnic groups that were more severely hit by the slave trade are today more likely to participate in household decisions and to have lower fertility.<sup>14</sup>

The slave trade also affected other types of social norms. Dalton and Leung (2011) and Edlund and Ku (2011) examine the hypothesis that the severe imbalance in sex ratio caused by the transatlantic slave trade altered beliefs about the acceptability of polygyny. Examining variation across ethnicities (Dalton and Leung, 2011) and countries (Edlund and Ku, 2011), these studies show that a history of the transatlantic slave trade is associated with a greater prevalence of polygyny today.

Wars are another shock that could permanently change gender roles in societies. Historians have suggested that, during World War II, the high mobilization of men in the United States had a strong impact on gender roles (Chafe, 1972). Goldin and Olivetti (2003), Acemoglu et al. (2004), and Fernandez, Fogli, and Olivetti (2004) use exogenous variation in mobilization rates across states and find a persistent effect of the war on female labor-force participation. Fernandez, Fogli, and Olivetti (2004) find that this effect operates through the marriage market.

Campa and Serafinelli (2016) document how more equal gender-role attitudes emerged in state-socialist regimes. They exploit the postwar imposition across Central and Eastern Europe of state-socialist regimes that promoted women's economic inclusion. The authors use two sets of evidence. In the first part of the paper, they use data from Germany<sup>15</sup> and compare attitudes toward work in the sample of women who, before German reunification, had lived in East Germany with

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<sup>14</sup> To show that the effect of the slave trade on gender roles was the result of the biased sex ratio, the author looks at the effect of the Indian Ocean slave trade (which was not biased toward men) and find no effect. To rule out another possibility—that places that were more affected by the transatlantic slave trade developed markets and local institutions that led to higher female labor-force participation—the author compares individuals of different ethnicity who currently live in the same village or in the same city neighborhood, finding that ancestral exposure to the slave trade still has an effect, although smaller.

<sup>15</sup> Before 1945, the politico-economic system was the same in East and West Germany. After 1945, the country was split in two, with women in the East and West exposed to very different institutions and policies. East Germany focused on policies that favoured female full-time employment, while West Germany encouraged a system in which women either stayed home after they had children or were funneled into part-time employment after an extended break.



those of women who had lived in West Germany.<sup>16</sup> In 1990, the likelihood of reporting that career success is important was approximately 11 percentage points higher for women in the East than for women in the West. The authors do not find a significant difference in men's attitudes towards work between the East and the West. The results are very similar when attitudes are measured in 2004. The positive attitudes toward work in the East show that increased female access to higher education and full-time employment can act as mediating channels.

The authors then extend the analysis using a difference-in-differences strategy that compares gender-role attitudes formed in Central and Eastern Europe to those formed in Western Europe before and after the imposition of state socialism in Central and Eastern Europe. To obtain time variation, they use measures of attitudes of immigrants who arrived in the United States at different times. The authors show that gender-role attitudes have become much less traditional in Central and Eastern Europe than in Western Europe.

Grosjean and Khattar (2016) study the long-run effect of the male-biased sex ratio that emerged in Australia by the late eighteenth century as a consequence of the British policy of sending convicts to Australia. Male convicts outnumbered female convicts by a ratio of 6 to 1. The sex ratio amongst immigrants continued to be very biased into the 20th century, as they were mostly men seeking out Australia's economic opportunities in mining and pastoralism. The authors use spatial and time variation in the sex ratio and study the short- and long-term effects of male-biased sex ratio on female outcomes at home and in the workplace. Since their identification relies on within-state variation, the results cannot be driven by institutional differences.

They find that gender imbalance was associated historically with women being more likely to get married, participating less in the labor force, and being less likely to work in high-ranking occupations. They then study the long-term implications. In areas that were more biased historically, people today have more conservative attitudes towards women working, women are less likely to have high-ranking occupations, and they work less and earn less. A one-unit increase in the historical sex ratio moves the average Australian today towards conservative attitudes by eight percentage points at the mean. It is also associated with a one-percentage-point decrease in the share of women employed as professionals (5 percent of the population mean and 12 percent of its standard deviation). There does not seem to be a welfare effect as measured by self-reported marital and overall life satisfaction. The authors explain this persistence as a result of cultural transmission.

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<sup>16</sup> Attitudes towards work are measured using a question about the importance of career success for the respondent.

Xue (2016) studies the impact of China's cotton revolution—the adoption of spinning and weaving technologies from 1300 until 1840—on gender roles. This revolution allowed women to produce cotton textiles at home and sell clothing. Women living in regions suitable for the production of cotton textiles experienced a huge increase in their economic earning power, which became similar to or greater than that of their husbands. To identify the causal effect of the cotton revolution on modern outcomes, Xue collects information about premodern cotton textiles from county and prefecture gazetteers. Data on 1,489 counties are then linked to the contemporary sex ratio at birth. She finds a strong and negative relationship between premodern cotton textile production and sex ratio at birth. The reduction is substantial: one quarter of the standard deviation of the sex ratio variable.

The effect of the cotton revolution on gender roles is also observed in other historical periods in China: immediately after the shock but also during the period of state socialism. The author finds that cotton textile production prevented suicides of widows in the Ming dynasty: widows in areas suitable to cotton textile production generally maintained a decent standard of living and had relatively high social status. Xue also finds that female labor-force participation in pre-socialist China and the probability of a wife's heading the household under state socialism were both higher in regions suitable to cotton production.

### **3. Heterogeneity in historical persistence**

In this chapter, we reviewed evidence of historical persistence in gender roles. It is, however, important to note that while there is a high degree of persistence, gender norms have also sometimes changed quickly over time.<sup>17</sup> When do gender-role differences persist and when do they not? What factors affect their persistence? What determines the speed of their evolution when they change?

Giuliano and Nunn (2016) examine these questions by testing an insight that has been developed in the evolutionary anthropology literature (Boyd and Richerson, 1985, 2005; Rogers, 1988). The idea is very simple: First consider a population living in a stable environment. In such a setting, the actions of one's ancestors are particularly informative about which of many possible actions are optimal. The fact that these actions have evolved in this environment is important information. Thus, there are important benefits to a cultural belief in the importance of tradition. We would therefore expect

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<sup>17</sup> Among the factors responsible for the change are the increase in marital bargaining power due to the reduction in time spent on household chores (Greenwood et al., 2005), a changing social atmosphere (Fernandez et al., 2004), the introduction of the Pill (Goldin and Katz, 2002), and the diffusion of knowledge about the effects of female labor-force participation (Fogli and Veldkamp, 2011; Fernandez, 2013).

societies that live in a stable environment to strongly value tradition and to be reluctant to deviate from it. Next, consider a population living in a very unstable environment. The setting of each generation changes sufficiently that the optimal actions of the previous generation may no longer be optimal. In such an environment, the traditions of one's ancestors are less informative and cultural traits that strongly value tradition are thus less beneficial. We would therefore expect these societies to be less strongly tied to tradition and more likely to adopt new cultural practices and beliefs. The authors take this hypothesis to the data and test whether societies that historically lived in environments with more climate variability value tradition less, are more likely to adopt new cultural values, and exhibit less cultural persistence. They test this mechanism for gender differences by looking at female participation in agriculture in pre-industrial societies and female labor-force participation today. They also look at the relationship between the traditional practice of polygamy and the practice of polygamy today.

To measure a location's historical environmental stability, they use paleo-climatic data from Mann et al. (2009) that measures the average annual temperature of 0.5-degree-by-0.5-degree grid cells globally, beginning in 500 AD. Data on pre-industrial societies are taken from the *Ethnographic Atlas*. The authors first document a strong relationship between traditional participation of women in agriculture and female labor-force participation rates today and a strong relationship between traditional practice of polygamy and the practice of polygamy today. (Although average female labor-force participation has been increasing and the practice of polygamy decreasing for decades or centuries, we still see a high degree of persistence of both practices today.) They then show that the persistence is weaker in countries with more historical variability in the environment. The paper is the first attempt in trying to provide a better understanding of when culture persists and when does it change. The findings also comprise a test of a prediction that is common in a class of model from evolutionary anthropology. The core assumption of the models is that culture evolves systematically based on relative costs and benefits of the different cultural traits. Testing these models is important since the current models of cultural evolution within economics share many of the same assumptions and features as the model from evolutionary anthropology.<sup>18</sup> More research needs to be done on how much other sources of instability (such as international trade, migration or economic and political instability) could also contribute to the evolution of gender norms or cultural values more generally.

## 4. Conclusion

History matters in explaining the differences in gender roles observed today. What aspects of

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<sup>18</sup> See for example Bisin and Verdier (2000, 2001), Hauk and Saez-Marti (2002), or Tabellini (2008)

history should we look at? In this chapter, we reviewed recent empirical research on various historical determinants of contemporary differences in gender roles. Most of the research illustrates that differences in cultural norms regarding gender roles emerge in response to specific historical situations, but tend to persist even after the historical conditions have changed. Thus, even the distant past affects gender norms today. Research also finds that persistence tends to be stronger when the environment is very stable and therefore experimenting with new norms is less necessary.

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