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Economic Origins of Cultural Norms: The Case of Animal Husbandry and Bastardy*

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Abstract

This paper explores the historical origins of the cultural norm regarding illegitimacy (formerly known as bastardy). We test the hypothesis that traditional agricultural production structures influenced the historical illegitimacy ratio, and have a lasting effect until today. Based on data from the Austro-Hungarian Empire and modern Austria, we show that regions, which focused on animal husbandry (as compared to crop farming) had significantly higher illegitimacy ratios in the past, and female descendants of these societies are still more likely to approve illegitimacy and have a non-marital birth today. To establish causality, we exploit variation in the local agricultural suitability, which determined the historical dominance of animal husbandry. Since the differences in the agricultural production structure are completely obsolete in today's economy, we suggest to interpret the persistence in revealed and stated preferences as a cultural norm. Complementary evidence from an 'epidemiological approach' suggest that this norm is passed down through generations, and the family is the most important transmission channel. Our findings highlight the more general phenomenon that cultural norms can be shaped by economic conditions, and may persist, even if economic conditions become irrelevant.

JEL Classification: D03, A13, J13, J12, J43, Q15, N33, N53, N93.

Keywords: Cultural norms, fertility, marriage, illegitimacy, animal husbandry.

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1 Introduction

It is widely acknowledged among economic scholar that individuals' decisions are not only based on economic incentives, but also on prevailing cultural norms.¹ This fact is documented in numerous experimental and empirical settings and has led to a revision of economic decision models. In contrast, very little is known about how cultural norms are formed, and how they change over time. In this paper, we aim to contribute to the burgeoning literature studying the origins of cultural norms.²

We study the case of illegitimacy (formerly known as bastardy), which describes the status of being born to parents who were not married. Today, the social acceptance of non-marital births is typically linked to cultural differences (such as the religiosity of the population). Relatedly, the rise in extramarital births in Western countries is often explained by the ongoing secularization or the sexual emancipation of women.³ Our interest is in explaining the origins of this cultural norm. Specifically, we test the hypothesis that differences in this cultural norm have their origins in the form of agricultural production structures traditionally employed in pre-industrial periods. We test this hypothesis by linking data from Austro-Hungarian Empire to today's Austria, covering a period of more than a century.

An important distinction among rural societies is whether the focus is on crop farming or on animal husbandry. In crop farming, the work load and the resulting demand for additional labor, is determined by the rhythm of the seasons. While fluctuation can be partially offset by secondary works in the 'dead season', additional manpower is needed in the harvest season. In contrast, in animal husbandry the workload is distributed relatively evenly throughout the year. A further important difference are the required skills. Animal husbandry requires a sound knowledge of the peculiarities of each animal (analogous to firm-specific human capital), while harvesting is less specific. As a consequence, in rural societies dominated by animal husbandry most workers in the 18th and 19th century had long-term labor contracts as farmhands, while in rural societies dominated by crop farming most workers had short-term labor contracts as day laborers. Farmhands were regarded as household members, who lived permanently at the farm, and were predominantly paid in kind. The lack of cash-income did not allow farmhands to marry and to establish their own household. As a consequence, their offspring was born illegitimate and tolerated by society as a pool of disenfranchised cheap labor. Since children born out-of-wedlock grew

¹See, for instance, Guiso *et al.* (2006); Fernández (2011); Alesina and Giuliano (2015). We use the terms 'cultural norm', 'culture' and 'social norm' interchangeably.

²See, for instance, Giuliano (2007); Nunn and Wantchekon (2011); Alesina *et al.* (2013). A distinct, but related, branch of literature shows the persistence of cultural norms over long periods of time, but does not clarify the origins of it (see, for instance, Algan and Cahuc, 2010; Voigtländer and Voth, 2012; Grosjean, 2014).

³Policy-makers tend to worry about high legitimacy ratios, since mother with children born out-of-wedlock have higher rates of poverty, rely disproportionately on public assistance, and their children tend to have inferior outcomes.

up as a servant member to the household, their chances to marry were almost zero, and they were likely to produce another generation of illegitimate children. In contrast, day laborers typically lived as cottagers. That means, they had simple dwellings (cottages), but typically lacked enough land to sustain their livelihood. Therefore, they supplemented their income as day laborers on bigger farms (or with craft and trade) for which they received cash. This additional cash-income enabled young couples to establish their own household, which led to marital fertility.⁴

Clearly, no region exclusively focused on either crop farming or animal husbandry. Thus, we will not find *farmhand societies* nor *day laborer societies* in pure form. Still, societies dominated by animal husbandry, and the resulting clustering of farmhands with their illegitimate children, developed the belief that out-of-wedlock births are a natural event. This cultural norm tends to persist even if the economy shifts its focus from agriculture to manufacturing and services. Thus, we hypothesize that women residing today in regions, which were historically farmhand societies are more likely to have a non-marital birth, as compared to those residing in former day laborer societies.

To test this hypothesis we have to link the *current* incidence of non-marital births to variation in the *historical* agricultural production structures. Such an analysis requires exceptionally rich historical data sources that can be linked to recent birth registers. For this purpose, we find the context of the Austro-Hungarian Empire well-suited. Starting from the mid 19th century exceptionally rich official statistics exist, which include, among others, regional information on the incidence of non-marital births and detailed information on the agricultural sector. The latter allows us to categorize a regions as either a predominantly farmhand society or as a day laborer society. We were able to compile a data set that links (either on a community or a district level) this historical information with recent administrative data sources from Austria. Most importantly, we use the *Austrian Birth Register*, which comprises individual-level information on all births since 1971.

The starting point of our empirical analysis are four strong and robust correlations. *First*, we find a positive relationship between the relative dominance of animal husbandry versus crop farming and the ratio of farmhands to day laborers in 1900. Thus, our data confirm that workers in animal husbandry predominately had long-term contracts, while workers in crop farming had short-term contracts. *Second*, in historical data we find a clear pattern of high illegitimacy ratios in farm hand societies and comparable low ratios in day laborer societies. This reflects the formation of the cultural norm regarding non-marital births, which was driven by prevailing economic conditions. *Third*, we find a positive relationship between the local historical and current illegitimacy ratio. This regional persistence in behavior over a time-period of almost 150 years — covering the transformation

⁴The historical correlation between agricultural production structures and the share of out-of-wedlocks births was first noted by Austrian historians (such as Ehmer, Ortmayr, and Mitterauer).

from a pre-industrial agricultural society to a post-industrial society, in which agricultural production structures from the 19th century became obsolete — provides first evidence for the importance of cultural norms. The interpretation of this relationship as a cultural norm is supported by the finding that the relationship only holds for native Austrians, but not for immigrants (whose ancestors were not exposed to the historical agricultural production structures). *Fourth*, we find a significant relationship between the historical agricultural production structure and the current likelihood of a non-marital birth.

To be able to make causal statements, we use variation in the local agricultural suitability, which determined the historical agricultural production structure. The potential yield of crop farming versus animal husbandry is determined by different biophysical factors (mainly climate, soil and terrain). These factors are not readily amenable to change by human activity or institutions and as such exogenous. Since Austria’s topography comprises alpine mountains as well as a lowlands, we focus on the strong variability in terrain. Sloping terrain is more difficult to cultivate than flatland, and is subject to higher rates of water runoff and soil erosion (van Velthuisen *et al.*, 2007). While this applies to both crop farming and animal husbandry, the productivity constraints of a higher slope gradient are comparable higher for crop farming. In line with this we find a higher historical dominance of animal husbandry (and farmhand societies) in Austrian regions characterized by steep slopes. We offer two different causal estimates. First, our reduced form estimate — relating the current likelihood of an out-of-wedlock birth to the terrain slope — shows that biophysical factors structurally affect a demographic outcomes in a modern society. Second, our instrumental variable estimate relates the variation in historical agricultural production structure (due to the terrain slope) to the current likelihood of an out-of-wedlock birth. This estimate shows that the existing cultural norm regarding non-marital births has its origins in the form of agricultural production structures traditionally employed in pre-industrial periods. We replicate our analysis by using exogenous variation in climate. This alternative IV-strategy provides very comparable estimates.

To further support our causal interpretation, we complement our analysis of revealed preference with evidence based on stated preferences. We link recent survey responses on the attitude towards illegitimacy to the historical illegitimacy ratio and the historical agricultural production structure in the respondent’s region of residence. This analysis corroborates our conclusion derived from our main analysis.

Finally, we examine the behavior of immigrants to Austria (and their descendants). We find that their propensity to have an out-of-wedlock birth is only very weakly related to the historical illegitimacy ratio of their current place of residence in Austria. In contrast, the historical illegitimacy ratio in their (ancestors’) country of origin, is a very powerful predictor for their behavior. We interpret this result from this so called ‘epidemiological approach’ as evidence for the importance of the family as a transmission channel for

the cultural norm regarding bastardy. Put differently, the norm seems to be passed down through generations and other (past or present) institutions at the current place of residence are only of second order importance.

Four guideposts can be used to put this analysis into the context of the existing literature. First, we add to the growing literature on the persistence of cultural attitudes over long periods of time.⁵ Second, we contribute specifically to the burgeoning literature (see footnote 1), which aims to go beyond showing the mere existence of persistence, but identify the origins of cultural norms. Our main empirical finding highlights the more general phenomenon that cultural norms can be shaped by economic conditions and may persist even if economic conditions become irrelevant. Thus our finding contributes to deeper understanding of the origins of cultural norms and values. Third, we speak to the literature which identifies social norms as determinants of family outcomes. A number of papers proxy culture among US immigrants by their country of ancestry to study the role of culture in family-related outcomes such as fertility (Fernández and Fogli, 2006, 2009), living arrangements (Giuliano, 2007), divorce (Furtado, Marcén and Sevilla, 2013). Fourth, more specifically, we also contribute to the literature studying the determinants of the illegitimate births. Existing papers discuss several potential explanations for the variation in the share of non-marital child births across time and space. The literature studying pre-industrial societies puts forward rural inheritance patterns (Cite!) and the elimination of formal marriage restrictions (Knodel, 1967). The literature studying industrial societies provides evidence for the effect of the increased availability of contraception and abortion (Akerlof *et al.*, 1996), the liberalization of divorce law (Alesina and Giuliano, 2007), the reform of joint custody laws (Halla, 2013), existing welfare state arrangements (Lackner *et al.*, 2016), and distorted adult sex ratios (Bethmann and Kvasnicka, 2013). We provide empirical evidence — for the widely held believe — that cultural norms are an important factor.

The remainder of the paper is organized as follows. We begin, in Section 2 by describing pre-industrial agricultural society in Austro-Hungarian Empire and characterizing farm-hand and day-laborer societies. In Section 3, we link historical and contemporaneous data on out-of-wedlock births to document the persistence in this variable over time. Section 4 comprises our analytical results. We link the historical agricultural production structure with out-of-wedlock-births today. We present stepwise results from different estimation strategies to establish a causal link. In a first step, we control for selection based observables. In a second step, we exploit exogenous variation in the local agricultural suitability due variation in the local slope of the terrain and in the local historical climate. In the two subsequent Sections, we provide complementary analyses to support our causal interpretation, and to describe the specific transmission channels. In Sections 5, we highlight that the same pattern is present in the link between historical agricultural

⁵Cite here literature which shows more generally persistence.

production structure and stated preferences. In Section 6, we present our ‘epidemiological approach’ to provide evidence on the transmission channel of the social norm regarding illegitimacy. Section 7 concludes the paper.

2 Animal Husbandry and Bastardy

A large literature in contemporary history focuses on the complex system of interrelationships between the agricultural structure and family arrangements in pre-industrial societies (Mitterauer, 1992). For a long time, the Austrian economy was dominated by agriculture. Figure A.1 shows the evolution of the share of the population in agriculture for the last 120 years. In 1900, there was still more than 50 percent of the population associated with the agricultural sector. Given the dominance of agriculture with most of the population, we should not be surprised by a strong connection between the predominant forms of agriculture and all aspects of life in the Austro-Hungarian Empire.

2.1 Historical Agricultural Production Structure

Agriculture in Austria around 1900 was organized on a spectrum between animal husbandry and crop farming. In most areas there are features of both forms of agricultural specialization: farmers do not only grow crops, but also have animals to supplement their diary or the other way round. We therefore speak of relative dominance of one form of agriculture. For illustrative purposes it is nevertheless helpful to describe the two extreme forms of the agricultural structure.

Animal husbandry was labor intensive throughout the year since animals had to be tended to every day. Farmers employed servants to perform the necessary tasks of feeding, milking, and looking out for the cattle in the meadows. Because of the close relationship between workers and animals, these servants had to learn the peculiarities of each animal. The relation-specific knowledge and the distribution of the workload more or less evenly throughout the year made long-term labor contracts the prevalent form (Mitterauer, 1986, p.200). Servants were usually hired for a year and contracts were regularly renewed. In this way servants became part of the larger family of the farmer. A large part of the compensation package was paid in-kind by providing food and residence. Table A.2 in the appendix summarizes data from Austria for 1893 and shows that a simple servant or maid received more than two thirds of their compensation in-kind. Higher ranks of servants received a slightly lower share in-kind.

Crop farming is the at the opposite extreme of the spectrum of the agricultural production structure. The planting, growing, and harvesting of plants required large amounts of labor during peak-seasons, but relatively little during downtime. This form of agriculture led to a completely different relationship between workers and farmers than animal

husbandry. The required number of workers was hired with short-term contracts during peak-seasons. These day laborers did not become part of the extended family of the farmer and were mostly paid in cash. Because of the large demand for day laborers during the peak-season, wages were relatively high (Mitterauer, 1986, p.213f). Farmers in crop farming areas often provided small dwellings for cottager families, who provided a certain amount of labor in exchange. This form of dependency allowed the farmer access to additional workers when required, but avoided a permanent contract with the worker (Mitterauer, 1986, p.216). Since day laborers and cottagers could not find employment in agriculture throughout the year, they performed different kinds of crafts and trades during low-seasons (Ortmayr, 1984, p.107f). The additional cash-income and the requirement of finding a different kind of work during low-seasons, prevented the non-land holding population from a relationship of dependence with land holding farmers. This enabled agricultural workers in crop farming areas to establish their own household, get married, and have marital offspring.

Although the literature in contemporary Austrian history describes the relationship between the agricultural production structure and labor relationships extensively, there is no empirical investigation of this pattern that goes beyond scatterplots and descriptive statistics. We examine this relationship by estimating the association between a farmhand society (*SERV*) and the relative dominance of cattle farming (*CATTLE*) described in equation (1):

$$SERV_{dp}^{1900} = \alpha_1 + \beta_1 CATTLE_{dp}^{1900} + X_{dp}^{1900} \gamma_1 + \phi_{1p} + \varepsilon_{1dp}^{1900}. \quad (1)$$

The agricultural census of 1902 (*Landwirtschaftliche Betriebszählung 1902*) provides very detailed information on agricultural production at the district level, which includes the composition of the workforce, land usage, details on the livestock etc. We combine this data with the population census of 1900 to get information on the size, labor composition and specialization of the agricultural sector in each district.

Our employed measure of the relative dominance of animal husbandry is the *ratio of cattle to agricultural workers*. We are aware that this single measure for the predominant form of agricultural production compresses a complex system of relationships into one number. The advantage of this measure, however, is the availability of all the necessary data at the municipality level.

The *share of servants* is our measure of the relative dominance of a farmhand society, which measures the share of servants in agriculture of the total population. An equivalent measure of day laborers can not be constructed because the agricultural census registered relatively few day laborer at the cutoff date of June 3rd, 1902. Table 1 show descriptive statistics at the district level for these variables.

Our sample consists of districts from the population census of 1900 in the Austrian

part of the Austro-Hungarian Empire that (a) did not change until the agricultural census in 1902, (b) do not consist of a single city, and (c) are still part of Austria today. This leaves us with 66 districts, which comprises 94% of the area of Austria.⁶

In Table 4 we show the relationship between the agricultural production structure and the predominant labor relationship. There is a strong positive unconditional relationship between the share of servants in the population and the ratio of cattle to agricultural workers in column (1). The positive correlation holds when we control for unobserved heterogeneity at the province level with the inclusion of province fixed effects. Although the estimate decreases slightly in size, it does not lose statistical significance. In columns (3) to (6), we sequentially include sets of covariates measured in 1900 to control for urbanization, the demographic and sectoral composition of the population, religious affiliation, literacy and non-agricultural wages. In the last column, we include all the control variables simultaneously. None of these control variables changes the estimated relationship between animal husbandry and farmhand society.

The empirical evidence strengthens our prior on the connection between relative dominance of animal husbandry and the occurrence of a farmhand society.

2.2 Linking Animal Husbandry and Bastardy in a Pre-Industrial Agricultural Society

The literature on contemporary Austrian history not only makes the connection between animal husbandry and a farmhand society, but also to the prevalence of bastardy (Mitterauer, 1983, 1986, 1992; Ehmer, 1991). The Austrian alpine region constitutes an extreme case of the prevalence of illegitimate births in Europe (Ehmer, 1991, p.120).⁷

Servants in agriculture were closely integrated into the family of the farmer and paid mostly in-kind. In this way, the farmer had substantial power over the living arrangements of servants. For at least three reasons servants were obstructed from marriage: (a) celibacy ensured high mobility of servants to compensate fluctuations in labor demand (Ehmer, 1991, p.70), (b) married servants would reduce the social status of the farmer as household head (Ehmer, 1991, p.127), and (c) due to a lack of funds servants were not in an economic situation to establish a household. The prevalence of *life time servants* is a unique phenomenon in the alpine areas of Austria. In other parts of Europe servants are either a transitory phase during which young adults earned the means to establish their own household (*life cycle servants*) or servants could get married and were not fully integrated in the family of the farmer (Ehmer, 1991, p.129f).

⁶Today's province of Burgenland was part of the Hungarian half of the empire in 1900 and is therefore never included in our data.

⁷Although illegitimacy is not the same as out-of-wedlock birth in all societies, we use these terms interchangeably, which is in line with the interpretation of illegitimacy in 19th century Austria (Mitterauer, 1983, p.13).

Day laborers and cottagers in agriculture were in a completely different situation. They earned cash-income through their work in agriculture and also in crafts and trades during the low-seasons. That group was also not in a relationship of dependence with the land-holding farmers that could dictate a certain family arrangement.

The two groups of agricultural workers, servants and day laborers, had in common that they produced offspring. The marital situation of each group, however, generated illegitimate children in the case of servants and legitimate offspring for day laborers. The roman-catholic church objected pregnancies of unmarried women and charged higher fees for christenings or special repentance (Klammer, 1992, p.91f.) and unmarried mothers often had to give their children away to another farm pledging a number of years of free labor of the child in the future. But for farmers in labor-intensive cattle farming illegitimate children of servants formed a pool of future disenfranchised labor. Illegitimate children of servants almost surely became servants themselves.

Table 3 shows direct evidence that the type of employment of the father or unmarried mother is correlated with the legal status of his/her child. The table summarizes data for all children born to fathers or unmarried mothers working as servants or day laborers in agriculture in 1900. While almost 80% of births were illegitimate for servants, only 16% were so for day laborers.⁸

For an empirical investigation of the relationship between the prevalence of bastardy and the predominant labor relationship in agriculture, we combine data from the agricultural census of 1902, the population census of 1900 and the population statistics of 1900 (*Bewegung der Bevölkerung in 1900*). We construct the variable *bastardy in 1900* as the share of live births to an unmarried mother of all live births.

The main estimating equation to explore the historic association between a farmhand society and bastardy is equation (5). In addition to our preferred measure of the predominant type of labor relationship in agriculture, *share of servants*, which measures servants relative to the total population, we define alternative measures to explore the robustness of the correlation. Alternative measures include the *share of servants of agricultural workers*, the *share of non-family agricultural workers*, and the *share of permanent agricultural workers*.

$$BAST_{dp}^{1900} = \alpha_2 + \beta_2 SERV_{dp}^{1900} + X_{dp}^{1900} \gamma_2 + \phi_{2p} + \varepsilon_{2dp}^{1900}. \quad (2)$$

In a first step, we regress our four measures of the agricultural labor relationship on the measure of bastardy in 1900 and province fixed effects. Table 5 shows the strong positive correlations between the occurrence of long-term labor contracts with family-external

⁸Aggregate census data show that males and females balance across occupation groups and marital status in agriculture. It is therefore unlikely that this pattern emerges through sorting of unmarried females into the group of servants.

servants and bastardy.⁹

In Table 6 we employ our preferred measure, the share of servants of the total population, and control for various district characteristics in 1900. Column (1) gives the unconditional relationship. A one percentage point increase in the share of servants in the population increases the share of illegitimate births by 1.56 percentage points. The estimated effect becomes smaller when in the within-province estimates in column (2), but remain significantly different from zero at the 1-percent level. The relationship between the share of servants and bastardy remains relatively stable when various district controls are included. Column (7) includes the full set of controls. The point estimate of 1.44 indicates that a one percentage point increase of servants in the population is associated with an increase of the share of illegitimate births by 1.44 percentage points, which is equivalent to a beta-coefficient of 0.56.

3 Persistence of Bastardy

As Figure 1 shows the high variation in the rates of illegitimate births in Austria over the last 200 years. While illegitimacy rates increased for most part of the 19th century, there was a sharp drop in the 1870s, when formal marriage restrictions were mostly abolished.¹⁰ After some ups and downs around the two world wars, the lowest rate was reached in the late 1950s. The rate of out-of-wedlock births shot up to over 40% since then.

Although the development of bastardy over time is interesting, we are interested in the persistence of regional patterns in illegitimacy rates. The maps in Figure 2 show the regional variation in illegitimacy rates in 1900 and 1972–2007 at the district level. The comparison of these maps already indicate that the spatial distribution of illegitimacy is stable over time.

We construct our contemporary measure of illegitimacy from data of the *Austrian birth registry* of 1972–2007. The variable *bastardy today (1972–2007)* is the share of births to unmarried Austrian mothers of all births to Austrian mothers. The descriptive statistics in Table 1 show that the share of illegitimate births increased slightly from 21 to 26% between 1900 and the current measure. A problem we face when connecting the historic data of districts with today's birth registry are the border changes over the last century. We solve this by reconstructing historic districts with today's municipalities. This enables

⁹I think we should only show Table 6 and move Table 5 to the appendix.

¹⁰Legal marriage restrictions were removed in 1868 with the exception of Salzburg (in 1883), Tyrol and Vorarlberg (in 1921) (Ehmer, 1991, p.61). Since we include province fixed effects in our regressions, our results do not capture difference in legal restrictions at the province level.

us to compare very similar geographic areas over time.¹¹

$$BAST_{dp}^{2000} = \alpha_3 + \beta_3 BAST_{dp}^{1900} + X_{dp}^{1900} \gamma_3 + \phi_{3p} + \varepsilon_{3dp}^{2000} \quad (3)$$

We estimate equation (3) with our sample of 66 districts by OLS. There is large persistence in the regional prevalence of bastardy over the last 100 years as Table 7 shows. Column (1) shows the unconditional relationship between the historic share of illegitimate births and today's rate. A one percentage point increase in the historic bastardy rate corresponds to a 0.56 percentage point increase in today's rate of illegitimate births. Province fixed effects reduce this correlation slightly, but other control variables do not affect the estimates. Interestingly, the historic control variables do not significantly influence today's regional variation in the share of illegitimate births once the historic bastardy rate is included in the model.

While the history literature has dealt extensively with the connection between the agricultural structure, labor relationships, and illegitimacy in pre-industrial Austria (Haslinger, 1982; Mitterauer, 1983, 1986, 1992), we are the first to examine the connection to today's regional pattern of illegitimacy empirically.¹²

4 Bastardy beyond Animal Husbandry: The Origin of a Social Norm

4.1 Linking Historical Animal Husbandry and Bastardy Today

We hypothesize that the historic agricultural structure formed a social norm about illegitimacy that persists until today. A large literature shows that people react to social and cultural norms in fertility decisions and family formation (Alesina *et al.*, 2013; Fernández and Fogli, 2006, 2009; Furtado *et al.*, 2013). In regions with high historic illegitimacy rates, the social penalty for women to give birth to an illegitimate child are lower. Only a small fraction of births in our contemporaneous sample can be from mothers who experienced a farmhand society themselves. So there must be some form of inter-generational transmission of the perception of illegitimate children.

The persistence of this social phenomenon for over 100 years could have a number of potential reasons other than the formation of a social norm. We can rule out that the original reason for the emergence of illegitimacy, the structure of labor relationships in

¹¹Population data for all population censuses are available for current municipalities borders from *Statistik Austria*. With these data we can compare population figures of reconstructed historic districts with actual population figures of districts in 1900. The numbers shows that on average 95% of the historic population can be reconstructed. The contemporary bastardy rate for historic districts should therefore contain little measurement error.

¹²Kytir and Münz (1986) loosely discuss the persistence of illegitimate births in Austria and show suggestive maps.

agriculture, is still the driving force. The agricultural sector has substantially changed over the last century. First, while there were over 50% of the population affiliated with agriculture in 1900 in the sample region, this number shrank to less than 5% in 2001.¹³ Second, labor relationships in agriculture changed and there are no servants anymore.

Persistent legal differences between regions are also an unlikely reason for the observed positive correlation of illegitimacy rates over time. The lowest administrative level at which legal regulations vary is the province level. Since we always control for province fixed effects, persistent legal differences can not cause the observed correlation in bastardy rates over time.

One might argue that persistent regional variation in human capital accumulation could be correlated with illegitimate births. Two pieces of evidence speak against this interpretation. Neither the control variable for illegitimacy in 1900 nor the sectoral composition of the labor market in 1900, arguably correlated with human capital investment, change the estimate of the persistence of illegitimacy much. Second, even at the municipality level bastardy today is highly correlated with the agricultural structure in 1900 once the contemporary level of schooling is included (Tables A.3 and A.4).

Our interpretation is that the historic agricultural structure created a social norm about illegitimacy that persists until today. To this end we estimate a model that captures our entire line of argument. When we estimate equation (4), we regress the contemporary measure of bastardy on the historic agricultural structure. This model has the advantage that we do not need to specify the details of the mechanism but can focus on cause and consequence.

$$BAST_{mp}^{2000} = \alpha_4 + \beta_4 CATTLE_{mp}^{1900} + X_{mp}^{1900} \gamma_4 + \phi_{4p} + \varepsilon_{4mp}^{2000} \quad (4)$$

The approach has the additional advantage that we do not rely on aggregate district-level data, but can work with the smaller geographic unit of a municipality. The municipality sample consists of 1,318 municipalities that we can cleanly track since 1900. At the municipality level we have data on the population, the stock of cattle, and a small set of control variables like log population, dummy variables for the existence of large land holdings and factories, the market status of a municipality, and the share of people in agriculture in 1934. With these measures we can construct a close proxy to our preferred measure of the historic agricultural structure, the *ratio of cattle to agricultural workers*.¹⁴

¹³See Figure A.1 in the Appendix for the evolution of the share of the population in agriculture since 1890.

¹⁴At the municipality level, we need to approximate the number of people in agriculture in 1900 with the share of people in agriculture measured in 1934 times the total population in 1900. The census of 1934 was the first census in Austria that published detailed information on the sector of employment at the municipality level. The correlation of the share of the population in agriculture in 1900 and 1934 at the district level is 0.929, which suggests that there was little regional variation in the reduction of the agricultural sector.

4.2 Addressing Causality

4.2.1 Selection on Observables

Table 8 presents the OLS-estimates of equation (4). The district level estimates in columns (1) to (3) combine the findings of Sections 2 and 3. The first column shows a positive unconditional relationship between the relative dominance of cattle farming and bastardy today. The inclusion of province fixed effects in column (2) slightly reduces the positive association, but also increases the precision of the estimate. The full model with all control variables in column (3) hardly change the estimated effect. According to this estimate, one more piece of cattle per agricultural worker in 1900 is associated with an increase of today's bastardy rate by 5 percentage points.

Columns (4) to (6) use the geographically much smaller municipalities as the unit of observation. The positive relationship between the ratio of cattle to people and bastardy today is slightly smaller in this sample but highly statistically significant. Again the point estimate decreases slightly with the inclusion of province fixed effects, but remains significantly different from zero. Column (6) includes the set of municipality controls, which do not change the estimated relationship. In this model, the estimated effect of 0.031 implies a beta-coefficient of 0.23, ie. a one standard deviation increase in the ratio of cattle to agricultural workers increases the share of illegitimate children by 0.23 standard deviations.

However, the strong positive relationship between the historic dominance of cattle farming and today's bastardy rate in the previous section does not lend itself to a causal interpretation. There are a number of potential problems in the OLS estimates.

First, persistent omitted factors that our control variables do not capture, could have influenced the dominant form of agriculture in the past and also affect today's pattern of illegitimate births. Local prosperity through the geographic location of the region along a trade route could be such a factor. It is reassuring that the inclusion of control variables does not change the estimated effect. This is evidence that the positive association between our measure of the historic agricultural structure and bastardy today is hardly correlated with omitted factors.

Second, causality could run the other way. A region with a persistently high share of illegitimate children offers a large pool of cheap labor. Labor-intensive cattle farming would have had a comparative advantage over crop farming in the past. The correlation between the historic agricultural structure and today's prevalence of bastardy would then be spurious.

Third, measurement error in the explanatory variable could attenuate the estimated effect. This is very likely as we capture a complex system of relationships that make up the historic agricultural structure in just one number, the ratio of cattle to agricultural workers. It is unavoidable that the compression of the agricultural structure into this

statistic obliterates important information.

The three potential issues do not allow a clear prediction of the bias of the OLS estimates. Reverse causality would over-estimate the causal effect, while measurement error leads to attenuation bias of the OLS estimates. An omitted variable could bias the estimates in either direction. In the next subsection, we deal with these issues by employing an instrumental variable strategy that solves these issues.

4.2.2 Selection on Unobservables

In this section, we employ exogenous variation in the relative dominance of cattle farming to estimate the causal effect of the historic agricultural structure on today's bastardy rate. As instrumental variables for the historic agricultural structure we use time-invariant local geographic and climatic information that influence the predominance of cattle farming.

Our main instrument is the mean slope of a district or municipality that we calculate from GIS data with $10\text{m} \times 10\text{m}$ grid cells.¹⁵ Steeper terrain provides a comparative advantage for cattle farming because of lower water runoff and soil erosion. Areas that are too steep to use as fields can still be used for cattle farming.

Figures 6 and 7 show the correlation between our measure of the predominance of cattle farming and the mean slope of the terrain at the district and municipality levels. The left panels show the unconditional relationship while the right panel gives the within-province relationship. The positive association stands out in each graph.

Table 9 shows estimations of equation (4) where the ratio of cattle to agricultural workers is instrumented with the mean terrain slope. In this way we can identify the causal effect of the historic agricultural structure on today's bastardy rate by using only exogenous variation of the historic ratio of cattle to agricultural workers. If our instrumental variables are valid, we can rule out that omitted factors, reverse causality, or measurement error bias the estimates.

Columns (1) to (3) of Table 9 use the district-level dataset and sequentially include province fixed effects and control variables. The point estimates are 60–160 percent higher than the corresponding IV estimates. The first stage estimates show that the mean slope of the terrain explains a sizable portion of the variation in the ratio of cattle to agricultural workers. The F-statistic is only about 5 in the full specification of column (3). This is not surprising with a sample size of only 66 observations.

However, the mean terrain slope is a strong instrument for the ratio of cattle to agricultural workers in the sample of municipalities with a F-statistic of over 80 in all specifications. Columns (4) to (6) show very similar IV estimates between specifications. An increase of the ratio of cattle to agricultural workers by one unit increases the share of illegitimate births by 10 percentage points today. This corresponds to a beta-coefficient of

¹⁵Digital Elevation Model (CC-BY-3.0: Land Kärnten - data.ktn.gv.at).

0.76, which indicates the dominant role of the historic agricultural structure in explaining the contemporary variation in illegitimacy rates.

At the municipality level, we also employ climatic data as exogenous variation in the agricultural structure.¹⁶ With detailed information on mean temperature, precipitation, cloud cover, sunshine hours for winter and summer for the period 1961–1990 we can calculate mean values for each municipality.¹⁷ These climatic variables provide alternative instrumental variables for the historic agricultural structure.¹⁸

We show the IV estimates of our alternative instruments at the municipality level in Table 10. The climate variables we use as instruments are the mean precipitation in summer, and sunshine hours, cloud cover, humidity, temperature in July. The first stage is strong for each one of these variables and also when we include them jointly in column (6), the F-statistic of 62.

Interestingly, the IV estimates of the effect of the historic agricultural structure on today's prevalence of bastardy using one instrument at a time or together are very close to the IV estimates using the terrain slope as the instrumental variable. The estimates remain unchanged when we use the climate and terrain slope instruments together in column (7).

Threats to identification Our instruments are only valid if the exclusion restriction is satisfied, ie. that there is no association between terrain slope or local climate and today's bastardy rate that does not run through the historic agricultural structure. One way to deal with this issue is to test the robustness of the IV estimates to the inclusion of control variables for alternative pathways of the instrument. We do this in Table A.4 in the Appendix (move to appendix). We use control variables for the municipality income level in 2010, the share of employed in agriculture and manufacturing, and the educational level in 2011 in columns (2) to (4). The IV estimates of the effect of the historic agricultural structure on the contemporary rate of illegitimate births do not change or become slightly larger when these (potentially endogenous) control variables are included.

We also show that the size of today's tourism industry, measured by the share of employed in tourism or the log of beds in tourism per capita, does not explain the effect we find. When we include all these contemporary control variables in column (7), the estimated effect of the historic agricultural structure on today's bastardy rate is highly significant and larger than in the preferred IV specification.

¹⁶Another determinant of the predominant form of agriculture are soil type and quality. However, soil quality is endogenous to the form of land usage, which invalidates its use as an instrumental variable.

¹⁷Data source: ZAMG (data.gv.at, downloaded in November 2016).

¹⁸One might be concerned that climate change over the last 100 years has changed the local climate pattern. We show in Table A.5 in the Appendix with data from long-standing weather stations that the correlation in temperature, precipitation, air pressure, and sunshine hours is very close to one between the mean of the periods 1896–1925 and 1961–1990.

5 Evidence from Stated Preferences

So far, we have examined revealed preferences. In this section, we make use of individual-level survey data to study stated preferences. This analysis is instructive for two reasons. First, there might be a gap between these two dimensions (beyond survey response bias) due to unintended out-of-wedlock births. Second, stated and reveal preferences are most likely correlated with a different set of confounding factors. Thus, if we find the same pattern in stated preferences, this would clearly corroborate our conclusion derived from our main analysis.

We use data from the *Generations & Gender Programme* (GGP) survey, which includes a question on whether [...] ‘*woman can have child as single parent even without stable relationship*’. Respondents are asked to evaluate this statement on a 5-point scale ranging from ‘*strongly disagree (1)*’ to ‘*strongly agree*’. While this survey question is not ideal (since it does not explicitly refer to marriage), the GGP survey has the clear advantage over other surveys that it includes quite detailed information on the respondents place of residence. This allows us to link the historical illegitimacy ratio (and animal husbandry) of the respective respondent’s district of residence to her stated preference. Our estimation sample comprises almost 1,130 respondents from 63 different districts. In our OLS estimations, we control for the same set of district-level covariates as used above, and a basic set of individual-level controls. Standard errors are cluster on a district-level

The estimation results summarized in Table 11 show a significant positive association between both historical measures and the approval of women having a child as single parent. In columns (1) and (2), we use an ordinal variable based on the original scale as a dependent variable. An increase in the historical illegitimacy ratio and in the historical cattle ratio by one standard deviation, increases the approval of women having a child as single parent today by 0.12 and 0.13 standard deviations, respectively. The specification summarized in columns (3) and (4) using a binary indicator (equal to one if a respondent agrees or strongly agrees) as a regressand provides equivalent conclusions.

6 Evidence on the Transmission of the Social Norm

In a final step, we analyze the determinants of illegitimacy in the sample of immigrant women in Austria. This analysis exploits two interesting sources variation. First, immigrants from the same country of origin are placed in Austrian regions with a very different historical agricultural production structure. A comparison among these immigrants might inform us, how the exposure to this different historical agricultural production structure affects their behavior. Second, immigrants from different countries of origin are placed in the same Austrian region. This comparison might inform us, how a different cultural background (in particular, the norm regarding illegitimacy) affects behavior in a region

with a constant historical agricultural production structure. The latter comparison is often called an epidemiological approach.¹⁹ By exploiting both dimensions of variation within one approach, we aim to quantify the relative importance of the inherited cultural norm regarding illegitimacy and the current institutions (which are shaped by the historical agricultural production structure). We translate this attempt into the following linear probability model:

$$\Pr(ILL_{icd}^t = 1|\mathbf{X}) = \alpha_1 + \alpha_2 ILL_d^{1900} + \alpha_3 ILL_c^{19x0} + X_{dp}^{1900} \gamma_2 + \phi_{2p} + \varepsilon_{2dp}^{1900}. \quad (5)$$

where the dependent variable ILL_{icd}^t is equal to one if the child of immigrant mother i , who originates from country c , residing in the Austrian district d , born in period t was illegitimate. The two explanatory variables of primary interest are the historical illegitimacy ratio in district d , ILL_d^{1900} , and the historical illegitimacy ratio in the sending country c . The latter serves as proxy for the culture norm regarding illegitimacy in country c . The estimation results from linear probability models are summarized in Table 12.²⁰ The specifications in columns (1) to (5) differ with respect to the sample years, and the set of included control variables. Across specifications, we consistently find that the likelihood of immigrants to have an out-of-wedlock birth is only very weakly related to the historical illegitimacy ratio of their current place of residence in Austria. In contrast, the historical illegitimacy ratio in their (ancestors') country of origin, is a very powerful predictor for their behavior. Across columns (1) to (4) the effect of the historical illegitimacy ratio in the sending country is roughly seven times as larger as the effect of the historical illegitimacy ratio in the residing district. In column (5), this ratio drops to four. This was caused by the inclusion of control variables for mother's religious denominations. We interpret this result as evidence for the importance of the family as a transmission channel for the cultural norm regarding bastardy. Put differently, the norm seems to be passed down through generations and other (past or present) institutions at the current place of residence are only of second order importance.

7 Conclusions

This paper explores the historical origins of the cultural norm regarding illegitimacy. We test the hypothesis that traditional agricultural production structures influenced the his-

¹⁹Fernández (2011) defines the epidemiological approach as the attempt to identify the effect of culture through the variation in outcomes of individuals, who share the same institutional environment, but whose social norms are potentially different. Most empirical analyses focus on immigrants from various sending countries within one receiving country. In our context, the culture is the norm regarding illegitimacy (from the sending country) and the institutional environment is the local historical agricultural production structure (in the specific region of the receiving country, Austria). Compared to the traditional epidemiological approach we exploit not only variation in the cultural norm across groups of immigrants, but also variation in the institutional environment *within* the receiving country.

²⁰An equivalent estimation for all births to Austrian women is summarized in Table A.11.

torical illegitimacy ratio, and have a lasting effect until today. Based on data from the Austro-Hungarian Empire and modern Austria, we show that regions, which focused on animal husbandry (as compared to crop farming) had significantly higher illegitimacy ratios in the past, and female descendants of these societies are still more likely to approve illegitimacy and have a non-marital birth today. To establish causality, we exploit variation in the local agricultural suitability, which determined the historical dominance of animal husbandry. Since the differences in the agricultural production structure are completely obsolete in today's economy, we suggest to interpret the persistence in revealed and stated preferences as a cultural norm. Complementary evidence from an 'epidemiological approach' suggest that this norm is passed down through generations, and the family is the most important transmission channel. Our findings highlight the more general phenomenon that cultural norms can be shaped by economic conditions, and may persist, even if economic conditions become irrelevant. We suggest to study the origins of other cultural norms that are important for economic conditions today.

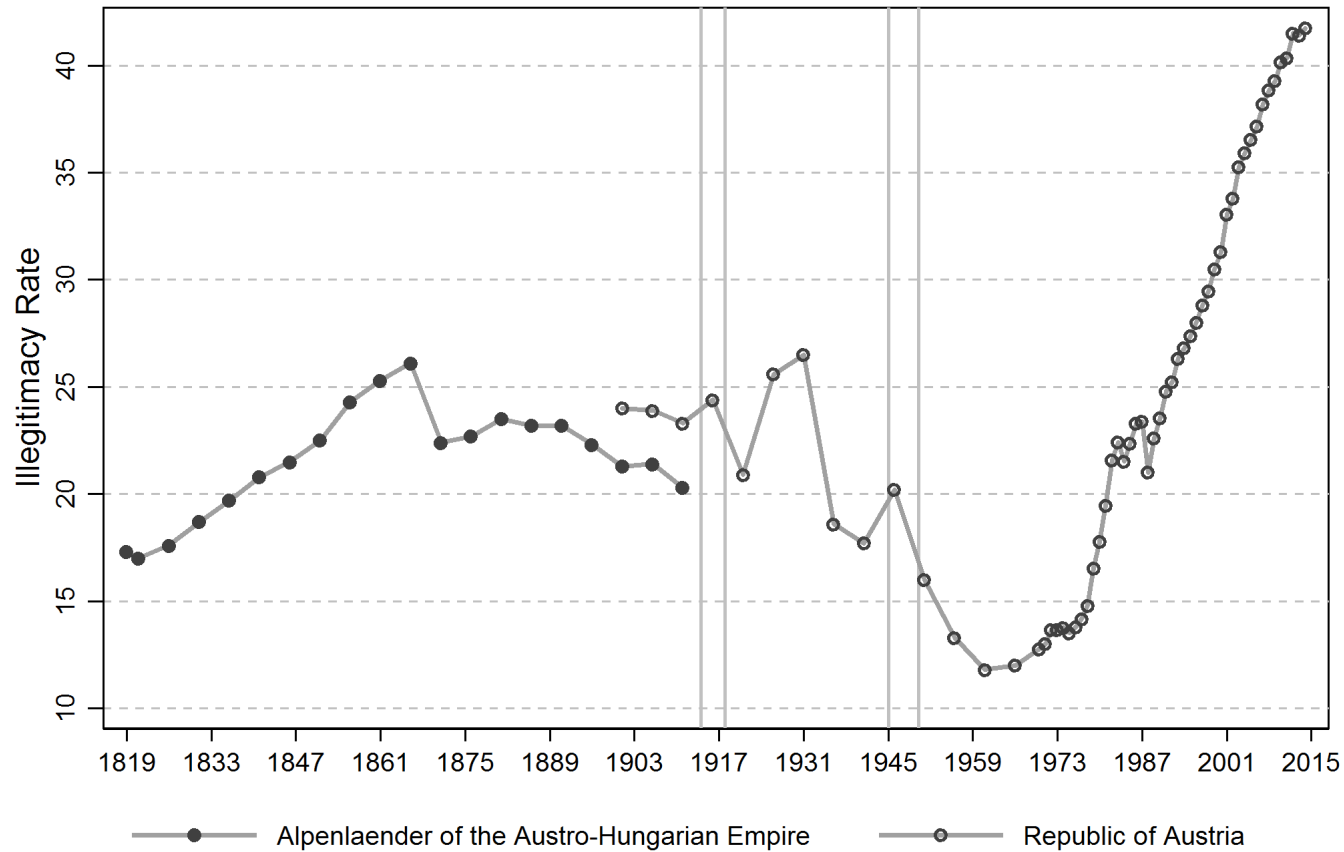
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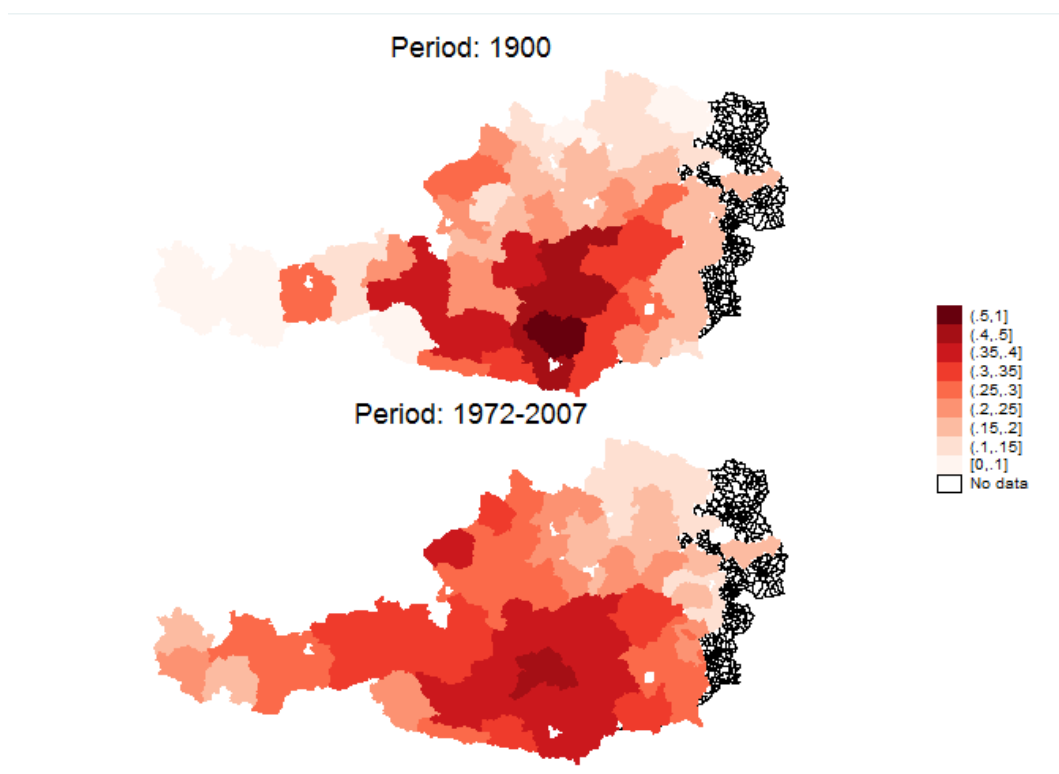
8 Tables and Figures (to be placed in article)

Figure 1: Development of the Share of Illegitimate Births in Austria, 1819–2014



Notes: Data for the years 1819 to 1966 are from Haslinger (1982). Data for the years 1970 to 2014 are retrieved from the statistical database of *Statistics Austria* (STATcube, accessed in August 2015). The vertical lines indicate the periods of WWI and WWII.

Figure 2: Share of Illegitimate Births in Austrian Districts



Notes: Missing data points are either city-districts (not in our sample) or municipalities in historic districts that we could not reconstruct with today's municipalities. Districts correspond to borders in 1900.

Figure 3: Share of Illegitimate Births in Austrian Communities by Decade

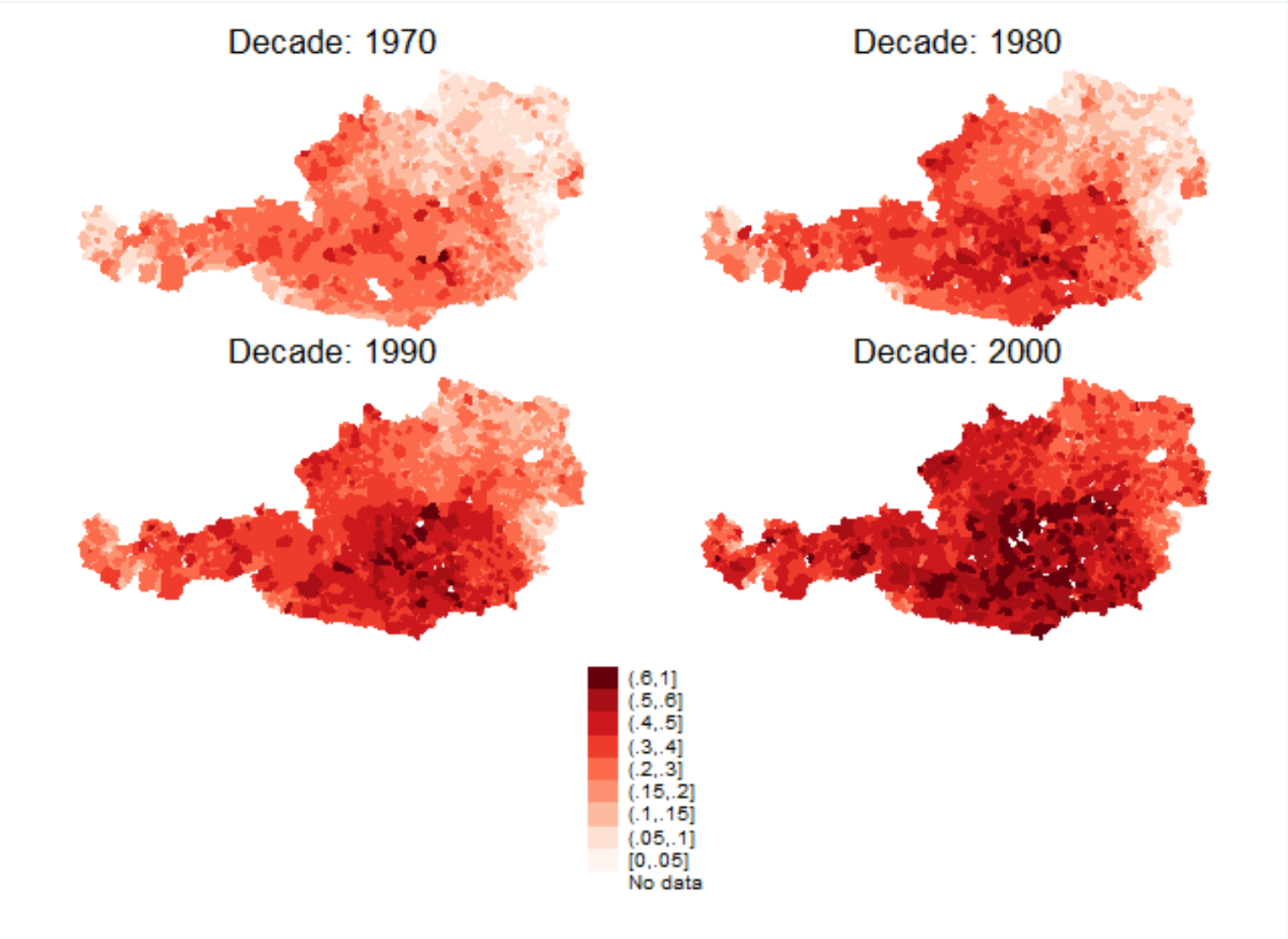
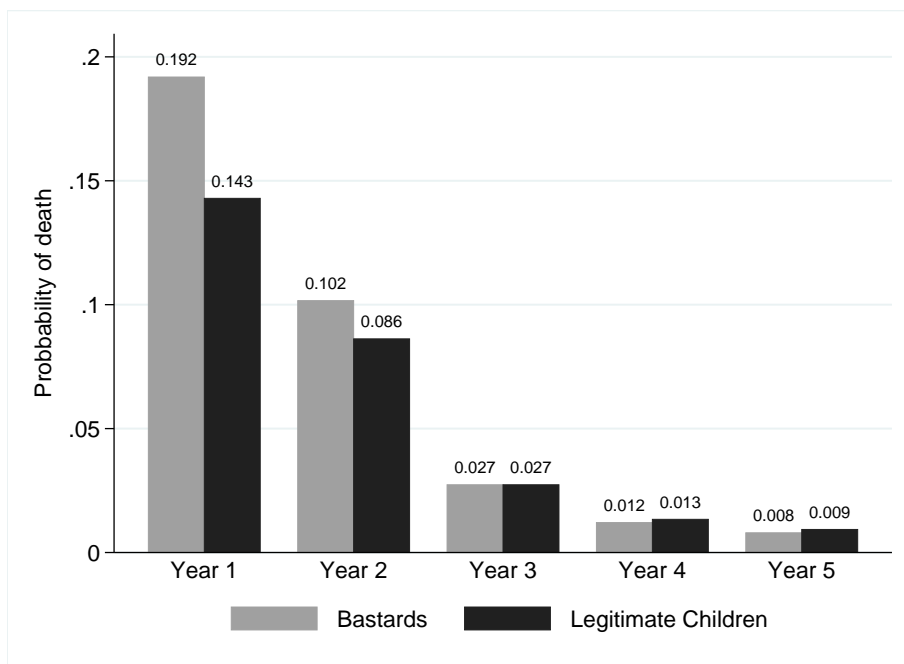


Figure 4: Probability of Remaining a Bastard



Note: Data is aggregated for Austria over the birth cohorts 1900–1904. The data come from the publications *Bewegung der Bevölkerung* of the years 1900–1909. The probability of legitimization is the number of legitimizations divided by the stock of illegitimate children. The lower bound assumes that all deaths of illegitimate children occurred on Jan. 1, while the upper bound assumes Dec. 31.

Figure 5: Probability of Death in Early Age by Legitimation Status



Note: Data is aggregated for Austria over the birth cohorts 1900–1904. The data come from the publications *Bewegung der Bevölkerung* of the years 1900–1909. Because children can get legitimized (but not the other way round), the probability of death for bastards is downward biased, while the probability of death for legitimate children is upward biased.

Figure 6: First-stage at the District Level

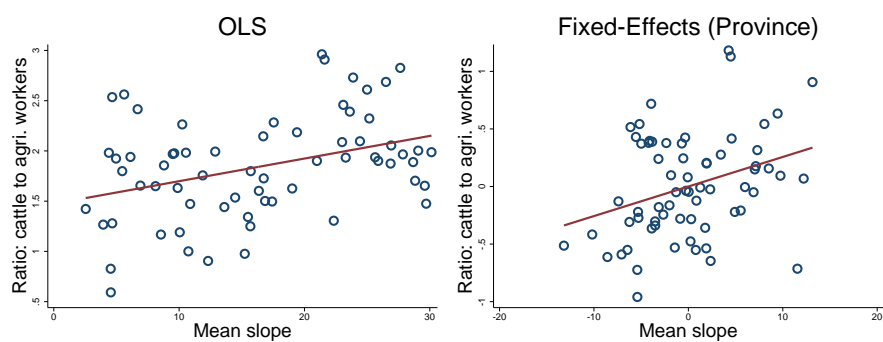


Figure 7: First-Stage at the Municipality Level

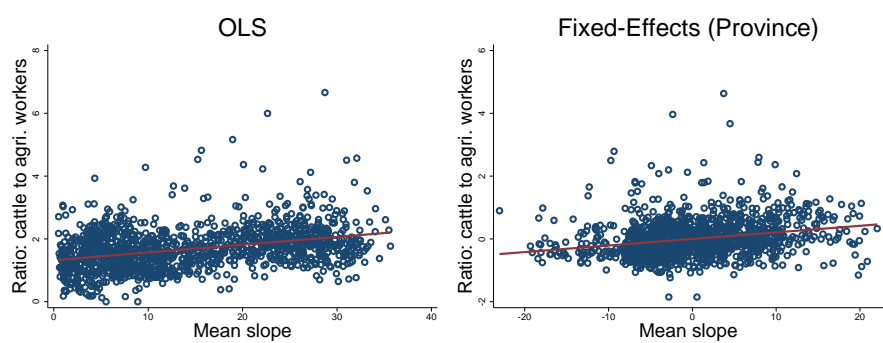


Table 1: Descriptive Statistics: District-Level

	Mean	Std. Dev.	Mean by quartile of ratio cattle to agri. workers			
			1st	2nd	3rd	4th
Bastardy						
Share of illegitimate births in 1900	0.21	0.11	0.15	0.21	0.18	0.30
Share of illegitimate births 1972–2007	0.26	0.08	0.21	0.26	0.23	0.33
Main Variables						
Ratio: cattle to agri. workers	1.84	0.51	1.18	1.69	1.97	2.49
Share of land used as field	0.26	0.19	0.35	0.27	0.22	0.20
Share of servants	0.09	0.04	0.07	0.09	0.08	0.13
Share of farms with ≤ 5 hectare land	0.48	0.13	0.56	0.49	0.47	0.39
Share of farms with > 20 hectare land	0.20	0.11	0.12	0.19	0.18	0.31
Fertility and Nuptiality						
Marital fertility rate	273.11	35.15	262.94	271.79	289.72	268.36
Non-marital fertility rate	46.61	23.72	33.54	44.57	41.59	65.68
Mean age at marriage (females)	29.17	1.04	29.11	29.16	28.82	29.58
Ratio of deceased children (0–5) to births	0.29	0.04	0.31	0.28	0.29	0.27
Instrumental Variables						
Mean slope	16.37	8.43	11.55	16.56	18.17	19.01
Control Variables						
Urbanization rate	0.43	0.21	0.55	0.41	0.42	0.35
Share of age < 14	0.31	0.02	0.31	0.31	0.32	0.32
Share of age 15–60	0.59	0.02	0.59	0.59	0.58	0.59
Share employed in agriculture	0.59	0.13	0.56	0.61	0.59	0.61
Share employed in manufacturing	0.21	0.11	0.23	0.21	0.22	0.19
Share employed in services	0.05	0.03	0.06	0.05	0.05	0.05
Share of catholics	0.98	0.03	0.98	0.98	0.98	0.99
Share of illiterate	0.09	0.07	0.07	0.10	0.07	0.11
Log. teacher income	7.41	0.25	7.48	7.38	7.36	7.44

Notes: All variables without an indication of the year are either measured in 1900/1902 or time-invariant. The level of observation is a district (N=66). The (non-)marital fertility rate is defined as the number of (il)legitimate births per 1,000 (un)married women at age 14–45. The mean slope is calculated from a digital terrain model of Austria with a 10×10 meter grid size. The urbanization rate is defined as the share of the population that lives in towns with more than 500 inhabitants. Teacher income measures the mean total income of a male teacher as reported in the *Volksschulstatistik 1900*.

Table 2: Descriptive Statistics: Municipality-Level

	Mean	Std. Dev.	Mean by quartile of ratio cattle to agri. workers			
			1st	2nd	3rd	4th
Bastardy						
Share of illegitimate births 1972–2007	0.25	0.09	0.20	0.23	0.27	0.30
Main Variables						
Ratio: cattle to agri. workers in 1900	1.67	0.67	0.90	1.45	1.83	2.51
Instrumental Variables						
Mean slope	14.24	9.56	8.97	13.25	16.70	18.06
Mean precipitation in summer	6.94	2.13	5.56	6.81	7.64	7.73
Mean sunshine in July	50.53	3.33	53.57	50.53	49.20	48.83
Mean cloud cover in July	59.01	3.69	55.12	59.13	60.81	60.99
Mean humidity in July	72.10	2.25	70.12	72.04	73.13	73.10
Mean temperature in July	15.89	2.70	17.87	16.10	14.99	14.61
Control Variables						
Share in agriculture in 1934	0.56	0.20	0.62	0.56	0.57	0.49
Log. population in 1900	6.91	0.63	7.07	6.96	6.83	6.78
Dummy: market status in 2013	0.32	0.47	0.40	0.34	0.27	0.27
Dummy: factory in 1900	0.19	0.39	0.23	0.17	0.16	0.20
Dummy: large land holding in 1900	0.59	0.49	0.63	0.62	0.54	0.56

Notes: The level of observation is a municipality (N=1,318). The mean slope is calculated from a digital terrain model of Austria with a 10×10 meter grid size. Climate data are averages for 1961–1990 and was published as GIS raster data by the Austrian meteorological institute (ZAMG). The share of the population in agriculture was first published at the municipality level in 1934, which we use as a proxy for the share of the population in agriculture in 1900.

Table 3: Birth Status of Child by Occupation of Father or Unmarried Mother

	Birth status of child (in %)	
	Legitimate	Illegitimate
Occupation of father or unmarried mother		
Servant in agriculture	20.1	79.9
Day laborer in agriculture	84.3	15.7

Notes: Austrian part of Monarchy, Data source: *Bewegung der Bevölkerung 1900*.

Table 4: Animal Husbandry and Farmhand Societies in 1900

	Dependent variable: Share of servants of total population in 1900						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ratio: cattle to agri. workers	0.047*** (0.009)	0.038*** (0.008)	0.034*** (0.008)	0.049*** (0.007)	0.040*** (0.007)	0.039*** (0.008)	0.039*** (0.008)
Urbanization rate			-0.042** (0.021)				0.008 (0.024)
<i>Age structure (Base group: Share > 60)</i>							
Share <14				-1.519*** (0.337)			-0.312 (0.502)
Share 15 to 60				-0.865*** (0.283)			0.473 (0.563)
<i>Sectoral composition (Base group: Residual share)</i>							
Agriculture					0.080 (0.108)		0.065 (0.107)
Manufacturing					-0.091 (0.108)		-0.127 (0.102)
Services					0.229 (0.257)		0.028 (0.251)
Share of catholics						0.399*** (0.139)	0.181 (0.133)
Share of illiterate						-0.001 (0.001)	0.000 (0.001)
Log. teacher income						-0.021 (0.038)	0.017 (0.039)
Province FE		Yes	Yes	Yes	Yes	Yes	Yes
No. observations	66	66	66	66	66	66	66
Adj. R-squared	0.30	0.57	0.59	0.67	0.67	0.62	0.74
Mean of dep. var.	0.09	0.09	0.09	0.09	0.09	0.09	0.09
S.d. of dep. var.	0.04	0.04	0.04	0.04	0.04	0.04	0.04

Notes: All independent variables measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 5: Different Proxies for Farmhand Societies and Bastardy in 1900

Dependent variable: Bastardy (illegitimacy share in 1900)				
	(1)	(2)	(3)	(4)
Share of servants	0.970*** (0.266)			
Share servants of agri. workers		0.669*** (0.084)		
Share non-family agri. workers			0.693*** (0.076)	
Share permanent agri. workers				0.589*** (0.144)
Province FE	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>	<i>Yes</i>
No. observations	66	66	66	66
Adj. R-squared	0.63	0.78	0.81	0.64
Mean of dep. var.	0.21	0.21	0.21	0.21
S.d. of dep. var.	0.11	0.11	0.11	0.11
Mean of indep. var.	0.09	0.24	0.28	0.61

Notes: *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 6: Farmhand Societies and Bastardy in 1900

	Dependent variable: Bastardy (illegitimacy share in 1900)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Share of servants	1.554*** (0.257)	0.970*** (0.266)	1.272*** (0.262)	1.158*** (0.221)	1.524*** (0.213)	1.008*** (0.244)	1.440*** (0.267)
Urbanization rate			0.162*** (0.049)				0.027 (0.052)
<i>Age structure (Base group: Share > 60)</i>							
Share <14				3.015*** (0.725)			0.708 (1.006)
Share 15 to 60				3.532*** (0.616)			0.643 (1.206)
<i>Sectoral composition (Base group: Residual share)</i>							
Agriculture					-0.838*** (0.207)		-0.721*** (0.241)
Manufacturing					-0.418* (0.215)		-0.438* (0.232)
Services					-0.764 (0.483)		-0.733 (0.555)
Share of catholics						-0.787** (0.309)	-0.418 (0.287)
Share of illiterate						0.007*** (0.002)	0.003* (0.002)
Log. teacher income						0.256*** (0.082)	0.003 (0.088)
Province FE		Yes	Yes	Yes	Yes	Yes	Yes
No. observations	66	66	66	66	66	66	66
Adj. R-squared	0.35	0.63	0.68	0.76	0.81	0.73	0.80
Mean of dep. var.	0.21	0.21	0.21	0.21	0.21	0.21	0.21
S.d. of dep. var.	0.11	0.11	0.11	0.11	0.11	0.11	0.11

Notes: All independent variables measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 7: Persistence of Bastardy

Dependent variable: Bastardy today (illegitimacy share 1972-2007)							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Bastardy in 1900	0.559*** (0.064)	0.420*** (0.055)	0.426*** (0.057)	0.431*** (0.064)	0.432*** (0.063)	0.375*** (0.065)	0.395*** (0.072)
Urbanization rate			-0.014 (0.024)				-0.007 (0.033)
<i>Age structure (Base group: Share >60)</i>							
Share <14				-0.478 (0.432)			-0.713 (0.636)
Share 15 to 60				-0.192 (0.405)			-0.216 (0.741)
<i>Sectoral composition (Base group: Residual share)</i>							
Agriculture					0.028 (0.146)		0.016 (0.158)
Manufacturing					0.099 (0.144)		0.101 (0.152)
Services					-0.402 (0.319)		-0.551 (0.357)
Share of catholics						-0.165 (0.168)	-0.248 (0.184)
Share of illiterate						0.002 (0.001)	0.002 (0.001)
Log. teacher income						0.023 (0.048)	0.048 (0.055)
Province FE		Yes	Yes	Yes	Yes	Yes	Yes
No. observations	66	66	66	66	66	66	66
Adj. R-squared	0.54	0.86	0.86	0.86	0.86	0.86	0.86
Mean of dep. var.	0.26	0.26	0.26	0.26	0.26	0.26	0.26
S.d. of dep. var.	0.08	0.08	0.08	0.08	0.08	0.08	0.08

Notes: All independent variables measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 8: Linking Historical Animal Husbandry and Bastardy Today: OLS estimates

	Dependent variable: Bastardy today (illegitimacy share 1972-2007)					
	(1)	(2)	(3)	(4)	(5)	(6)
	District-level estimates			Municipality-level estimates		
Ratio: cattle to agri. workers	0.084*** (0.018)	0.050*** (0.010)	0.052*** (0.013)	0.051*** (0.003)	0.033*** (0.003)	0.031*** (0.003)
Province FE		Yes	Yes		Yes	Yes
Urbanization control			Yes			
Demographic controls			Yes			
Sector of Employment controls			Yes			
Human capital controls			Yes			
Municipality controls						Yes
No. observations	66	66	66	1,318	1,318	1,318
Adj. R-squared	0.25	0.80	0.83	0.14	0.57	0.58
Mean of dep. var.	0.26	0.26	0.26	0.25	0.25	0.25
S.d. of dep. var.	0.08	0.08	0.08	0.09	0.09	0.09

Notes: All independent variables measured in year 1900. The unit of observation is either a district according to borders in 1900 (columns (1) to (3)) or a municipality according to borders in 2013 (columns (4) to (6)). *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 9: Linking Historical Animal Husbandry and Bastardy Today: IV Estimates

	Dependent variable: Bastardy today (illegitimacy share 1972-2007)					
	(1)	(2)	(3)	(4)	(5)	(6)
	District-level estimates			Municipality-level estimates		
Panel A: IV estimates						
Ratio: cattle to agri. workers	0.217*** (0.065)	0.114*** (0.039)	0.083** (0.039)	0.132*** (0.012)	0.106*** (0.014)	0.104*** (0.013)
Panel B: First stage estimates						
	Dependent variable: Ratio of cattle to agricultural workers					
Mean slope of municipality	0.023*** (0.007)	0.026** (0.010)	0.026** (0.012)	0.025*** (0.002)	0.021*** (0.002)	0.021*** (0.002)
F-statistic	10.06	6.76	4.99	187.14	83.05	103.11
Adj. R-squared	0.12	0.23	0.51	0.12	0.25	0.39
Province FE		Yes	Yes		Yes	Yes
Urbanization control			Yes			
Demographic controls			Yes			
Sector of Employment controls			Yes			
Human capital controls			Yes			
Municipality controls						Yes
No. observations	66	66	66	1,318	1,318	1,318

Notes: All independent variables measured in year 1900. The unit of observation is either a district according to borders in 1900 (columns (1) to (3)) or a municipality according to borders in 2013 (columns (4) to (6)). *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table 10: Linking Historical Animal Husbandry and Bastardy Today: IV Estimates with Alternative IVs

	Dependent variable: Bastardy today (illegitimacy share 1972-2007)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: IV estimates							
Ratio: cattle to agri. workers	0.121*** (0.015)	0.109*** (0.010)	0.087*** (0.008)	0.115*** (0.012)	0.091*** (0.010)	0.092*** (0.008)	0.090*** (0.008)
Panel B: First stage estimates							
	Dependent variable: Ratio cattle to agricultural workers						
Mean precipitation in summer	0.098*** (0.010)					0.035*** (0.013)	0.050*** (0.014)
Mean sunshine in July		-0.072*** (0.005)				-0.015* (0.008)	-0.016* (0.008)
Mean cloud cover in July			0.086*** (0.005)			0.075*** (0.011)	0.080*** (0.011)
Mean humidity in July				0.109*** (0.009)		-0.017 (0.015)	-0.019 (0.015)
Mean temperature in July					-0.096*** (0.007)	0.004 (0.012)	-0.023* (0.014)
Mean slope of municipality							-0.013*** (0.003)
F-statistic	95.88	222.45	297.48	153.59	176.18	62.68	55.32
Adj. R-squared	0.39	0.44	0.47	0.42	0.42	0.47	0.48
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	1,318	1,318	1,318	1,318	1,318	1,318	1,318

Notes: *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively. Precipitation is measured in 100 liters per square meter.

Table 11: Linking Historical Animal Husbandry and Bastardy Today: Stated Preferences

	Woman can have child as single parent even without stable relationship: strongly disagree (1), disagree (2), neither agree nor disagree (3), agree (4), or strongly agree (5).			
	Dependent variable: ordinal 5-point scale		Dependent variable: Binary Equal to one if (strongly) agree	
	(1)	(2)	(3)	(4)
Bastardy in home district in 1900 ^b	1.053*		0.895***	
	(0.547)		(0.291)	
Ratio: cattle to agri. workers in 1900 ^c		0.235**		0.094*
		(0.090)		(0.052)
Male	-0.154***	-0.149***	-0.110***	-0.113***
	(0.056)	(0.055)	(0.040)	(0.040)
<i>Respondent's marital status (base group: single)</i>				
Married	-0.133**	-0.133**	-0.083**	-0.087**
	(0.057)	(0.057)	(0.036)	(0.036)
Divorced	0.204*	0.205*	0.087	0.085
	(0.120)	(0.120)	(0.079)	(0.080)
Widowed	0.239	0.217	0.312**	0.309**
	(0.417)	(0.423)	(0.135)	(0.135)
Number of children	-0.071**	-0.072**	-0.026	-0.025
	(0.029)	(0.029)	(0.016)	(0.016)
<i>Respondent's decade of birth (base group: 1960s)</i>				
1970s	-0.041	-0.043	-0.035	-0.037
	(0.067)	(0.067)	(0.035)	(0.035)
1980s	-0.023	-0.027	-0.033	-0.035
	(0.081)	(0.081)	(0.041)	(0.042)
Province fixed effects	Yes	Yes	Yes	Yes
District-level covariates ^c	Yes	Yes	Yes	Yes
Number of observations	1,126	1,126	1,126	1,126
Adj. R-squared	0.046	0.048	0.056	0.050
Mean of dependent variable	3.085	3.085	0.391	0.391

Notes: Estimations are based on individual-level survey data from the *Generations & Gender Programme* survey (First Wave from Austria). Method of estimation is OLS. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively. ^a ADD, ^b ADD, ^c ADD

Table 12: Determinants of illegitimacy in the sample of immigrant women in Austria

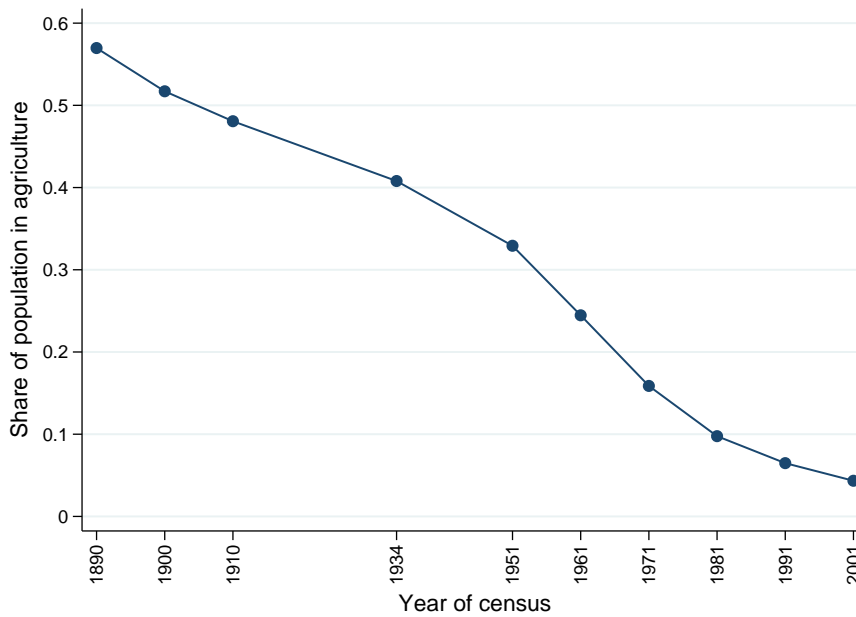
	Dependent variable: Binary variable indicating an illegitimate birth in the sample of all births to immigrant women in Austria between				
	1972 and 2007		1984 and 2007 ^a		
	(1)	(2)	(3)	(4)	(5)
Bastardy in home district in 1900 ^b	0.113** (0.054)	0.110** (0.053)	0.106** (0.046)	0.107** (0.044)	0.083* (0.043)
Bastardy in sending country around 1950 ^c	0.838*** (0.063)	0.826*** (0.065)	0.716*** (0.061)	0.668*** (0.058)	0.322*** (0.036)
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Conception year fixed effects	Yes	Yes	Yes	Yes	Yes
District-level covariates	Yes	Yes	Yes	Yes	Yes
Mother's age	No	Yes	Yes	Yes	Yes
Parity	No	Yes	Yes	Yes	Yes
Mother's educational attainment	No	No	No	Yes	Yes
Mother's religious denomination	No	No	No	No	Yes
Number of observations	149,002	149,002	115,796	115,796	115,796
Adj. R-squared	0.030	0.059	0.057	0.060	0.079
Mean of dependent variable	0.119	0.119	0.119	0.119	0.119

Individual-level data on Non-Austrian mothers. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively. ^a Information on mothers educational attainment and religious denomination was not collected in the *Austrian Birth Register* before 1984.

Web Appendix

This Web Appendix (not for publication) provides additional material discussed in the unpublished manuscript ‘Economic Origins of Cultural Norms: The Case of Animal Husbandry and Bastardy’ by Christoph Eder and Martin Halla.

Figure A.1: Evolution of the Share of the Population in Agriculture



Notes: The graph summarizes the share of the population affiliated with the agricultural sector by year. The sample replicates the sample of our district level analysis: districts within today’s borders of Austria without city-districts.

Table A.1: Percent of All Births to Unmarried Women for Selected OECD Countries, by Decade

	(I)	(II)	(III)	(IV)	(V)	(VI)	(VII)	(VII)
	1925	1940s	1950s	1960s	1970s	1980s	1990s	2000s
<i>Souther European countries</i>								
Greece				1.1	1.3	1.8	3.0	5.1
Italy	5.0			2.1	2.9	5.2	7.7	14.3
Spain	6.1			1.7	1.9	6.8	11.8	25.8
Portugal				8.1	7.4	11.7	17.9	29.8
Mean of region				3.3	3.3	6.4	10.1	18.8
<i>Western European countries</i>								
Austria	22.4			11.9	14.0	21.6	27.1	36.0
Belgium	5.1			2.3	3.1	7.2	17.4	37.2
France	8.7			6.1	8.3	19.2	36.5	47.4
Germany	12.0			6.2	8.5	13.8	16.4	28.4
Netherlands	1.8			1.8	2.4	7.7	15.8	34.0
Switzerland	3.7			4.0	3.9	5.6	7.3	14.0
Mean of region				5.4	6.7	12.5	20.1	32.8
<i>Anglo-Saxon countries</i>								
Australia				6.5	10.0	15.7	25.4	31.4
New Zealand				9.8	16.7	25.9	39.3	44.5
United Kingdom	4.1			7.0	9.0	19.2	33.5	42.3
Unites States		3.7	4.4	11.1	14.6	22.1	31.4	34.2
Mean of region				8.6	12.6	20.7	32.4	38.1
<i>Nordic countries</i>								
Denmark	10.5			9.6	20.4	41.2	46.1	45.5
Iceland	14.4			27.2	33.7	47.0	60.0	64.1
Norway	6.7			4.6	10.0	24.4	45.5	52.0
Sweden	14.5			13.7	30.1	45.8	51.8	55.3
Mean of region				13.8	23.5	39.6	50.8	54.3
Overall Mean				7.3	10.9	18.9	27.7	35.9

Notes: Columns IV to VIII are calculated based on data used in Lackner *et al.* (2016).

Table A.2: Share of In-kind Payments for Different Servant Groups in 1893

	N	Mean	Std. Dev.	Min.	Max.
Share of in-kind payments					
Higher servant	94	0.583	0.096	0.143	0.806
Simple servant	76	0.682	0.097	0.500	0.910
Higher maid	104	0.641	0.097	0.207	0.833
Simple maid	101	0.685	0.094	0.405	0.895

Notes: *N* indicates the number of court districts (subdivision of districts) this estimate is based on. Source: *Die landwirtschaftlichen Löhne in den im Reichsrathe vertretenen Königreichen und Ländern nach dem Stande des Jahres 1893*. Bureau der K. K. statistischen Central-Commission.

Table A.3: Linking Historical Animal Husbandry and Bastardy Today: OLS Estimates Using Municipality-level Data: Robustness Checks

	Dependent variable: Bastardy today (illegitimacy share 1972-2007)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ratio: cattle to agri. workers	0.031*** (0.003)	0.028*** (0.003)	0.028*** (0.003)	0.029*** (0.003)	0.031*** (0.003)	0.029*** (0.003)	0.025*** (0.003)
Log. mean income in 2010		-0.068*** (0.015)					0.012 (0.024)
Share employed in agriculture 2011			0.035 (0.047)				0.068 (0.052)
Share employed in sec. sector 2011			0.187*** (0.026)				0.175*** (0.033)
Share education: apprenticeship 2011				0.001 (0.001)			0.001 (0.001)
Share education: high school 2011				-0.003*** (0.001)			-0.003*** (0.001)
Share education: tertiary 2011				0.000 (0.001)			0.002** (0.001)
Share employed in tourism 2011					0.051 (0.041)		-0.073 (0.071)
Log. beds in tourism p. c. in 2013						0.023*** (0.006)	0.042*** (0.010)
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	1,318	1,318	1,318	1,318	1,318	1,318	1,318
Adj. R-squared	0.58	0.58	0.60	0.60	0.58	0.58	0.61
Mean of dep. var.	0.25	0.25	0.25	0.25	0.25	0.25	0.25
S.d. of dep. var.	0.09	0.09	0.09	0.09	0.09	0.09	0.09

Notes: If not indicated differently, all independent variables are measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table A.4: Linking Historical Animal Husbandry and Bastardy Today: IV Estimates Using Municipality-level Data: Robustness Checks

	Dependent variable: Bastardy today (illegitimacy share 1972-2007)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Panel A: IV estimates							
Ratio: cattle to agri. workers	0.104*** (0.013)	0.112*** (0.018)	0.142*** (0.026)	0.103*** (0.015)	0.117*** (0.017)	0.109*** (0.017)	0.197*** (0.067)
Log. mean income in 2010		0.034 (0.028)					0.036 (0.044)
Share employed in agriculture 2011			-0.510*** (0.139)				-0.749** (0.330)
Share employed in sec. sector 2011			0.131*** (0.038)				0.002 (0.089)
Share education: apprenticeship 2011				0.000 (0.001)			-0.003 (0.002)
Share education: high school 2011				-0.004*** (0.001)			-0.006*** (0.002)
Share education: tertiary 2011				0.003*** (0.001)			0.001 (0.002)
Share employed in tourism 2011					-0.159** (0.065)		-0.415** (0.183)
Log. beds in tourism p. c. in 2013						-0.008 (0.010)	0.023 (0.020)
Panel B: First stage estimates							
	Dependent variable: Ratio cattle to agricultural workers						
Mean slope of municipality	0.021*** (0.002)	0.017*** (0.002)	0.013*** (0.002)	0.019*** (0.002)	0.018*** (0.002)	0.018*** (0.002)	0.007*** (0.002)
F-statistic	103.11	62.09	39.09	81.88	73.80	67.35	9.52
Adj. R-squared	0.39	0.42	0.44	0.41	0.40	0.40	0.46
Province FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. observations	1,318	1,318	1,318	1,318	1,318	1,318	1,318

Notes: If not indicated differently, all independent variables are measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table A.5: Correlation of Historic and Contemporary Climate Data

	N	Corr. Coeff.
Mean temperature	48	0.999
Mean temperature in January	48	0.995
Mean temperature in July	48	0.999
Mean precipitation in winter	38	0.938
Mean precipitation in summer	38	0.978
Mean air pressure	10	1.000
Mean sunshine in January	10	0.833
Mean sunshien in July	10	0.973

Notes: Data are from the HISTALP project (<http://www.zamg.ac.at/histalp/>). The historic period uses data from 1896–1925; the contemporary period from 1961–1990. N indicates the number of weather stations. ADD TEXT

Table A.6: Fertility

	Dependent variable: Log. fertility		
	All	Marital	Non-marital
	(1)	(2)	(3)
Panel A: OLS estimates			
Ratio: cattle to agri. workers	0.067***	-0.021	0.489***
	(0.021)	(0.027)	(0.096)
Adj. R-squared	0.71	0.66	0.82
Panel B: IV estimates			
Ratio: cattle to agri. workers	0.105*	-0.060	0.916***
	(0.061)	(0.079)	(0.323)
Panel C: First stage estimates			
	Dep. var.: Ratio of cattle to agri. workers		
Mean slope of district	0.026**	0.026**	0.026**
	(0.012)	(0.012)	(0.012)
F-statistic	4.99	4.99	4.99
Adj. R-squared	0.51	0.51	0.51
Province FE	Yes	Yes	Yes
Urbanization control	Yes	Yes	Yes
Demographic controls	Yes	Yes	Yes
Sector of Employment controls	Yes	Yes	Yes
Human capital controls	Yes	Yes	Yes
No. observations	66	66	66
Mean of dep. var.	4.90	5.60	3.69
S.d. of dep. var.	0.10	0.12	0.60

Notes: The (non-)marital fertility rate is defined as the number of (il)legitimate births per 1,000 (un)married women at age 14–45. If not indicated differently, all independent variables are measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table A.7: Age at Marriage

	Dependent variable: Age at marriage (females)		
	(1)	(2)	(3)
Panel A: OLS estimates			
Ratio: cattle to agri. workers	0.362 (0.249)	0.083 (0.268)	-0.099 (0.275)
Adj. R-squared	0.02	0.13	0.51
Panel B: IV estimates			
Ratio: cattle to agri. workers	-0.002 (0.677)	-1.180 (0.915)	-0.398 (0.789)
Panel C: First stage estimates Dep. var.: Ratio of cattle to agri. workers			
Mean slope of district	0.023*** (0.007)	0.026** (0.010)	0.026** (0.012)
F-statistic	10.06	6.76	4.99
Adj. R-squared	0.12	0.23	0.51
Province FE		Yes	Yes
Urbanization control			Yes
Demographic controls			Yes
Sector of Employment controls			Yes
Human capital controls			Yes
No. observations	66	66	66
Mean of dep. var.	29.17	29.17	29.17
S.d. of dep. var.	1.04	1.04	1.04

Notes: If not indicated differently, all independent variables are measured in year 1900. The unit of observation is a district according to borders in 1900. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively.

Table A.8: Illegitimate Percentage of all Live Births

Country	Number of Births	Share Illegitimates	Years	Comment
(Former) Yugoslavia	63,614	7.24	1950-57	
Turkey	46,764			
Germany	14,393	9.38	1949-58	Weighted Average
Romania	5,676	9.22	1907-35	
Czechoslovakia	3,163	5.49	1949-57	
West Germany	2,729	8.23	1949-58	
Hungary	2,171	7.50	1949-58	
Poland	2,156	5.15	1955-56	
Russian Federation	2,076	2.72	1876-1900	
Switzerland	1,892	3.64	1949-58	
Italy	1,819	3.22	1949-57	
Netherlands	1,095	1.33	1949-58	
Philippines	871	2.16	1952-53; 56-58	Weighted Average
United Kingdom	766	4.77	1949-58	
Thailand	742			
United States	625	4.20	1949-57	
Egypt	611	0.10	1949-57	Health Bureau Localities Federal District
Brazil	597	13.18	1949-52	
China (PR)	560			
France	542	6.58	1949-58	
Ukraine	518			
Bulgaria	466	4.63	1949-58	
India	432			
Iran	347			
Sweden	326	9.88	1949-57	
Dominican Rep.	311	59.92	1949-58	
Albania	303	0.49	1951-57	
Vietnam	270			
Tunisia	252	4.84	1949-56	European Pop. Lagos: Indigenous Pop.
Nigeria	221	0.23	1953-58	
Afghanistan	214			
Belgium	210	2.24	1949-58	
Spain	207	4.48	1949-58	
Pakistan	192			
Iraq	166			
Belarus	162			
Armenia	155			
Finland	149	4.59	1949-58	Southern Zone
Morocco	149	4.78	1949-56	
Denmark	145	6.94	1949-57	
Canada	140	3.88	1949-58	
Japan	138	1.98	1949-57	
Portugal	131	11.15	1949-58	
Australia	129	4.08	1949-58	
South Korea	126	0.57	1981-83	
Georgia	126			
China	125	2.48	1949-58	
Mexico	119	25.38	1952-57	
Mongolia	119			
Indonesia	114	7.10	1949-51	European Pop.
Ghana	108			
Norway	106	3.73	1949-57	
Peru	104	43.16	1949-57	
Liechtenstein	102	3.31	1951-58	
Lebanon	100			
Greece	92	1.43	1956-58	
Argentina	87	24.81	1949-58	
East Germany	85	12.80	1949-58	
Colombia	84	27.17	1949-57	
Cuba	72	30.80	1929	
Soviet Union	68	2.72	1876-1900	
Moldova	66			
Bangladesh	65			
Cambodia	62			
Lithuania	53	6.40	1921-25; 31-40	
Taiwan	52	2.48	1949-58	
Venezuela	51	57.46	1949-56	
Malaysia	49			

Continued on next page

Table A.8 – continued from previous page

Country	Number of Births	Share Illegitimates	Years	Comment
Kenya	48			
Ireland	47	2.20	1949-58	
Sri Lanka	47	6.53	1977-82	
Latvia	44	4.60	1922	
Algeria	43	3.02	1949-57	Self-calculated
Chile	43	18.26	1949-58	
Kongo-Kinshasa	42			
Luxembourg	41	3.29	1949-58	
Jordan	37			
Ecuador	36	33.83	1954-57	
Azerbaijan	32			
New Zealand	30	4.36	1949-57	European Pop.
South Africa	30	11.47	1949-57	Self-calculated
Cameroon	28			
Israel	26	0.28	1950-57	Jewish Pop.
Kyrgyzstan	24			
Libya	24			
North Korea	22			
Burundi	20	6.88	1949-54	White Pop.
Costa Rica	19	24.48	1949-58	
Bolivia	19	32.33	1949-56	
Iceland	18	26.44	1949-56	
Somalia	18			
Mauritius	17	26.13	1951-58	
Nepal	17			
Ethopia	15			
Angola	14	36.96	1949-58	Church Registers
Tanzania	14			
Paraguay	12	48.13	1951-57	
Jamaica	12	70.61	1977-83	
Singapore	12			
Uzbekistan	12			
Trinidad und Tobago	11	51.05	1949-58	
Senegal	11			
Cyprus	9	0.57	1949-58	
Nicaragua	9	56.30	1957	
Malta	8	0.83	1952-58	
Namibia	8	0.92	1949-57	
Guatemala	8	69.93	1955-58	
Papua New Guinea	7	1.80	1949-58	Not-indigenous Pop.
Uruguay	7	21.87	1949-54	
Kongo-Brazzaville	7			
Panama	6	66.27	1952-58	Weighted Average
Kazakhstan	6			
Zimbabwe	5	1.27	1949-58	European Pop.
Rwanda	5	6.88	1949-54	White Pop.
Fiji	5	17.3	1978	
Mozambique	5	30.14	1949-53; 56-57	"Civilized Pop."
Ivory Coast	5			
Sierra Leone	5			
Uganda	5			
Cape Verde	4	53.06	1968-74	
Gambia	4			
Mauretania	4			
Palestine	4			
Seychelles	3	41.52	1952-53; 56-58	
El Salvador	3	58.45	1949; 1953	
Benin	3			
Burkina Faso	3			
Burma	3			
Guinea	3			
Kuwait	3			
Laos	3			
Mali	3			
Saudi Arabia	3			
Sudan	3			
Tonga	2	10.16	1949-57	
Guinea-Bissau	2	64.07	1950-52	"Civilized Pop."
Honduras	2	65.07	1949-57	
Grenada	2	67.56	1949-58	
Liberia	2			

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Table A.8 – continued from previous page

Country	Number of Births	Share Illegitimates	Years	Comment
Madagascar	2			
Yemen	2			
Monaco	1	6.06	1949-53	
Western Samoa	1	10.16	1966-73	
Guyana	1	36.23	1949-58	Self-calculated
Andorra	1			
Central African Rep.	1			
Eritrea	1			
Haiti	1			
Other	4799			

Note: The percentage share of illegitimate births is calculated as arithmetic mean of the share of the years denoted in the respective column. Data is from ?UN 1959?, with the following exceptions: Data for Cape Verde and American Samoa is from ?UN1975?, for Fiji and Sri Lanka from ?UN1981? and for South Korea from ?UN1986?, for Latvia, Lithuania, and the Russian Federation or the Soviet Union is from ?Wimperis1960?. Weighted average: rates mit bevkerungsanteilen gewichtet (z.B. UK aus Schottland, England, Wales) Self-calculated: Mittelwert aus verschiedenen rates, z.B. indigene und weie Bevlkerung, aber keine Gewichtung

Table A.9: Individual Austrian

Dependent variable: Binary variable indicating an illegitimate birth in the sample of all births to Austrian women between					
	1972 and 2007		1984 and 2007 ^a		
	(1)	(2)	(3)	(4)	(5)
Bastardy in home district in 1900 ^b	0.394*** (0.082)	0.386*** (0.078)	0.375*** (0.086)	0.374*** (0.083)	0.371*** (0.083)
<i>Mother's age (base group: 20 years or below)</i>					
between 21 and 25 years		-0.277*** (0.008)	-0.253*** (0.005)	-0.236*** (0.006)	-0.235*** (0.005)
between 26 and 30 years		-0.381*** (0.012)	-0.363*** (0.007)	-0.333*** (0.007)	-0.334*** (0.007)
between 31 and 35 years		-0.389*** (0.013)	-0.370*** (0.007)	-0.333*** (0.007)	-0.337*** (0.008)
36 years and above		-0.365*** (0.014)	-0.337*** (0.007)	-0.301*** (0.007)	-0.307*** (0.008)
<i>Parity (base group: first)</i>					
Second		-0.233*** (0.007)	-0.235*** (0.008)	-0.244*** (0.008)	-0.243*** (0.008)
Third or higher		-0.281*** (0.010)	-0.283*** (0.012)	-0.305*** (0.012)	-0.301*** (0.012)
<i>Mother's educational attainment (base group: compulsory)</i>					
Apprenticeship				-0.037*** (0.003)	-0.047*** (0.003)
Interm. tech. and voc. school				-0.082*** (0.003)	-0.094*** (0.004)
Academic secondary school				-0.106*** (0.005)	-0.119*** (0.005)
University degree				-0.135*** (0.006)	-0.148*** (0.006)
Unknown				-0.040*** (0.008)	-0.048*** (0.009)
<i>Mother's religious denomination (base group: Catholic)</i>					
Protestant					0.006 (0.005)
Muslim					-0.366*** (0.013)
Other denomination					-0.164*** (0.011)
Unknown/Atheist					0.022*** (0.008)
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Conception year fixed effects	Yes	Yes	Yes	Yes	Yes
District-level covariates	Yes	Yes	Yes	Yes	Yes
Number of observations	1,870,497	1,870,497	1,146,613	1,146,613	1,146,613
Adj. R-squared	0.069	0.223	0.216	0.223	0.229
Mean of dependent variable	0.266	0.266	0.320	0.320	0.320

Notes: This table summarizes the estimated effect of historical bastardy in the residential district on the likelihood of a native Austrian women to have a illegitimate birth today. Thus, the dependent variable is equal to one if the mother was not married at the time of birth, and zero otherwise. All individual-level variables are based on the *Austrian Birth Register* (ABR). Method of estimation is OLS. Robust standard errors (allowing for clustering on the district levels and/or heteroskedasticity of unknown form) are in parentheses. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively. ^a Information on mothers educational attainment and religious denomination was not collected in the ABR before 1984. ^b This variable measures the share of illegitimate births in the residential district of the mother in the year 1900. ^c See Table XX.

Table A.10: Individual Non-Austrian

	Dependent variable: Binary variable indicating an illegitimate birth in the sample of all births to immigrant women in Austria between				
	1972 and 2007		1984 and 2007 ^a		
	(1)	(2)	(3)	(4)	(5)
Bastardy in home district in 1900 ^b	0.123** (0.052)	0.117** (0.048)	0.098** (0.043)	0.098** (0.043)	0.081* (0.046)
Bastardy in sending country around 1950 ^c	0.132*** (0.044)	0.138*** (0.046)	0.125** (0.050)	0.123** (0.049)	0.074 (0.048)
<i>Mother's age (base group: 20 years or below)</i>					
between 21 and 25 years		-0.149*** (0.014)	-0.146*** (0.018)	-0.146*** (0.018)	-0.146*** (0.017)
between 26 and 30 years		-0.165*** (0.016)	-0.156*** (0.021)	-0.153*** (0.020)	-0.159*** (0.019)
between 31 and 35 years		-0.144*** (0.018)	-0.137*** (0.023)	-0.131*** (0.022)	-0.142*** (0.021)
36 years and above		-0.114*** (0.019)	-0.106*** (0.025)	-0.099*** (0.023)	-0.115*** (0.022)
<i>Parity (base group: first)</i>					
Second		-0.108*** (0.005)	-0.109*** (0.005)	-0.111*** (0.005)	-0.107*** (0.005)
Third or higher		-0.125*** (0.007)	-0.127*** (0.008)	-0.129*** (0.008)	-0.121*** (0.007)
<i>Mother's educational attainment (base group: compulsory)</i>					
Apprenticeship				0.010* (0.005)	-0.005 (0.005)
Interm. tech. and voc. school				0.009 (0.006)	-0.016** (0.007)
Academic secondary school				-0.017*** (0.006)	-0.044*** (0.006)
University degree				-0.032*** (0.007)	-0.065*** (0.007)
Unknown				-0.017 (0.013)	-0.026** (0.012)
<i>Mother's religious denomination (base group: Catholic)</i>					
Protestant					0.067*** (0.007)
Muslim					-0.054*** (0.008)
Other denomination					0.010 (0.007)
Unknown/Atheist					0.078*** (0.009)
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Conception year fixed effects	Yes	Yes	Yes	Yes	Yes
District-level covariates	Yes	Yes	Yes	Yes	Yes
Number of observations	102,238	102,238	80,319	80,319	80,319
Adj. R-squared	0.013	0.056	0.061	0.062	0.073
Mean of dependent variable	0.159	0.159	0.157	0.157	0.157

Notes: Individual-level data on Non-Austrian mothers. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively. ^a Information on mothers educational attainment and religious denomination was not collected in the *Austrian Birth Register* before 1984.

Table A.11: Individual Austrian – less detail

	Dependent variable: Binary variable indicating an illegitimate birth in the sample of all births to Austrian women between				
	1972 and 2007		1984 and 2007 ^a		
	(1)	(2)	(3)	(4)	(5)
Bastardy in home district in 1900 ^b	0.394*** (0.082)	0.386*** (0.078)	0.375*** (0.086)	0.374*** (0.083)	0.371*** (0.083)
Mother's age	No	Yes	Yes	Yes	Yes
Parity	No	Yes	Yes	Yes	Yes
Mother's educational attainment	No	No	No	Yes	Yes
Mother's religious denomination	No	No	No	No	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Conception year fixed effects	Yes	Yes	Yes	Yes	Yes
District-level covariates	Yes	Yes	Yes	Yes	Yes
Number of observations	1,870,497	1,870,497	1,146,613	1,146,613	1,146,613
Adj. R-squared	0.069	0.223	0.216	0.223	0.229
Mean of dependent variable	0.266	0.266	0.320	0.320	0.320

Notes: This table summarizes the estimated effect of historical bastardy in the residential district on the likelihood of a native Austrian women to have a illegitimate birth today. Thus, the dependent variable is equal to one if the mother was not married at the time of birth, and zero otherwise. All individual-level variables are based on the *Austrian Birth Register* (ABR). Method of estimation is OLS. Robust standard errors (allowing for clustering on the district levels and/or heteroskedasticity of unknown form) are in parentheses. *, ** and *** indicate statistical significance at the 10% level, 5% level, and 1% level, respectively. ^a Information on mothers educational attainment and religious denomination was not collected in the ABR before 1984. ^b This variable measures the share of illegitimate births in the residential district of the mother in the year 1900.