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Breaking Up the Vendetta Honor Code?

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Abstract

We use a granular dataset on emigration to study the causes leading, in the latter half of the 20th century, to a decrease in homicides in Sardinia and specifically in Barbagia, an area historically governed by the honor-based *codice barbaricino*. We find that in communities where *vendetta* norms were more widespread, migration translated into a reduction in the murder rate, a proxy for the bite of the honor culture. This decline is observed both in the short and long term, and only obtains for honor-related crimes. Our interpretation of the results is that the short-run decrease in homicides following shepherds' migration is a consequence of the dilution of honor norms among adults, and hence lower usage of revenge for dispute settlement. In the long term, the shrink of the honor trait among adults implies a reduction in socialization of new cohorts to the *vendetta* code as well as decreased adherence to the honor norms due to diminished fear of community retaliation.

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1 Introduction

The region of Barbagia, located in the mountainous and rural center of Sardinia, has a long history of violence attributed to the dominant culture of honor known as the *codice barbaricino*. However, in recent years, the region has witnessed a significant decrease in the annual number of homicides. This study investigates the factors that have contributed to this moderation, focusing on the migration of shepherds that occurred during the two decades following 1965. The origin of this migratory event, which disproportionately impacted pastoral areas, is to be found in the fertility boom of the late 1930s. The life of shepherds in Barbagia took place in a harsh and vast landscape and their wealth was tied to livestock. These conditions, coupled with the historical absence of a formal authority enforcing property rights, provided an ideal environment for the emergence and flourishing of a culture of honor. Shepherds developed a reputation for being tough to defend their property rights and deter rustlers. The culture of honor was perpetuated through a 'sheepfold school,' which played a crucial role in instructing new generations about the norms and principles of the honor code, as highlighted by Lilliu (2002a). Education relied on socialized individuals passing on their honor traits to the next cohorts. Furthermore, a high fraction of the population sharing the honor culture ensured widespread adherence to the norms, as deviating from the prescribed behavior risked dishonorability and retaliation. This study aims to examine the consequences of a migratory event that led to a decrease in the number of socializers and enforcers within the community.

Our findings reveal that the migration of shepherds has resulted in a lower homicide rate. This effect is specific to honor-related crimes, but does not obtain for other offenses such as fraud. This relationship holds true both in the short and long run. The short-term effect is driven by the fact that after migration a lower fraction of adults relies on honor norms to settle disputes. The long-run reduction is instead attributed to two forces: on the one hand the community is deprived of socializers to honor norms, so that new generations do not learn their cultural code; on the other hand, a smaller share of people carrying an honor trait implies weaker threat of punishment by the community towards non-compliers. Overall, in Barbagia a 1 percentage point increase in emigration (equivalent to a 32.27% increase compared to the pre-1985 average) leads to a 23.43% reduction in the murder rate immediately after the migration event. Furthermore, our broader analysis reveals that, in the long run, a 1 percentage point increase in shepherds' migration resulted in a statistically significant 14.69% reduction in the homicide rate in municipalities with a stronger pre-existing honor culture. We capture

the initial impact of honor norms by examining the share of shepherds in each municipality in 1930.

Our results shed light on the cultural dynamics that are specific to honor cultures. The possession of an honor trait can be viewed as a best adaptation when individuals face tough environments. In such circumstances, acquiring a reputation for being ready to retaliate and engage in *vendettas* when offended is advantageous to deter potential offenders and securing property. However, the honor equilibrium, which relies on costly revenge, can only be sustained when a significant fraction of the population is socialized to the honor culture. As the environment becomes less harsh, the threat of dishonor following failure to retaliate diminishes, and the *vendetta* code is abandoned. Our findings suggest that one of the driving factors behind the reduction in the homicide rate is the decreased incentives for engaging in vengeance, as there is no credible threat of punishment from the community.

The second key mechanism that underlies the disappearance of honor norms is the break down in the informal education system after the migration event. Oblique socialization, involving the transmission of honor traits from adults in the community to younger generations, becomes less likely as the share of adult shepherds who carry the honor trait diminishes in the population. Our study demonstrates that as herdsmen, who were capable of passing on the honor trait to their offspring and other children in the community, left Barbagia, the homicide rate declined not only in the short term but also three decades later, when those whose education took place whilst emigration was unfolding became adults. This finding suggests that the new generations growing up with less exposure to the honor code fail to acquire the honor trait themselves.

To ensure the robustness of our results, we control for contemporary determinants of homicides, including literacy and employment, and include municipality and year fixed effects. Falsification tests are also performed: the permutation test looking at the effect of emigration on all Sardinian historical regions makes the one for Barbagia significant at the 10% level. Additionally, our findings remain robust when controlling for the historical backwardness of the municipality. Finally, we employ instrumental variable estimation, using the fraction of herdsmen and a measure of land intensity utilization for sheep in 1930 as push factors influencing shepherds' migration in 1965.

One further concern is that enhanced police enforcement may be driving our results. Sardinia, particularly Barbagia, has historically been a dangerous area with above-average crime rates. Over time, numerous efforts have been made by the island's rulers to combat violence and establish law and order. This could

potentially bias our results if the Italian government decided to allocate more police forces to regions characterized by a culture of honor. These honor norms are intertwined with the pastoral economy, which also triggers migration following the population boom. Consequently, in municipalities strongly characterized by the culture of honor, we would expect to observe: (i) higher migration due to the population boom, and (ii) lower homicides attributed to police enforcement. To address this concern, we perform two tests. Firstly, we include and interact historical region with year fixed effects, which we consider the most relevant level at which new police forces would have an effect. Secondly, we conduct a placebo test on non honor-related crimes, such as frauds and sexual violence, and find insignificant estimates.

This paper contributes to the literature on cultural transmission and dynamics following emigration. Previous studies have primarily focused on effects pertaining to destination countries. Studies show that immigrants in the United States retain aspects of their parents' culture even in the second generation, relating to marriage agreements (Giuliano, 2007), fertility behavior (Fernández and Fogli, 2009), and labor market participation (Fernández and Fogli, 2009; Antecol, 2000). Additionally, parental culture has been found to influence the savings behavior of second-generation immigrants in Canada (Carroll et al., 1994). These newcomers not only bring their cultural traits but also disseminate their political (Barsbai et al., 2017; Docquier et al., 2016) and social values (Miho et al., 2021). When specifically considering cultures of honor, where interpersonal violence plays a crucial role in maintaining order within the community, cultural hysteresis has been identified as a key factor explaining the persistently higher homicide rates among white males in the southern United States (Grosjean, 2014). Our study offers an additional perspective by analyzing cultural dynamics in the origin country and complements existing evidence by demonstrating that the honor trait gradually fades away when socializers leave the community.

Our second contribution pertains to the literature on cultures of honor. We show that when individuals carrying the honor trait depart from their region, they also remove enforcers of the honor code. As a result, incentives to adhere to these rules decrease, as non-compliers no longer face punishment, and eventually the honor code loses its grip. Game-theoretic models of honor cultures illustrate that equilibria in which individuals are ready to engage in *vendettas*, despite the high personal costs involved, can only be achieved when a significant fraction of the population shares the honor norm (Thrasher and Handfield, 2018; Silverman, 2004). This finding generally applies to social norms, as their widespread respect heavily depends on the fear of punishment (Abbink et al., 2017). In the

case of the honor trait and its prescribed code of violent conduct, it can be viewed as a result of a herding economy, which has been found to encourage self-help revenge norms (Cao et al., 2021). Agent-based simulations in the psychology literature (Nowak et al., 2016; Zia et al., 2021) also indicate that the honor trait can be a best adaptation when right-enforcing authorities are absent and the environment is perceived as 'tough.' As the environment softens, violence is no longer the optimal response, and the honor trait gradually vanishes. We provide empirical evidence for this decrease in the bite of violent honor norms when communities become less harsh.

The rest of the paper is organized as follows. Section 2 provides the historical and theoretical background. Section 3 presents the data. Section 4 discusses the empirical strategy employed to examine the effect of pastoral migration on homicides. Section 5 shows our main results and discusses robustness checks. Section 6 reviews and empirically tests alternative explanations. Section 7 concludes.

2 Background and Framework

2.1 The Culture of Honor in Barbagia

Barbagia has a historical reputation for its population's propensity for violence. The lives of shepherds in this region are regulated by a culture of honor known as *codice barbaricino*. This culture entails the adherence to norms and prescriptions aimed at maintaining respectability within society. Several factors have contributed to the development of this cultural environment, including the region's landscape, its pastoral economy, and a lack of institutions responsible for enforcing rights and justice. Consequently, the inhabitants of Barbagia place great importance on preserving an honorable reputation and are prepared to engage in violent *vendettas* when offended by others.

This tough environment resulted from a culture of the 'frontier', which sprung from the attempts of foreign powers to gain control of the island. They were always met with fierce opposition. Lilliu (2002b) interprets the entire history of the region as an unfolding of the Sardinian 'constant of resistance' against alien oppressors. Among the first conquerors of this strategic land in the Mediterranean, we find the African city of Carthage and the Romans. Both had to combat the herdsmen inhabiting the region. Mastino (2005) gives an account of the Roman troubles in pacifying Sardinia, an attempt that failed to be achieved especially in Barbagia, that the Romans then decided to call *'Barbaria'* (land occupied by the Barbarians) as opposed to *'Romania'*, the coastal regions under the firm power of Rome. Life

in this mountainous region was mostly still and unchanging across generations, with prenuragic religious traditions dating as far back as the III millenium BC remaining alive at least until the evangelization promoted by pope Gregory the Great in the IV century AD, as reported by Mastino (1996).

The archetype of the region's inhabitant is that of the *barbaricino*, an individual of honor who values their own and their family's reputation, willingly accepts the consequences of offense, and is prepared to seek revenge. The prevalence of *vendettas* in the region has been a well-known issue for any power seeking sovereignty over Sardinia, dating back to at least the fourteenth century. Gallinari (2019) illustrates the various attempts made by the Crown of Aragon to curb crime and establish control in the region, all of which were met with hostility by the inhabitants. Similarly, the Crown of Savoy made repeated efforts to suppress crime and enforce law and order in the area. Charles Felix of Sardinia, appointed viceroy in 1799, gained a reputation for his brutal repression leading him to be known as Charles 'Ferox' among the Sardinians[1]. The culture of honor has persisted almost unchanged until at least the twentieth century. The Italian Republic made efforts to understand and combat this phenomenon, as evidenced by parliamentary inquiries such as the Commissione Parlamentare d'Inchiesta sui Fenomeni di Criminalità in Sardegna (1969). These inquiries aimed to provide an accurate representation of the cultural environment on the island, revealing a region that was backward, isolated, and reliant on sheep farming and other agro-pastoral activities. However, what worried Italian authorities most was the adherence of the herdsmen to the code of honor and the steadfast loyalty with which they upheld it.

The conduct adopted by the herdsmen posed challenges for occupying authorities due to the inherent conflict between the formal legal code and the honor code. For instance, while theft of livestock is traditionally considered a crime under the law, the community never punished, and often protected, rustlers. The act of raiding cattle was seen as a demonstration of one's worth rather than a criminal act. Countless efforts were made by the *Carabinieri*, a gendarmerie force established by the King of Sardinia and still active today, to enforce property rights regarding sheep. However, under the prevailing honor code in the area, only those who 'came from the sea or stole from the house'[2] were considered thieves.

In the aftermath of the Second World War, Sardinian and Italian scholars

[1] Where 'Felix' is Latin for happy, and 'Ferox' for ferocious.

[2] In Sardinian the code establishes that *furat chi furat in domo o chi venit dae su mare* (A robber is someone who robs in the house or who comes from the sea). Emphasis is placed on the sacrality of the house, and the condition of alien to the community of anybody coming from abroad, who cannot be treated under the same standards as natives.

started an analytical investigation of the code. The most rigorous and well-rounded effort is that by Pigliaru (1959), an Italian jurist born in Barbagia. He traced and formalized the cultural rules that dictated behavior of shepherds and emphasized the struggle of the Barbagian men torn between the cultural code and the formal legal code imposed by foreign powers. This internal fracture is at the center of the spiritual life of herdsmen and depicted in the Italian and Sardinian cultural works such as Deledda (1900), whose novels at broad tipify the Barbagian man. Adherence to this honor code has resulted in is a worringly high homicide rate. Murders were the 'norm' for settling disputes as they arise precisely because formal law enforcement cannot be trusted as it perceived as external to the community.

2.2 Historical Background

As evident from the previous section, Barbagia has historically lacked a central, formal institution entrusted with guaranteeing order and protecting property rights. Elias (1994) postulates that this absence is the reason for the prevalence of decentralized justice. He notes that revenge as a conflict resolution tool vanished in most of Europe as governing bodies responsible for maintaining order and safeguarding property rights emerged, as part of the 'civilizing process.' However, this transformation did not occur in Sardinia until the second half of the 20th century. The European decline in homicides documented by Eisner (2003) is only a recent phenomenon for the island, which continued reliance on *vendettas* and experiences one of the highest homicide rates in Italy even today. Nevertheless, throughout the last two centuries, and especially in the latter half of the 20th, there has been a decline in homicides. While the parliamentary inquiry Commissione Parlamentare d'Inchiesta sui Fenomeni di Criminalità in Sardegna (1969) reports peaks of 75 homicides per 10,000 inhabitants in Barbagia during the period 1800-1829, the National Statistical Institute, ISTAT (2021), reports 1 murder per 100,000 inhabitants in recent years. This decline has coincided with a decrease in adherence to the honor code in the region, particularly in Barbagia. The aim of this paper is to investigate the factors contributing to the disappearance of the culture of honor in the area.

In our study, we will exploit an emigratory boom unfolding in the latter half of the XX century and will establish it as one of the main reasons which led to the disappearance of the honor culture in the area. The origins of this migratory outflow can be traced to the high fertility rate that prevailed in the area around 1936-1945. Indeed, Pulain et al. (2020) document that Sardinia was a latecomer

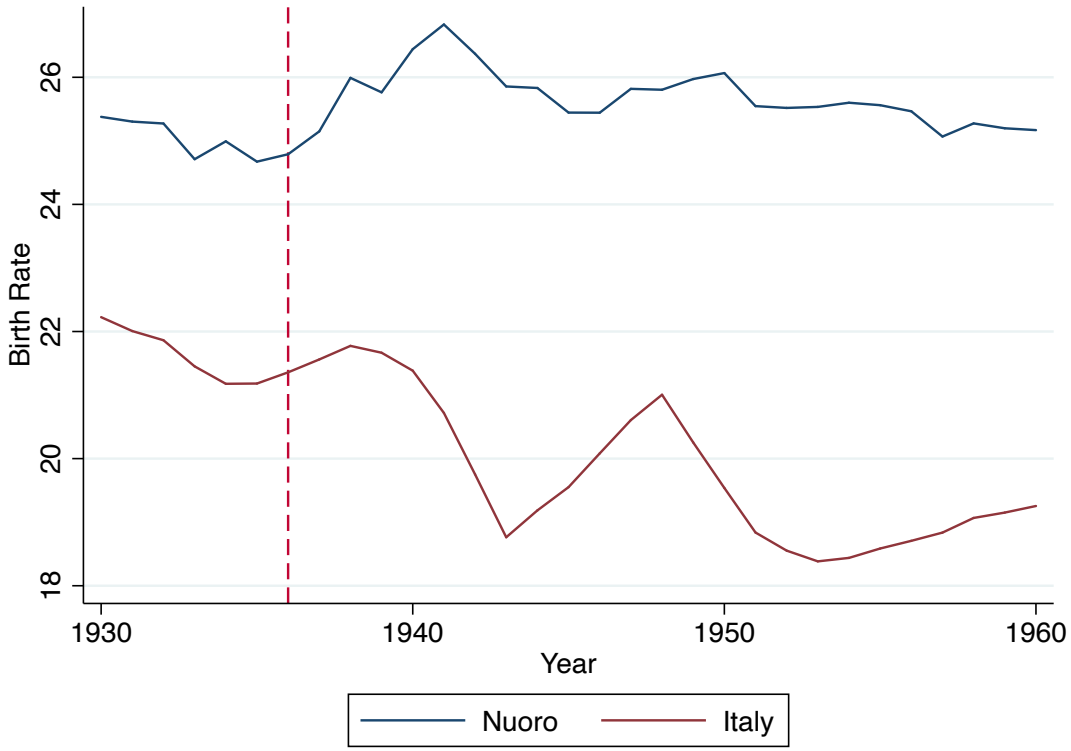

Figure 1: Births per 100 Inhabitants

to the fertility transition. While Italy and most of Western Europe experienced a decline in natality rates starting in the mid-19th century, Sardinia did not experience such a fall until after World War II. Prior to that, the fascist government made efforts to increase the natality rate: it created specific bodies entrusted with implementing natality-enhancing policies[3], taxing unmarried men[4], and granting privileges to families with many children[5]. Additionally, the area was not heavily affected by the war, with the bombing of Cagliari in 1943 being the only war event that impacted civilians. These factors led to a demographic boom in the region taking place between 1936 and 1945. Figure 1 illustrates the evolution of the birth rate, calculated as the number of births per 100 inhabitants, for both Nuoro (the province of Sardinia comprising almost entirely Barbagia) and the rest of Italy. From 1936 onwards, indicated by a red dotted line, a demographic boom is evident. During this period, the trend in this Sardinian province contrasts with

[3]An example is the Maternity and Childhood National Club (*Opera Nazionale Maternità e Infanzia*) created in 1925 and the Large Families Fascist Union (*Unione Fascista Famiglie Numerose*) of 1937.

[4]Royal Decree of February 12, 1927, n.124.

[5]These included precedence in public housing allocation and an unemployment benefit proportional to the number of children.

the declining trend in the rest of Italy, which instead experienced a significant reduction in birth rates. In a region where livestock is the main form of subsistence, land is essential to support it. As a consequence of this demographic boom, there was an oversupply of shepherds when these newborns came into adulthood. However, only a limited number of sheeps can be sustained in the interior regions of Sardinia, an island with limited resources. The demographic explosion led to a surge in migration from the late 1960s to the mid-1980s, approximately thirty years after the natality shock. Barbagian and Sardinian shepherds primarily migrated to mainland Italy, particularly to Tuscany (Meloni, 1996), but also to Latium and the Marches. Consistent with Grosjean's (2014) finding that honor traits are retained by emigrants, some of these Sardinian shepherds continued to adhere to the honor conduct, contributing to the negative reputation associated with newcomers.

However, our focus lies in Sardinia, specifically in Barbagia. The outflow of shepherds from rural communities resulted in a demographic rebalancing at the municipal level, where individuals with honor traits constituted a lower fraction of the overall population. This was because emigration was more widespread within the herdsmen population, driven by scarcity of land, essential for their survival. As a result of this mass shepherd migration, the honor code weakened. This can be attributed to two factors: first, in the immediate years following emigration, the number of adults sharing a honor traits decreased. Therefore, less people relied on the code for conflict resolution. Second, a cultural effect unfolded over the long term. The cohorts born during the emigration period were less exposed to honor norms because they were scarcer in the adult population and hence they had a lower likelihood of inheriting the honor trait. Consequently, they failed to pick it up and did not pass it on to their offspring, contributing to the dissolution of the vendetta honor code in the community. Moreover, as less people relied on the code, non-obedience to honor rules becomes less costly: fewer shepherds meant fewer enforcers of the code. Although the initial dilution effect was also active in the determination of the mid-run dynamics, the slowdown in fertility-implying less numerous new cohorts- was the key factor resulting in a nil effect on the homicide rate 10 to 15 years following migration.

The goal of our study is to explore why the honor culture, once deeply ingrained in the region of Barbagia in Sardinia, faded away during the migratory events of the latter half of the 20th century. To achieve this, we will examine the behavior of the homicide rate during this period, as is customary in the literature on honor cultures. In the next subsection, we will present the theoretical foundations underlying our investigation.

2.3 It Takes a Village

The basis of this paper is rooted in the fact that honor cultures are unique in that they rely on a delicate equilibrium that is maintained only when a significant portion of the population shares the honor trait. While they are subject to the typical socialization mechanisms described in Bisin and Verdier (2001), honor cultures require a critical mass of individuals adhering to the honor code to sustain their existence.

The process of socialization, through which new generations acquire the cultural traits of their community, can occur through various channels, including vertical socialization from parents, horizontal socialization from peers, and oblique socialization from the broader community. The first two theoretical models were presented in Cavalli-Sforza and Feldman (1981) and Boyd and Richerson (1988). In the latter, the authors highlight how cultural inheritance allows individuals to acquire adaptive skills without relying solely on trial and error. Notably, there is a bias towards acquiring cultural characteristics that are most advantageous for navigating the surrounding environment.

The framework established by Cavalli-Sforza and Feldman (1981) posits a structured socialization mechanism in which specific individuals pass on cultural traits to newborns, typically from parents to their children. This suggests that cultural traits do not uniformly diffuse in societies with social stratification. Conversely, Lumsden and Wilson (1981) propose a theory in which cultural traits can be more broadly diffused by individuals, leading to some convergence in the socialization process.

In our context, it is relevant to consider the possibility that the community at broad can socialize a child, born to parents with an honor trait, to adhere to formal rules rather than the *codice barbaricino*. This highlights the cultural substitutability that exists for Barbagian herdsmen-parents, because their cultural traits can be replaced by those of the now-majoritarian group in the municipality. Consequently, the migration of shepherds results in a sudden decrease in the fraction of individuals socialized into the culture of honor. As a consequence, honor becomes a minority trait among the adult population, affecting their ability to socialize newborns. Over time, new cohorts become increasingly less likely to adopt the honor trait until it ultimately fades away.

Another reinforcing mechanism is the diminishing fitness of the honor characteristic as the number of individuals socialized into the honor culture decreases and the environment becomes less 'tough.' Nowak et al. (2016) demonstrate that carrying an honor trait is most adaptive when individuals face an environment populated by other 'tough' agents. However, when the community primarily consists

of law-abiding individuals, the honor trait loses its significance. This is precisely what we observe in Barbagia, where the migration-induced changes in the community's composition lead to a softer environment and a decline in the prevalence of violence as a first-best response.

Furthermore, in game theoretic models of honor cultures stability is achieved only when a sufficiently large portion of the population possesses the honor trait. This stability arises from the need to establish a reputation for being honorable, which involves costly retaliation when challenged. When the community exerts less pressure on individuals due to migration-driven departures of potential killers, the motivation to maintain the honor trait diminishes. In the next section, we will describe the data to perform our empirical exercise.

3 Data

In this section, we describe the data used for the analysis. We utilize municipal-level data for emigrants, population, and homicides, with homicides serving as a proxy for the impact of the culture of honor. We also incorporate contemporaneous determinants of homicides, including literacy and employment rates, as control variables.

3.1 Homicides

The homicide data is obtained from the Survey on Deaths and Causes for Death by the National Statistical Institute, ISTAT. This dataset provides the annual count of deaths by sex, cause, and age in each Italian municipality from 1969 to 2019. We focus specifically on deaths attributed to homicides or aggressions, which constitute the variable for testing our main hypothesis. To calculate the homicide rate, we merge this dataset with the 1961 Italian Census by ISTAT and divide homicide counts by 1961 municipal-level population. Our final dataset comprises 377 Sardinian municipalities and covers the period from 1969 to 2019. Table 1 presents the average values over the entire period. It is evident that Barbagia had a significantly higher murder rate compared to the rest of the island. This finding is supported by a difference-of-means test, which rejects the null hypothesis of equality between the two.

3.2 Emigration

We introduce a novel dataset on Sardinian emigration, primarily based on two ISTAT publications: *Popolazione e Movimento Anagrafico dei Comuni* (Population

Table 1: Descriptive Statistics: Homicide, Emigration and Shepherd Share in 1930, by region.

	Sardinia		Barbagia	
	Mean	Std. Dev.	Mean	Std. Dev.
Homicide (per 1,000)	1.16	1.45	1.26	1.36
Emigration (per 100)	2.71	2.02	2.65	2.59
Shepherds (per 100)	12.28	3.85	13.63	3.60
Illitteracy (per 100)	7.31	5.99	5.59	4.94
Employment (per 100)	35.66	5.55	35.87	5.09
Male Employment (per 100)	54.10	10.85	53.57	10.88
Natality (per 100)	26.53	3.04	26.58	2.75
Sexual Violence (per 100,000)	4.18	3.04	2.97	1.54
Frauds (per 10,000)	9.15	9.01	7.57	8.19

Note: Barbagia is defined to comprise all municipalities belonging to the historical regions of Barbagia di Belvì, Barbagia di Nuoro, Barbagia di Ollolai, Barbagia di Seulo, Mandrolisai and Ogliastra. Figure A.1 gives a graphic definition of which municipalities are included in this region. For Natality, Sexual Violence, and Frauds, Barbagia corresponds to the province of Nuoro, while Sardinia is made up of Cagliari, Sassari, and Oristano.

and Registry Movements in Italian Municipalities) and *Statistiche Demografiche* (Demographic Statistics). The former publication, initiated in 1951, contains registry movements of the Italian population, including death counts. It provides information on newborns, marriages, registry office registrations due to immigration, and registry office cancellations due to emigration or death. The data is categorized by region, month, sex, age, and, since 1964, by municipality. However, it does not cover the census years of 1971 and 1981, nor the period from 1982 to 1988. In this latter period, *Statistiche Demografiche* briefly served as the source for reporting the same information. Both publications are derived by the statistical office from the Civil Status Acts, which are mandatorily maintained by municipalities. Due to the yearly nature of the publication, there is no standardized definition of municipality, resulting in the number of Sardinian municipalities in our dataset ranging from a low of 350 in 1964 to 377 in 2000. To ensure the robustness of our analysis, we also conducted it exclusively on the municipalities present throughout the entire period, finding no significant changes in the results.

We compute the emigration rate as the count of registry cancellations for emigration to other Italian municipalities, divided by the municipal population. Table 1 presents the 1964-2000 averages for the two regions. Although the rest of Sardinia appears to have a higher emigration rate than Barbagia, this masks different trends over time. Figure 2 illustrates the evolution during the analyzed period.

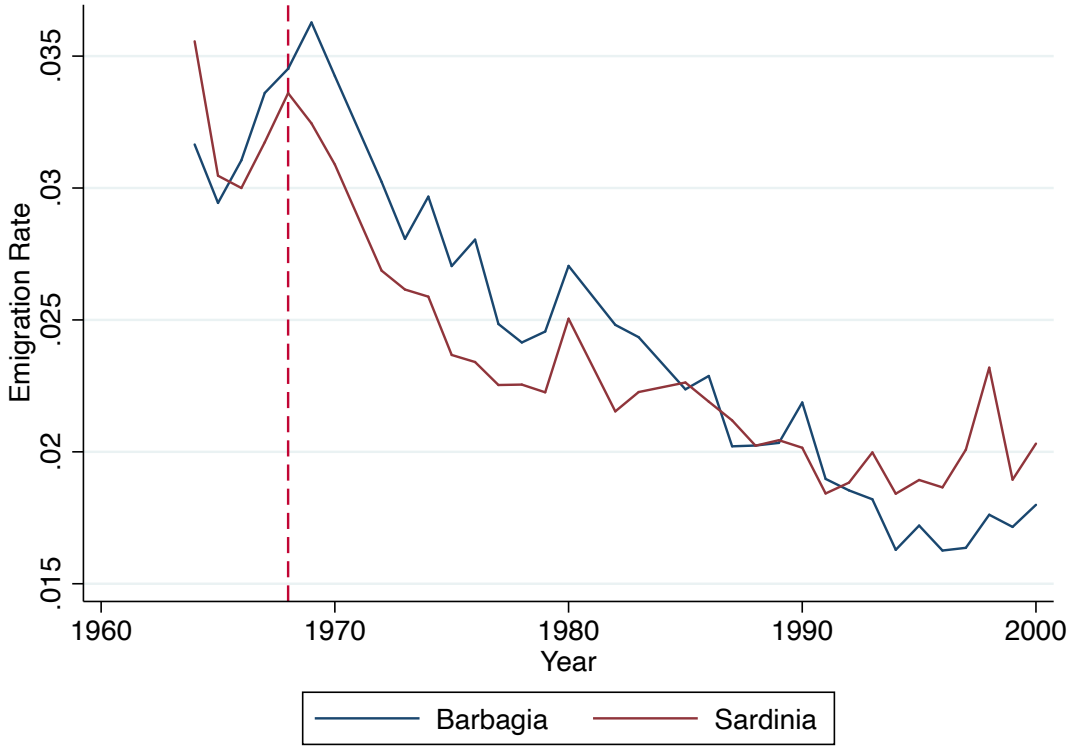

Figure 2: Emigration Rate per 100 Inhabitants in Barbagia and the Rest of Sardinia, 1964-2000

Prior to 1966, Sardinia's emigration rate exceeds that of Barbagia. As the demographic boom occurs and the large size of the new cohorts compels shepherds to relocate where land is available, the emigration rate in Barbagia spikes, reaching its peak in 1971. It remains consistently higher than the Sardinian average until at least 1985, thirty years after the demographic transition in Sardinia and the decline in natality rate. Subsequently, the Sardinian average surpasses Barbagia's, and both rates reach a plateau. It is important to emphasize the richness and comprehensiveness of this dataset, enabling a detailed reconstruction of migrations over a significant period of Sardinia's contemporary history. By employing the methodology proposed by Shertzer and Walsh (2019), future work could enhance our results by standardizing the definition of municipality and creating 'synthetic municipalities,' facilitating better cross-time comparisons.

3.3 Shepherds

The comprehensive dataset on migration introduced in the previous paragraph, while providing the most granular account of the island's 20th-century migration dynamics, does not provide a breakdown of emigrants by occupation. Official

Italian statistics do not report the count of emigrants at the municipal level by profession. Consequently, we need to use a proxy for the diffusion of honor norms in Sardinian municipalities. To achieve this, we combine two sources of information: the Italian general population census of 1931 and the 1930 general agricultural census. The latter was the third wave of the General Census of Agriculture initiated by the Italian government to assess the country's livestock wealth. It provides municipal-level data on the count of livestock owners, the number of existing farms, sheep, cows, and other cattle breeds. We utilize the count of people owning cattle in each municipality and divide this number by the total population in the municipality as of the 1931 census. This yields a measure of the share of shepherds present in 1930 at each location. Assuming that population composition remained relatively stable until the late 1960s migration wave, this measure also serves as a reasonable proxy for the municipal-level population composition at the start of the migration event in 1964. Therefore, by knowing the share of shepherds in 1930, we obtain a sufficiently accurate measure for the fraction of the population engaged in sheep farming in 1964. To assess the robustness of our measure, we also examine its correlation with the fraction of people employed in the agricultural sector, as reported by the censuses from 1951 to 1991. Results are presented in Table A.1 of the Appendix, indicating a positive and statistically significant correlation, supporting the measure's relevance.

Figure 3 illustrates the share of shepherds in 1931 for each Sardinian municipality. We observe that the central mountainous regions tend to have a higher proportion of herdsmen compared to the flatter coastal areas of the island. This observation is reinforced by the higher mean shepherd share in Barbagia compared to the rest of Sardinia, with a t-test confirming the statistical difference between the two. However, it is important to note that the number of municipalities available for 1930 differs from those existing from 1964 onwards. To impute the share of shepherds for municipalities created after the agricultural census, we follow these guidelines: if a municipality was entirely created from another one, its initial share of shepherds is set equal to that of the municipality from which it was formed. For municipalities created from multiple ones, the share of shepherds is calculated as an equally-weighted linear combination of the shares of the donor municipalities. This approach ensures coverage for all 377 districts. Alternatively, one could impute the share of initial shepherds by weighing each municipality donating area based on its contribution to either the area or population of the newly created district.

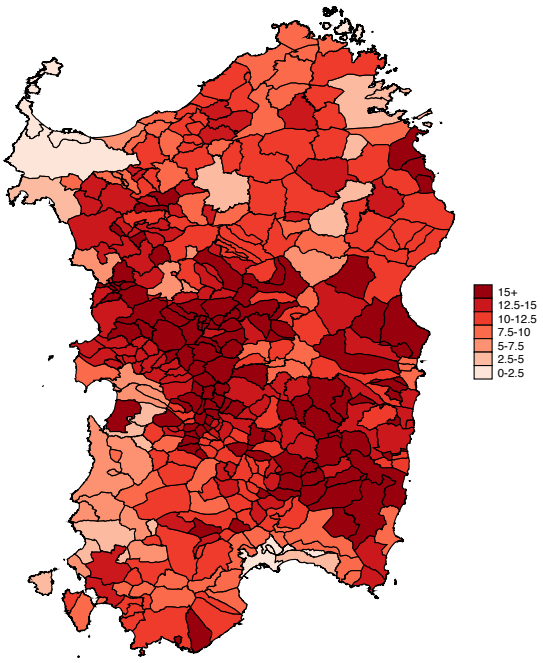

Figure 3: Number of Shepherds for Every 100 Inhabitants, in 1931

3.4 Other Data

We also include data on employment and literacy rates in Sardinian municipalities for the entire 1964-2019 period. Since these data come from the decadal Italian general population censuses, we impute rates for non-census years using a linear combination of the two nearest census figures. The weights assigned are proportional to the proximity of the census year to the reference year. Our analysis reveals that Barbagia had higher literacy and employment rates, with the latter being attributed to a significantly higher employment rate in the agro-pastoral sector (26 per 100 in Barbagia compared to 21 in the rest of Sardinia).

Additionally, we collect yearly data on the number of births in each Sardinian province from 1930 to 1960. This data is retrieved from the ISTAT publication *Movimento Naturale della Popolazione Presente nei Singoli Comuni del Regno* (Natural Movement of the Population Present in Each One of the Kingdom's Municipalities). While municipal-level measures of births would have been ideal, only province-level data is available. Table 1 shows that Barbagia had a slightly higher natality rate compared to the rest of Sardinia from 1930 to 1960.

Lastly, for a placebo analysis, we utilize provincial-level crime data from ISTAT's *Delitti Denunciati all'Autorità Giudiziaria da Polizia di Stato, Arma dei*

Carabinieri e Guardia di Finanza (Crimes reported to the judicial authority by the state police, Carabinieri, and financial guard). These statistics have been collected since 1983 and provide data on crimes such as smuggling, fraud, and slaughter. Despite Barbagia's historical reputation for crime, Table 1 demonstrates that, for non-honor-related crimes, the rate is lower in Barbagia compared to the rest of the island.

4 Empirical Strategy

Our empirical strategy aims to uncover two relationships. The first relationship we examine is the correlation between emigration in the years 1965-1985 and homicides that occur immediately after. The second relationship we investigate is the connection between emigration and the long-run homicide rate.

Regarding the first relationship, our expectation is that in the year(s) immediately following migration of shepherds, those loyal to the honor code, the homicide rate will decrease. This follows from the dilution of the honor trait in the adult population and the lower reliance on *vendettas* in the community for resolving disputes among its members. It is not migration in itself that directly reduces the murder rate; rather, it is the emigration of individuals socialized to the culture of honor, those who commit a higher number of homicides than average, that is expected to have an impact. Additionally, our available data only allows us to use a proxy for shepherds' emigration. Thus, conducting a short-run test on the correlation between the emigration of shepherds and homicides serves two purposes: (1) to verify the reliability of our measure of migration for the pastoral population, and (2) to demonstrate that these emigrating shepherds indeed exhibit a propensity for violence, and as they leave, the local environment becomes less hostile. To test this, we estimate the following equation:

$$\begin{aligned}\text{Homicide Rate}_{c,t+1} = \alpha_c + \alpha_t + \beta_1 \cdot \text{Emigration Rate}_{c,t} + \\ \beta_2 \cdot \text{Emigration Rate}_{c,t} \times \text{Shepherd Share}_{c,1930} + \gamma^{\intercal}\mathbf{X}_{c,t+1} + \epsilon_{c,t+1}\end{aligned} \tag{1}$$

where $\text{Homicide Rate}_{c,t}$ represents the homicide rate for municipality c at time t between 1965 and 1985. The terms α_c and α_t are municipality and time fixed effects, respectively. $\text{Emigration Rate}_{c,t-1}$ denotes the count of yearly emigrants to other Italian municipalities divided by the population at time $t-1$. $\text{Shepherd Share}_{c,1930}$ represents the count of shepherds in 1930 for each municipality divided by the 1931 population. $\mathbf{X}_{c,t}$ is a vector of contemporaneous determinants of homicides. To

account for the limited annual count of homicides, we calculate both homicides and emigration as their 5-year centered moving averages. The coefficient of interest in this equation is β_2, which captures the effect of emigration in municipalities where honor norms were more widespread on the one-year lagged homicide rate. We assume that the interaction between emigration and the share of shepherds provides a reasonable proxy for the number of emigrating shepherds. This assumption holds true if: (1) the population of shepherds in each municipality has an emigration rate that is exactly or approximately equal to the rate for the overall municipal population, and (2) the share of shepherds in 1931 adequately represents the demographic composition of each municipality during the analyzed period. Under these assumptions, our estimator captures the correlation between emigration among herdsmen and homicides that occur shortly after. We use a one-year lag for the homicide rate in order to specifically capture the immediate effect of emigration. $\beta_2 < 0$ indicates that we are able to capture properly shepherds' migration and, as they are socialized in a culture of honor, their departure leads to a reduction in the murder rate. In our estimation, we cluster standard errors at the municipal level to account for the serial correlation across time of the error terms.

The second relationship we aim to assess is the link between emigration of the pastoral population and long-term homicides. This analysis allows us to determine whether there is a cultural effect. We want to examine whether a decrease in the share of people socialized in an honor code leads to a reduced adoption of the honor trait by subsequent cohorts over the long run. This is our main hypothesis. The approach we take for this analysis differs somewhat from the previous one. The mechanical effect, which holds regardless of the cultural environment in which shepherds choose to migrate, is that when individuals predisposed to violence leave, the homicide rate decreases. However, for the cultural effect, the situation is different. The herdsmen who decide to migrate early on (between 1966 and 1971) do so in a distinct social environment compared to those who migrate between 1980 and 1985, at the end of the migratory boom. In this analysis, we aim to estimate the pure relationship between the migration of the shepherd population and the homicide rate. To achieve this, we focus on the peak of the emigration event, which occurs in the early period of 1966-1971, and examine its impact on the homicide rate in all subsequent years, ranging from a 0-year lag to a 43-year lag. This approach allows us to capture the specific relationship between the migration of the shepherd population and the homicide rate. We estimate the following equation:

$$\begin{aligned}\text{Homicide Rate}_c^s = \alpha^s + \beta_1^s \cdot \text{Emigration Rate}_{c,1966\to1971} + \\ \beta_2^s \cdot \text{Emigration Rate}_{c,1966\to1971} \times \text{Shepherd Share}_{c,1930} + \\ \gamma^{s\intercal}\mathbf{X}_c^s + \epsilon_c^s \qquad \forall s \end{aligned} \tag{2}$$

In this cross-sectional regression, α^s represents an intercept for each year s being estimated, and Emigration Rate$_{c,1966\to1971}$ measures the cumulative migration between the years 1966 and 1971 (such as the compounded migration rate). As a robustness check, we also include historical region fixed effects in this specification. Due to the limited number of annual homicide counts, we calculate the homicides as the uncentered 5-year moving average of migration. Thus, the homicide rate in year t is the equally-weighted average of homicides for all years between t and $t+4$. We run this cross-sectional regression for each year s between 1971 and 2014. Our interest lies in the collection of estimated coefficients $\{\beta_2^s\}_{s=1971}^{2014}$. If, for a given year s, $\beta_2^s < 0$, it implies that the migration of shepherds, who carry the honor trait in Sardinia, has had a negative effect on the homicide rate, serving as an indicator of the influence of the honor code in the region. Identification requires the same assumptions as before. In all specifications, we use standard errors robust to heteroskedasticity.

In order to assess causality for both Equations (1) and (2), it is crucial that assignment of emigration among herdsmen in the period is as good as random. A potential concern is whether there exists a factor capable of explaining both the initial emigration event and the subsequent decrease in homicides that persisted for more than four decades. However, we argue that the reason for shepherds migrating precisely during this period cannot be attributed to contemporaneous factors emerging in the early 1960s, such as an economic depression in the area due to adverse pasture field conditions. Instead, it can be attributed to the demographic boom that occurred in the late 1930s. Emigration was not contemporaneously determined with homicides but was rather predetermined three decades earlier. Therefore, identification relies on the assumption that migration in the shepherd population is solely driven by the natality boom, which took place in the 1930s and is exogenous to the homicide rate in the second half of the 20th century and early 21st century. Including controls such as literacy and employment, which are known to be correlated with homicides (Amin, 2019), can help us assess the robustness of our results.

5 Empirical Results

5.1 Baseline OLS Estimates: Short Run

Table 2 presents the OLS estimates of Equation (1). In column (1), we do not include fixed effects or controls, there appears to be a positive association between the emigration of violent individuals- the honor-abiding shepherds- and the homicide rate. However, when we include municipality- and time-fixed effects, the association becomes negative, indicating that an increase in shepherds' migration has a negative impact on the homicide rate. This reversal aligns with the fact that as more herdsmen migrate, given that they carry the honor trait, the *codice barbaricino* dilutes in the commmunity. Since they were the ones relying on *vendettas* entailing the need to engage in homicides, the murder rate experiences a short-run reduction. These results hold even when controlling for factors such as literacy and employment rate.

In columns (4) to (7), we further explore the relationship between shepherd migration and the homicide rate. By interacting the emigration rate with a dummy variable indicating municipalities with a shepherd share above the 75^{th} percentile in 1930, we find a significant negative coefficient for the interacted term in columns (4) and (5). This implies that municipalities with a higher prevalence of honor-trait carriers experienced a significant decrease in their homicide rate following the migration event of 1965-1985. These results remain robust even after including controls.

In the last two columns, we introduce an interaction between our migration measure and a dummy variable indicating municipalities belonging to the historical region of Barbagia. Figure A.1 of the Appendix gives a graphical idea of which municipalities are included in this area. The estimates show a significant and negative effect of emigration on lagged homicide in Barbagia, controlling for other contemporaneous determinants of murders. The effect size for this dummy variable is almost twice the size of the one for the shepherd share dummy, which is expected since Barbagia is known for its widespread honor culture. The estimates indicate that emigration had the greatest effect in Barbagia. It is worth noting that there is a positive and statistically significant correlation between being a Barbagian municipality and having an initial share of shepherds above the 75^{th} percentile.

To further validate our results, we conduct a falsification exercise by estimating the same equation as in column (7) of Table 2 for each of the 31 historical regions of Sardinia. The results are presented in Figure 4. Except for the regions within Barbagia, the coefficients are either positive or statistically insignificant. In contrast, almost all coefficients for Barbagia and its constituent regions are negative

Table 2: Homicide and Migration in 1965-1985

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Shepherd Share			Above 75th Pct.		Barbagia	
Emigration Rate	-0.0049	0.0011	0.0004	0.0023	0.0020	2.34×10^{-6}	0.0004
	(0.004)	(0.003)	(0.004)	(0.002)	(0.003)	(0.002)	(0.002)
Emigration Rate×Treat.	0.0377**	-0.0170	-0.0145	-0.0136**	-0.0134**	-0.0250***	-0.0258***
	(0.017)	(0.033)	(0.033)	(0.006)	(0.006)	(0.008)	(0.008)
Controls	No	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	Yes	Yes	Yes	Yes	Yes
Municipality FE	No	Yes	Yes	Yes	Yes	Yes	Yes
N	7,187	7,183	7,140	7,183	7,140	7,183	7,140
R^2	0.0010	0.3919	0.3918	0.3935	0.3933	0.3932	0.3932

Note: The table reports OLS estimates of equation (1). The dependent variable is the five-year centered moving average of the homicide rate. The unit of observation is a municipality-year. Standard errors are clustered at the municipality level. Columns (2)-(7) report the adjusted-R^2. Treatment, interacting emigration to proxy for herdsmen migration, is defined to be one of three variables: the shepherd share in 1931 in columns (1)-(3), a dummy for the municipality's shepherd share being above the 75th percentile in columns (4) and (5), and a dummy for the municipality belonging to the historical region of Barbagia in columns (6) and (7). For a definition of Barbagia see Figure A.1 of the Appendix. ***Significant at 1%; **significant at 5%; *significant at 10%.

and statistically significant. This provides additional evidence supporting the negative short-run relationship between shepherds' migration and the homicide rate. The effect is stronger in areas historically associated with the honor code, particularly the rural region of Barbagia. In Figure A.2 of the Appendix we also plot the density of these coefficients, noting that only three regions have a coefficients lower than the one for overall Barbagia but that among these three, two are parts of Barbagia (Mandrolisai and Barbagia di Nuoro). The two-sided implied p-value for the effect of Barbagia is 0.094, indicating that our results are significant at the 10% level. The coefficient in column (5) implies that a 1 percentage point increase in shepherds' migration leads to a 10.63% decrease in homicides compared to the average homicide rate of 1.26 per 1,000.

5.2 Baseline OLS Estimates: Long Run

We now focus on estimating Equation (2) to examine the impact of the peak migratory event occurring in the years 1966-1971 on the homicide rate. This exercise allows us to assess the effect of migration that was predetermined by the natality boom thirty years earlier. Figure 5 displays the collection of β_2^s estimates when interacting our migration measure with a dummy variable indicating municipalities above the 75^{th} percentile in shepherd share in 1930. The point estimates remain largely unchanged when including controls (Figure A.3b), and when using the benchmark specification (Figure A.3a), interacting emigration with the share of shepherds in 1930. The benchmark specification enriched with historical region fixed effects is shown in Figure A.3c.

The second analysis confirms our previous finding that there is a significant short-term decrease in the homicide rate following migration in municipalities in which honor norms were more diffused. This negative effect persisted until 1974, indicating that the migratory event of shepherds from 1966 to 1971 had a short-term negative impact on the murder rate. Additionally, we observe a persistent long-term negative effect, starting approximately 25 years after the migration event. This finding is consistent across all specifications.

The explanation for the long run decrease can be attributed to the lack of socializers for the honor culture within the community. In cultural models à la Bisin and Verdier (2001), when offspring are not socialized by their parents or peers, they interact with other adults from the community. If those carrying the honor trait- shepherds- are scarcer in the community, then the likelihood of inheriting the honor trait decreases. Consequently, children are less likely to grow up following the *vendetta* code that was prevalent in the community prior to

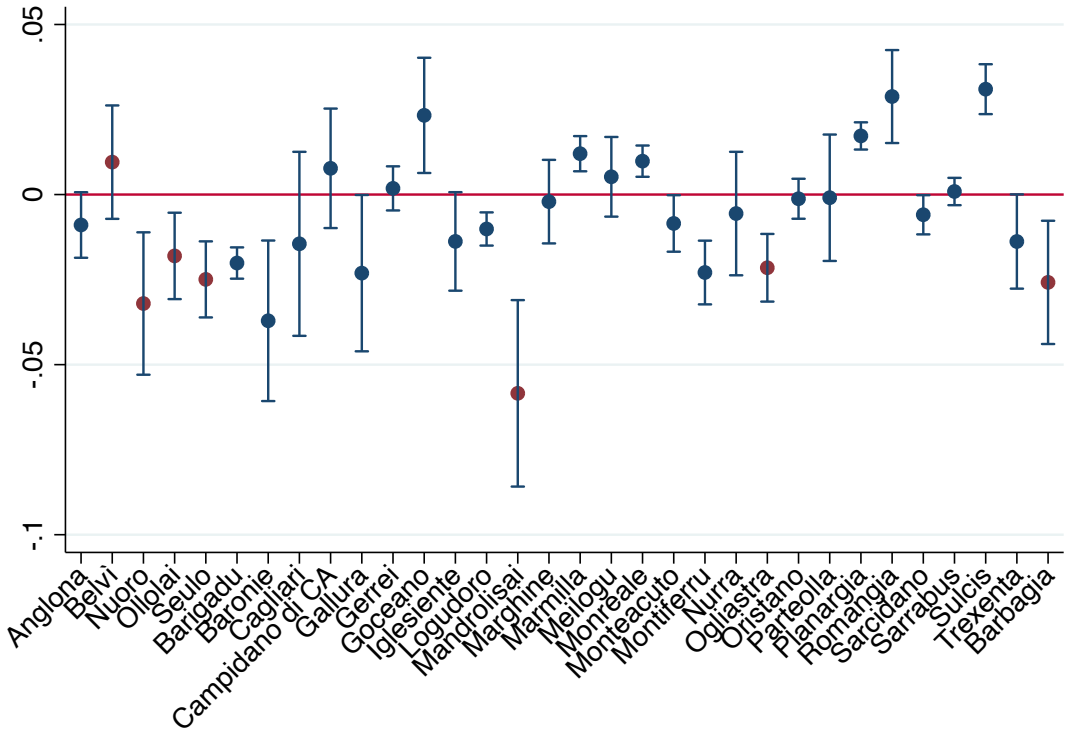

Figure 4: β_2 Estimates for Each Sardinian Historical Region

migration.

Moreover, cultures of honor require a sufficient number of individuals who share and adhere to the honor code for it to be sustained. In the case of the *codice barbaricino*, the honor equilibrium becomes no longer sustainable as people flee and, specifically, as shepherds leave their hometowns. A smaller fraction of the population is willing to abide by the rules of the honor code because non-compliers fear less the possibility of retaliation and the punishment cost that the community can impose is lower. Once the fear of punishment from other members of the society diminishes due to their decreasing presence, one of the main factors sustaining the honor code effectively disappears.

The mid-run dynamics are also noteworthy. Depending on the pace of natality and the intensity of migration, we can expect different outcomes ten to twenty years later. If natality remains steady and migration continues, the homicide rate is expected to decrease further in the mid-run due to a lower proportion of shepherds carrying the honor trait within the overall population. However, if natality decreases sufficiently and migration is moderate, the homicide rate may remain unchanged in the mid-run but decrease in the long run because shepherds constitute a lower fraction of the adult population while remaining the same proportion

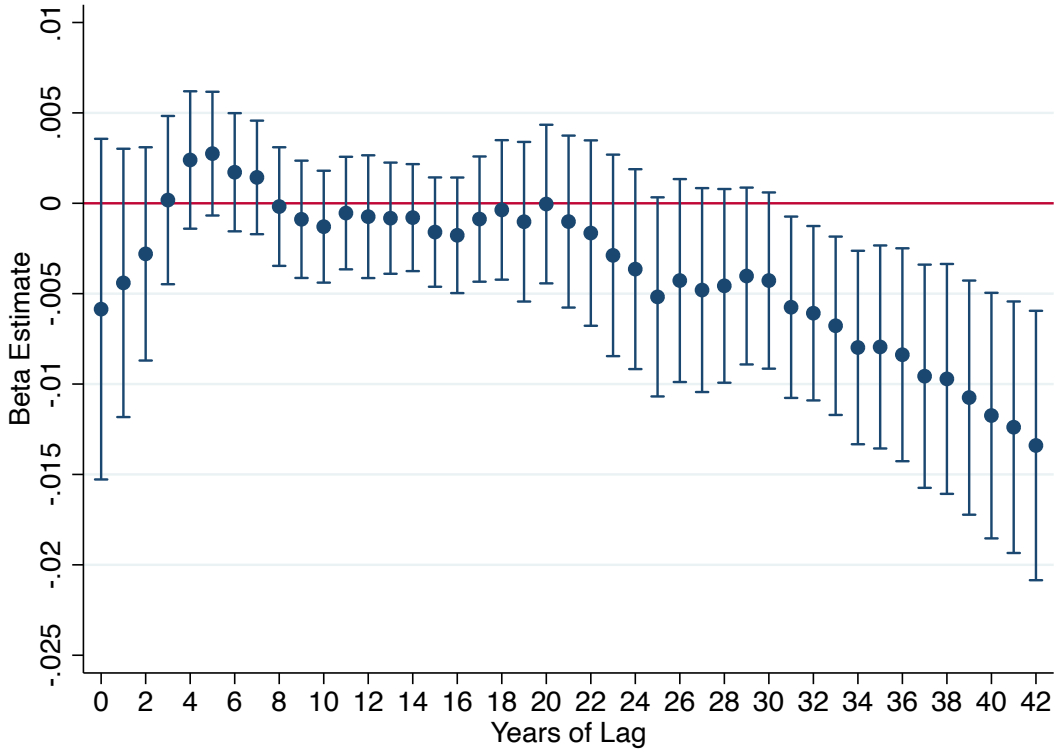

Figure 5: β_2^s Estimates from Equation (2)

within the overall population. This explanation aligns with the observations in Barbagia, where natality decreased after an initial boom, and shepherds became a lower fraction of the adult population. Although they failed to pass on their cultural traits to younger generations due to their decreasing presence as socializers, they remained a consistent fraction of the overall population. Consequently, the homicide rate did not decrease in the mid-run but exhibited a decrease in the long run due to the lower proportion of shepherds in the adult population.

5.3 Robustness Checks

We examine the robustness of our results using various specifications. In our benchmark estimation of Equation (1), we use a 5-years centered moving average. In Figure A.4a we report the point estimates and confidence intervals of the β_2 coefficients for the regression with controls and using the 75^{th} percentile dummy under different moving average window choices. We can see that the point estimates are not particularly sensitive to the window chosen, whereas the confidence intervals naturally widen as the series becomes smoother. Significance at 10% obtains for each coefficient except for the 10-year moving average.

Figure A.4b demonstrates the sensitivity of our results to different winsorizations, ranging from 0 to 10 percent for extreme cases of homicides and emigration. Notably, our findings are not driven by these extreme observations, as the point estimates remain consistently stable across all specifications. This provides confidence in the validity of our analysis, indicating that the obtained results are not attributable to extreme cases in terms of dangerous municipalities or extreme levels of migration.

Repeating the same procedure for the estimates presented in Figure 5 would perhaps be too burdensome. Our solution is to set winsorization at 5% of extreme cases for both homicides and emigration and to use the raw series of homicides, without smoothing it. Our results are presented in Figure A.5. The point estimates when the series is unsmoothed are very noisily estimated but the trend is the same. Winsorization also does not have any appreciable impact on either the point estimates or the qualitative results discussed in the previous paragraph. Finally, stabilizing the sample of *comuni*, so that we only look at the 350 municipalities that are available throughout the whole 1964-2014 time span, has no impact on the estimates, reported in Figure A.5b.

Our final robustness check involves utilizing census data, which provides yearly population counts and the fraction of people employed in the agro-pastoral sector, representing the share of shepherds over time[6]. Interpolation between census data points allows us to impute the population and shepherds' share using a linear combination weighted inversely by the distance between the reference and census years. To verify the accuracy of our imputation, we observe a strong correlation of 0.9943 (statistically significant at the 1% level) between our imputed population measure and the data obtained from ISTAT publications (as described in Section 3.2). Thus, we can retrieve the yearly count of shepherds and calculate their migration rate by dividing the difference in counts by the overall municipal population. Similarly, we compute the migration rate for the overall population as the percentage change in population at the municipal level. Subsequently, we conduct the following regression:

$$\begin{aligned}\text{Homicide Rate}_{c,t} = \alpha_c + \alpha_t + \beta_1 \cdot \text{Emigration Rate}_{c,t-1} + \\ \beta_2 \cdot \text{Shepherds' Emigration Rate}_{c,t-1} + \gamma^{\intercal}\mathbf{X}_{c,t} + \epsilon_{c,t} \qquad (3)\end{aligned}$$

[6]This is because land was almost exclusively devoted to sheep farming. The 1929 Agricultural cadaster shows that, in the Nuoro province, 425,648 hectars (ha) out of 705,593 ha that were productively used were devoted to livestock. Hence 60.32% of the overall municipal surface was reserved to pastoral occupations.

Table 3: Homicide and Migration in 1965-1985: Alternative Specifications

	(1)	(2)	(3)	(4)
			Barbagia	$> 75^{\text{th}}$ pct.
Emigration Rate	0.0123	0.0047	0.0035	0.0047
	(0.008)	(0.005)	(0.006)	(0.005)
Shepherds' Emig. Rate	0.0041*	0.0011	0.0057	0.0024
	(0.002)	(0.003)	(0.006)	(0.004)
Shep. Emig. Rate×Treat.			-0.0104	-0.0100
			(0.008)	(0.006)
Controls	Yes	Yes	Yes	Yes
Year FE	No	Yes	Yes	Yes
Municipality FE	No	Yes	Yes	Yes
N	7,108	7,108	7,108	7,108
R^2	0.0214	0.3920	0.3931	0.3924

Note: The table reports OLS estimates of equations (3) and (4), the dependent variable is the five-year centered moving average of the homicide rate. The unit of observation is a municipality-year. Standard errors are clustered at the municipality level. Columns (2)-(4) report the adjusted-R^2.
***Significant at 1%; **significant at 5%; *significant at 10%.

We also explore the following specification:

$$\begin{aligned}\text{Homicide Rate}_{c,t} = \alpha_c + \alpha_t + \beta_1 \cdot \text{Emigration Rate}_{c,t-1} + \\ \beta_2 \cdot \text{Shepherds' Emigration Rate}_{c,t-1} + \\ \beta_3 \cdot \text{Shepherds' Emigration Rate}_{c,t-1} \times \mathbb{I}_{c \in \text{Barbagia}} + \gamma^{\intercal}\mathbf{X}_{c,t} + \epsilon_{c,t}\end{aligned} \tag{4}$$

with obvious notation. Equation (4) allows for additional flexibility by permitting the effect of shepherds' migration to differ between municipalities inside and outside of Barbagia. We also replace the Barbagia dummy with a dummy for the municipality's shepherds' share in 1931 being above the 75^{th} percentile. Both Equations (3) and (4) serve to support our estimates of equation (1).

Table 3 reports our results, indicating that once again, emigration, even within the shepherd population, has a significant and non-zero effect only in municipalities characterized by a culture of honor, as expected. Therefore, our narrative is not solely based on the fact that emigrating shepherds lead to a decrease in the homicide rate. Rather, it is specifically the shepherds who embody the honor code, those who possess the honor trait, who impact the murder rate because they are willing to engage in fights to maintain their honorable reputation. The magnitude of the effect is nearly identical to that found in Table 2.

6 Competing Explanations

In this section, we explore competing explanations that could provide alternative interpretations of our findings. We focus on two primary factors: police enforcement and backwardness. We also present estimates from an Instrumental Variables approach.

6.1 Police Enforcement

One potential explanation for our results is related to police enforcement. It is plausible that the Italian government does not randomly assign police presence but rather allocates resources based on the crime rate.

Suppose that during the years when migration surged following the natality shock, the Italian government decided to increase police presence in Sardinia. Moreover, it may have prioritized allocating more resources to historically dangerous and violent areas— specifically those regions where the honor code governed behavior. In this scenario, a non-causal negative correlation between migration and homicides would emerge. The natality boom, which forces migration as herdsmen seek land for their livestock, coincides in timing with increased police presence in the region. Consequently, more policemen contribute to maintaining peace, resulting in a lower homicide rate in the area.

To address this alternative explanation, we employ two strategies. First, we run the same regression as in Equation (1), but this time we include historical regions fixed effects interacted with year fixed effects. The coefficient β_2 remains identified as long as police presence varies annually at the historical region level. We believe that the variation in police presence is most relevant at this level, as the effect of a police station opened in one specific municipality likely extends to neighboring areas due to the low population density in the region.

As a second check, we conduct a placebo test. We are aware that certain acts, deemed crimes under Italian law and subject to punishment, hold little relevance and are not widespread under the the *codice barbaricino* of Barbagia. Therefore, we re-estimate Equation (2) using dependent variables that correspond to crimes recognized only under Italian law but not considered significant according to the cultural code. Specifically, we examine the impact on fraud and sexual violence using provincial-level crime data presented in Section 3.4.

Panel A of Table 4 presents the estimates including interacted fixed effects. While our results are somewhat smaller, they remain negative, and the Barbagia dummy remains significant. Figure A.6 presents the coefficients from these regressions. As we can see the effect is nil both in the short and in the long run.

This suggests that it is not police presence happening exactly where emigration is strongest, perhaps because those are the areas historically characterized by violence that a government would want to fight, that is driving the reduction in homicide. Rather, it is the fact that the people socialized to a code of honor are going away that explains the reduction in the murder rate.

6.2 Backwardness

Another competing interpretation of the results in Table 2 is that regions with higher levels of backwardness tend to experience a greater reduction in the homicide rate when emigration occurs. This could be because more socio-economically disadvantaged regions have a higher prevalence of conflicts, and as people flee the area, the number of conflicts decreases more significantly compared to more advanced regions. However, it is not immediately apparent why the homicide rate would decrease more in a more backward region when people leave, compared to a more developed region.

However, so long as the share of shepherds is a proxy for backwardness our β_2 coefficient from the regression in Equation (1) could be exactly capturing the effect of more emigration in a more backward municipality on the homicide rate. To rule out the possibility that backwardness is the true explanation, we define backwardness from a socio-economic perspective and use the literacy rate in the area as a proxy. Consequently, we run the following regression:

$$\begin{aligned} \text{Homicide Rate}_{c,t} = \alpha_c + \alpha_t + \beta_1 \cdot \text{Emigration Rate}_{c,t-1} + \\ \beta_2 \cdot \text{Emigration Rate}_{c,t-1} \times \text{Shepherd Share}_{c,1930} + \\ \beta_3 \cdot \text{Emigration Rate}_{c,t-1} \times \text{Illiteracy Rate}_{c,t-1} + \gamma^{\intercal}\mathbf{X}_{c,t} + \epsilon_{c,t} \end{aligned} \tag{5}$$

with obvious notation. Notice that in this case the coefficient β_3 captures the effect of emigration in more backward regions on the homicide rate. Since the same argument can be applied to the longer run dynamics presented in Figure 5, we test a variation of Equation (2) which is identical in spirit to (5). We specify it as:

$$\begin{aligned} \text{Homicide Rate}_c^s = \alpha^s + \beta_1^s \cdot \text{Emigration Rate}_{c,1966\to1971} + \\ \beta_2^s \cdot \text{Emigration Rate}_{c,1966\to1971} \times \text{Shepherd Share}_{c,1930} + \\ \beta_3^s \cdot \text{Emigration Rate}_{c,1966\to1971} \times \text{Illiteracy Share}_{c,1971} + \gamma^{s\intercal}\mathbf{X}_c^s + \epsilon_c^s \quad \forall s \end{aligned} \tag{6}$$

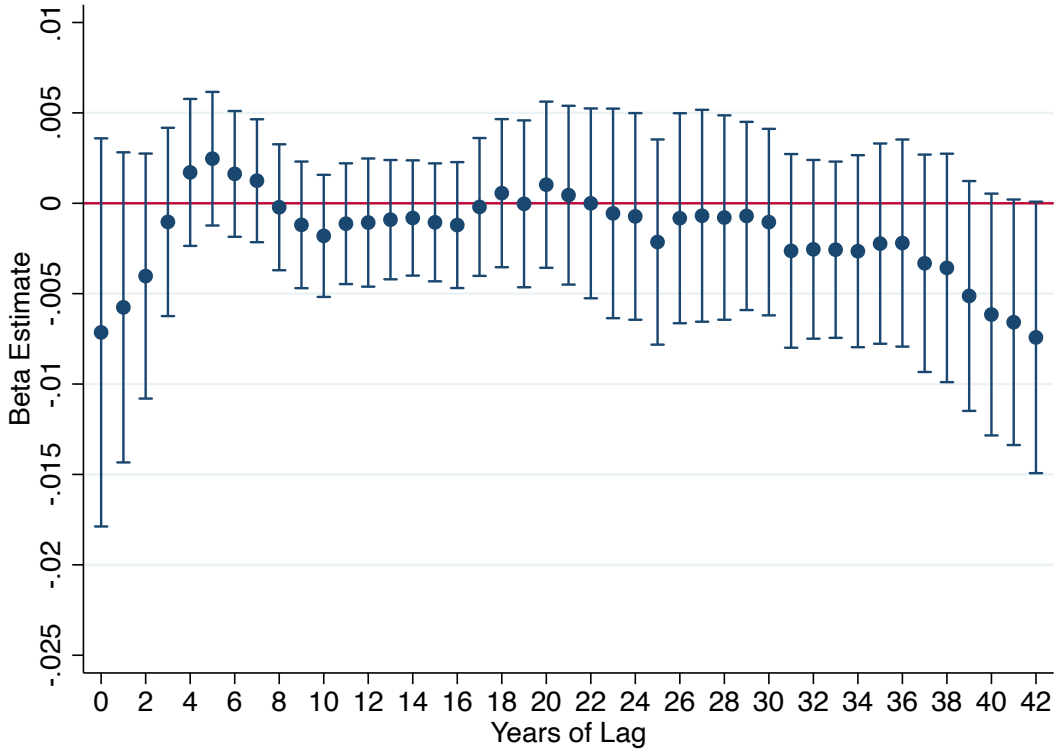

Figure 6: β_2^s Estimates from Equation (6)

The estimates for Equations (5) and (6), presented in Panel B of Table 4 and Figure 6, respectively, provide consistent support for our main hypothesis. The results indicate that what drives the effect is not the level of backwardness in a region, as measured by the illiteracy rate, influencing the impact of emigration on the homicide rate. The effect of emigration on the homicide rate does not appear to differ significantly between backward and advanced regions, as indicated by the insignificant estimates in Panel B of Table 4. However, the estimates of the coefficient β_2, capturing the migration of shepherds, remain negative and statistically significant.

These findings suggest that the underlying forces are as follows: first, the migration of shepherds triggers a decrease in the homicide rate attributable to a lower share of adults relying on a *vendetta* code. As individuals socialized within a culture of honor leave the area, the pool of potential perpetrators decreases, resulting in a reduction in the murder rate. In the long run, as people socialized within a culture of honor constitute a smaller fraction of the overall adult population, their influence in socializing newer cohorts to the culture of honor diminishes. As a result, newborns no longer acquire the honor trait, leading to a decrease in the homicide rate. It is not regions that are more backward and

Table 4: Homicide and Migration in 1965-1985: Competing Explanations

Panel A: Police Enforcement			
	(1)	(2)	(3)
	Shep. Share	Above 75th pct.	Barbagia
Emig. Rate	-0.0063	-0.0003	-0.0019
	(0.008)	(0.003)	(0.003)
Emig. Rate×Treat	0.0292	-0.0091	-0.0216***
	(0.056)	(0.006)	(0.006)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
Historical Region*Year FE	Yes	Yes	Yes
N	7,140	7,140	7,140
Adj-R^2	0.3828	0.3835	0.3835
Panel B: Backwardness			
	(1)	(2)	(3)
	Shep. Share	Above 75th pct.	Barbagia
Emig. Rate	-0.0090	-0.0128	-0.0150
	(0.009)	(0.010)	(0.011)
Emig. Rate×Treat	-0.0735	-0.0136**	-0.0254***
	(0.054)	(0.006)	(0.008)
Emig. Rate×Illiteracy	0.1996	0.1781	0.1751
	(0.146)	(0.137)	(0.135)
Controls	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
Municipality FE	Yes	Yes	Yes
N	7,124	7,124	7,124
Adj-R^2	0.3947	0.3959	0.3956

Note: Panel A re-estimates equation (1) adding historical region times year fixed effects. Panel B reports OLS estimates of equation (5), the dependent variable is again the five-year centered moving average of the homicide rate. The unit of observation is a municipality-year. Standard errors are clustered at the municipality level.
***Significant at 1%; **significant at 5%; *significant at 10%.

economically underdeveloped, as measured by the literacy rate, that experience a more pronounced decrease in the homicide rate following emigration.

6.3 Instrumental Variables Estimation

To further support our estimates and address the possibility of unobservable factors driving both the pattern and timing of the decrease in homicide rates and increase in emigration, we employ instrumental variables estimation. We utilize two instruments for emigration: the share of shepherds in 1930 from the Agricultural Census and a measure of land occupancy. These instruments act as push factors for emigration.

The share of shepherds in 1930 serves as an instrument because municipalities with a higher initial share of shepherds are more likely to experience a greater need for emigration. This is due to the overcrowding in the market for land, which intensifies when there are already more shepherds present in 1931. The measure of land occupancy, computed as the number of sheep in the 1930 Agricultural Census divided by the municipality's area, also influences emigration. Municipalities with higher land occupancy require more shepherds to migrate in 1965 when the cohorts born in 1935 enter the labor market.

The instruments are relevant and seem to satisfy the monotonicity assumption: both trigger *more* emigration within the shepherd population. It is unlikely that tighter labor market conditions and scarcer land would decrease incentives for emigration, but rather increase them if conditions were less crowded. What we need is, instead, that the only way in which the municipal-level market conditions in 1931, as captured by the herdsmen's share and land occupancy, only impact the homicide rate from 1971 onwards through the emigration of shepherds taking place in 1966 until 1971, the peak of emigration we instrument. If this is true, then the shepherds' share and number of sheeps per km^2 is a good instrument for the emigration of shepherds thirty years after the peak of the natality boom, namely from 1966 until 1971. Our first stage is therefore:

$$\begin{aligned}\text{Shepherds' Emig. Rate}_{c,1966\to1971} = \alpha_r + \zeta_1 \cdot \text{Herdsmen's Share}_{c,1930} + \\ \zeta_2 \cdot \text{Sheeps per Squared Kilometer}_{c,1930} + \epsilon_c \end{aligned} \quad (7)$$

where α_r are historical region fixed effects. Our second stage is given as:

$$\text{Homicide Rate}_c^s = \alpha_r^s + \beta_1^s \cdot \widehat{\text{Shepherds' Emig. Rate}}_{c,1966\to1971} + \epsilon_c^s \quad \forall s \quad (8)$$

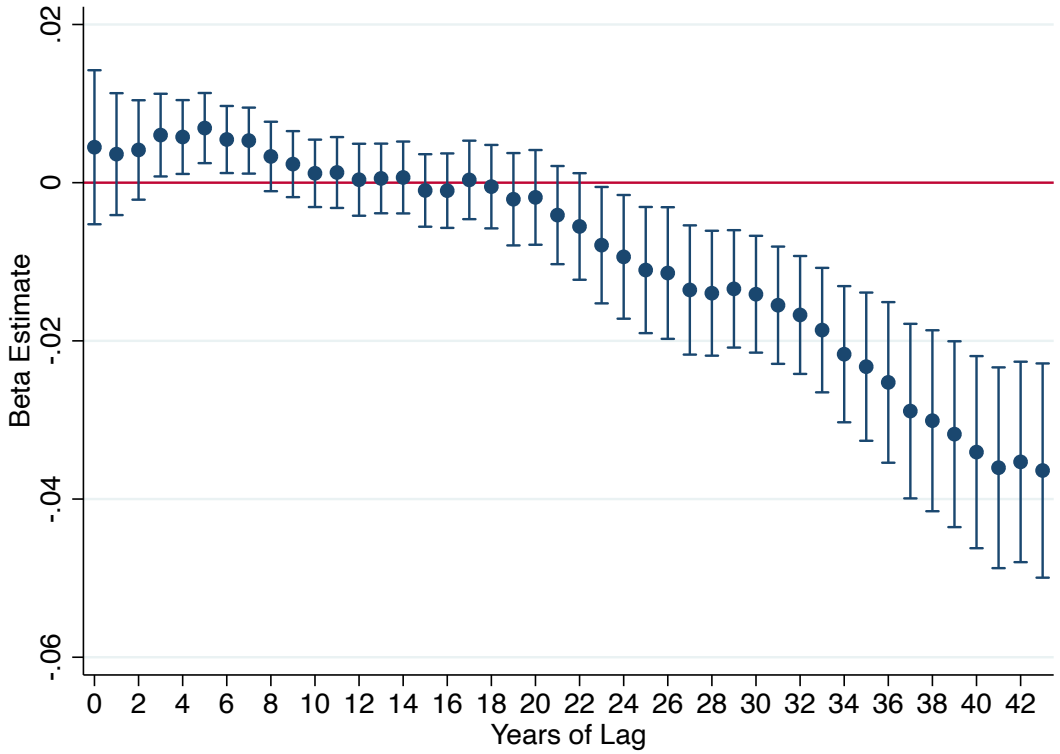

Figure 7: IV Estimation of Equation (8)

and estimate this two-stage regression for every year between 1971 and 2014. Figure 7 presents our results, which are consistent with the overall analysis and serve to confirm the existence of a long-run breakdown in the functioning of the honor code. Our KP $F-$statistic is 94.123 in all specifications, giving us confidence that our instruments are not weak. Having an overidentified model allows us to test for the validity of each instrument at a time. The $J-$statistics for the tests of overidentified instruments are usually very low and significance never obtains at the 5% level. Table A.3 of the Appendix reports them for every regression.

The IV estimation exercise strengthens our main finding, providing empirical evidence that the honor code and its cultural impact deteriorate as emigration of honor types unfolds. These findings support game theoretical models of honor cultures, demonstrating that the achievement of societal equilibria in which honor norms prevail depends on the fraction of individuals socialized within the honor culture. Additionally, we provide evidence of the importance of the oblique socialization mechanism where the community and prevailing culture are influential determinants of the cultural traits observed in new generations.

7 Conclusion

In this paper, we have examined the honor code prevalent in the Sardinian region of Barbagia. By utilizing a unique dataset on Sardinian demography, we are able to establish a relationship between the emigration of shepherds in the latter half of the XX century and a reduction in the homicide rate in honor-based communities.

In the short-run the decrease in the murder rate obtains because a lower fraction of adults relies on the *vendetta* honor code. When shepherds leave their municipality, revenge become less used as a tool for resolving conflicts among community members.

Looking at the mid- and long-run response of homicides to shepherd emigration, our research provides extensive evidence for two channels emphasized in models of cultural transmissions and honor norms. Firstly, we test the importance of the oblique socialization mechanism, whereby young cohorts acquire the cultural traits of society at broad. We find that, looking at the XX century's history of the Sardinian island, one factor that contributed to the fading away of the honor culture was the lack of adult socializers to the honor code. As honor-carrying herdsmen left the community, they decreased children's exposure to the honor trait. This translated in a lower fraction of young people taking up the honor code, eventually leading to a reduction in the use of self-help justice in the form of *vendettas*, and a weaker bite of the honor culture in the area.

The second channel that underlies the disappearance of honor norms is decreased fear of punishment and community retaliation for agents who do not comply with the honor rules. We empirically substantiate the prediction of game-theoretic models that honor norms only survive when enough people respect them. We show evidence for the culture of honor fading away because shepherds' migration entailed the elimination of punishers from the community, so that the threat of group retaliation and the fear of status loss no longer compelled individuals to engage in vindicatory action when their honor was questioned, making the honor code effectively vanish.

Additionally, our research indicates that non-honor related crimes did not exhibit a response to the migration of shepherds, suggesting that our findings are specific to the honor-based dynamics rather than general socio-economic disadvantages. Furthermore, our measure of shepherd migration remains statistically significant even when accounting for a measure of backwardness, providing further support for the cultural mechanisms at play.

Overall, our study contributes to a deeper understanding of honor cultures and their evolution over time. By examining the specific context of the Sardinian region

and the impact of shepherd emigration, we highlight the importance of honor trait carriers in the community serving both as socializers of newer generations and as deterrents ensuring obedience by all members to the honor rules.

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Appendix A

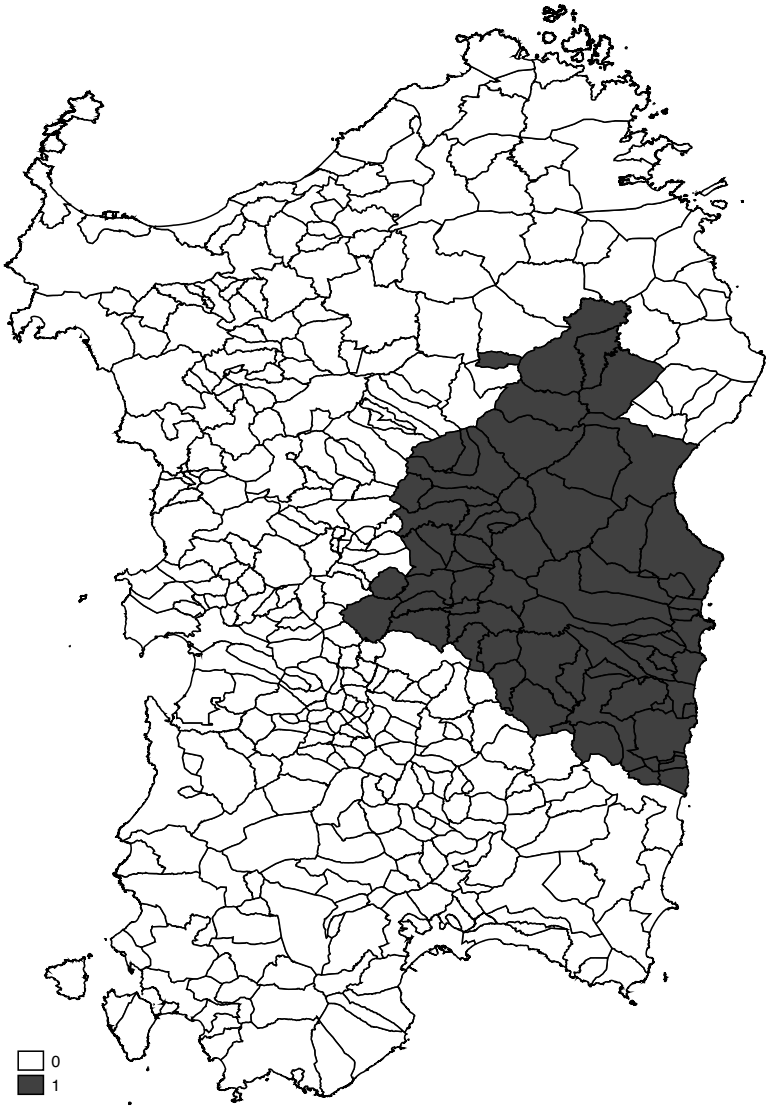


Figure A.1: Sardinia with Barbagia in gray

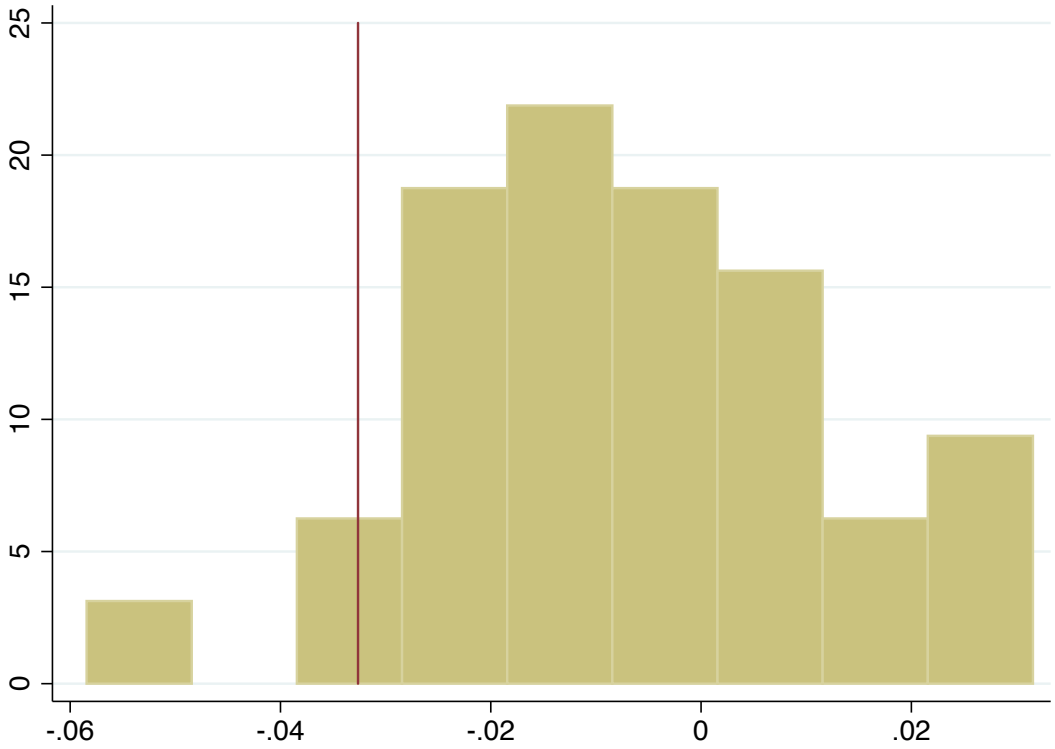
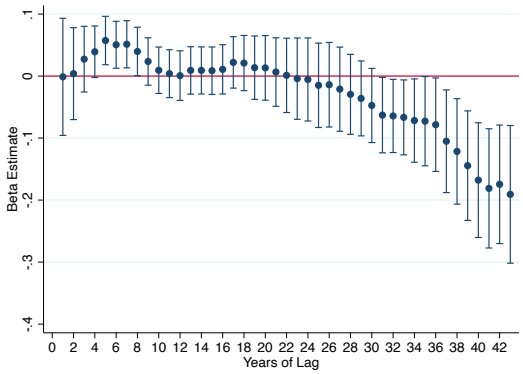
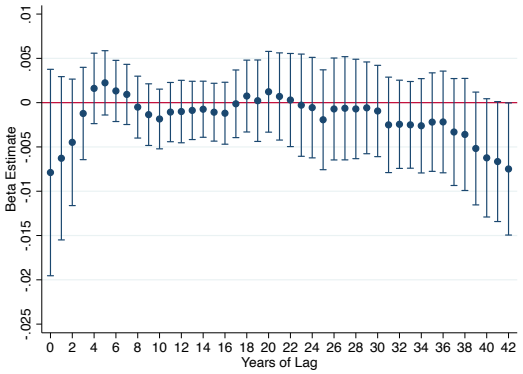


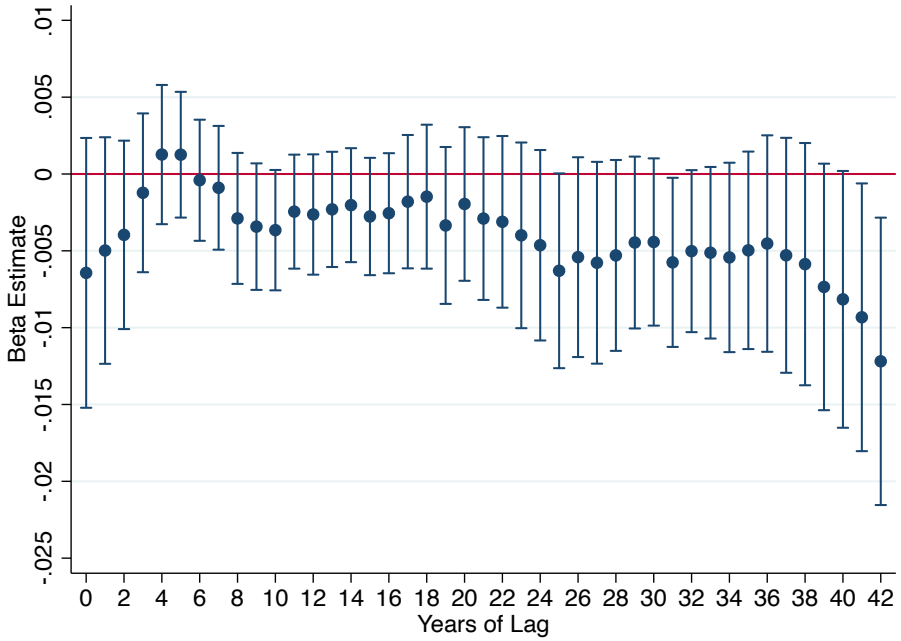
Figure A.2: Density of β_2 Estimates for All Sardinian Historical Regions



(a) β_2^s Estimates for Shepherd Share Interaction with Controls

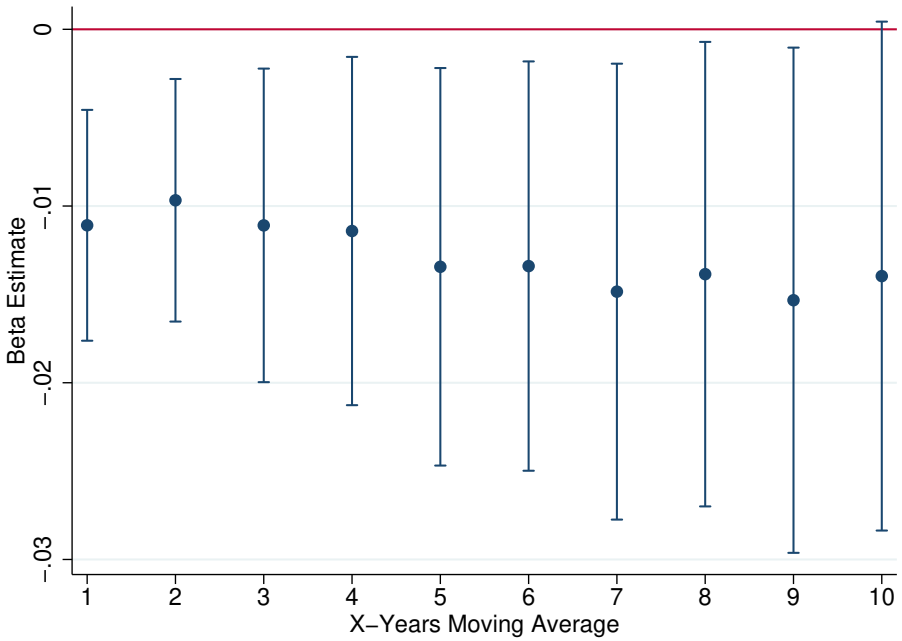


(b) β_2^s Estimates for Shepherd Share Dummy with Controls

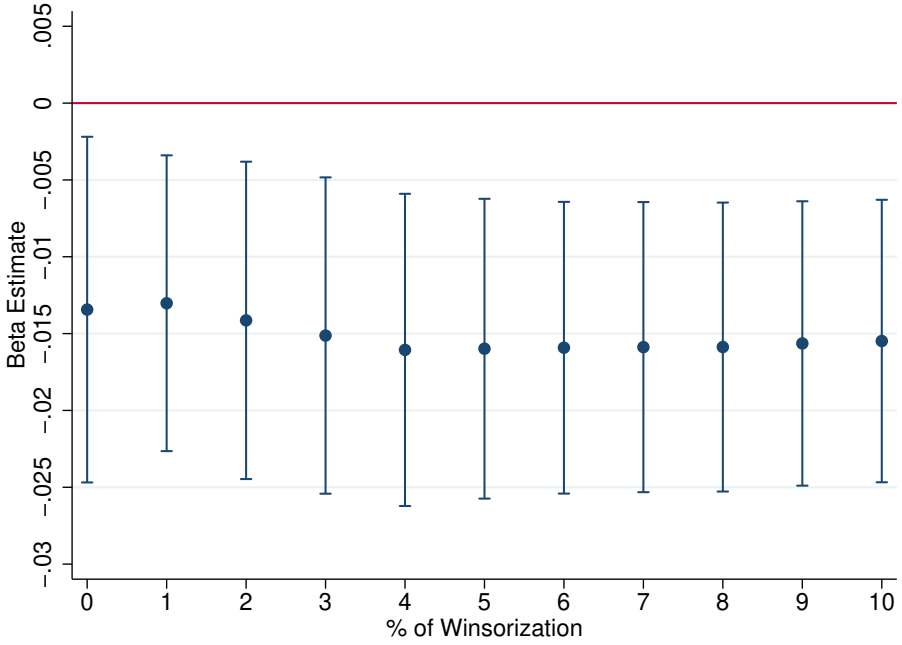


(c) β_2^s Estimates for Shepherd Share Dummy with Historical Region FE

Figure A.3: β_2^s Estimates for Different Specifications of Equation (2)

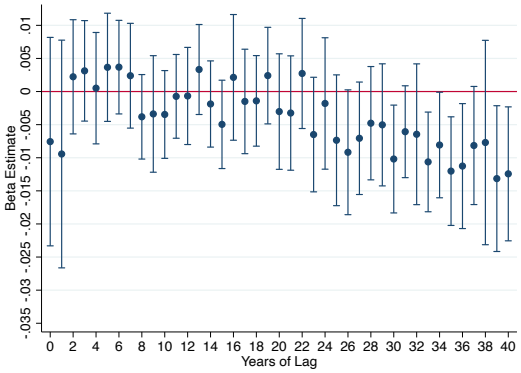


(a) β_2 Estimates for Different MA Specifications of Equation (1)

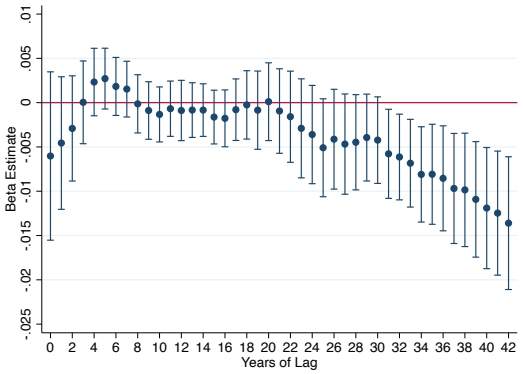


(b) β_2 Estimates for Different Winsorizations of Equation (1)

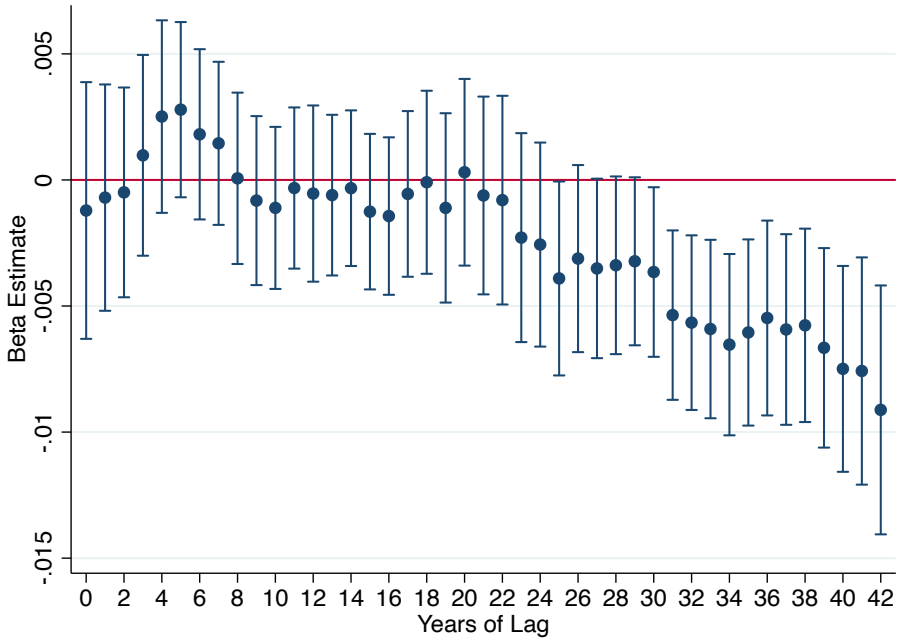
Figure A.4: β_2 Estimates Under Alternative Choices



(a) β_2^s Estimates for 1-year MA



(b) β_2^s Estimates for the Stable Sample of *Comuni*



(c) β_2^s Estimates for Winsorizations at 5%

Figure A.5: β_2 Estimates of Equation (2) Under Alternative Choices

Table A.1: Correlation in Share of Shepherds measures across time.

Share of Shepherds in	1931	1951	1961	1971	1981	1991	2001	2011
1931	1							
1951	0.5886	1						
	(0.0000)							
1961	0.4620	0.7835	1					
	(0.0000)	(0.0000)						
1971	0.4109	0.6779	0.7487	1				
	(0.0000)	(0.0000)	(0.0000)					
1981	0.4111	0.5778	0.5735	0.7641	1			
	(0.0000)	(0.0000)	(0.0000)	(0.0000)				
1991	0.4131	0.5525	0.4893	0.6429	0.8366	1		
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)			
2001	0.3344	0.4775	0.4195	0.5700	0.7379	0.8461	1	
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)		
2011	0.3061	0.4272	0.3268	0.4924	0.6925	0.7829	0.8847	1
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	

Note: Correlations are taken over all Sardinian municipalities. For 1931 the Share of Shepherds is taken as the count of shepherds in the 1930 Agricultural Census over the 1931 population count of the General Population Census. For the period 1951-2011 the share of shepherds is taken as people employed in the agricultural or farming sector in the Population Censuses.

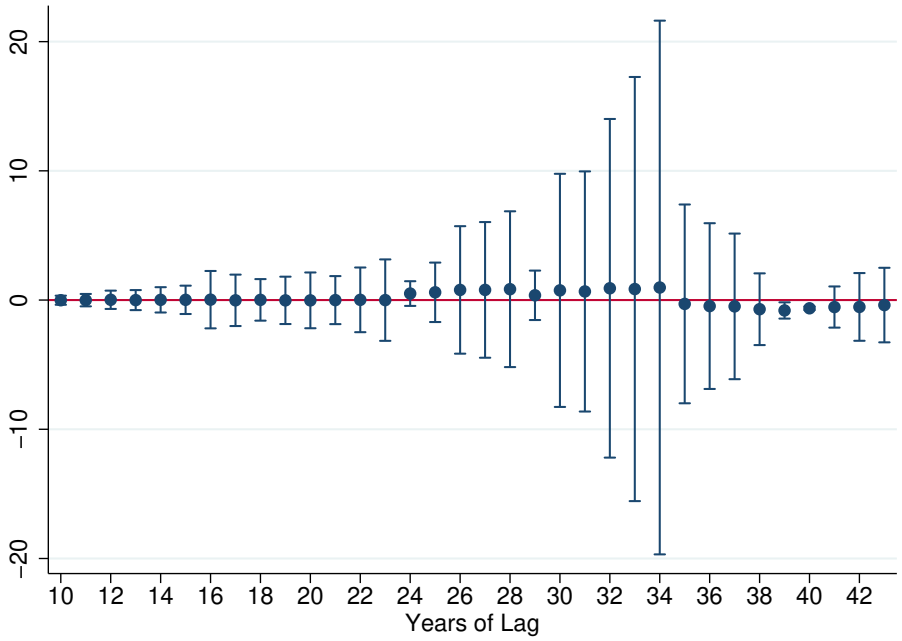
Table A.2: Simulation of the Evolution of a Honor-Culture Population

Year	Cohort											
	0-9	10-19	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90+	Total	Homicide Rate
t	100	100	100	116	116	116	88	88	88	88	1,000	1.26
$t+1$	100	100	100	114	114	114	86	88	88	88	992	1.25
$t+10$	90	100	100	100	105	105	105	80	88	88	961	1.26
$t+20$	90	90	100	100	100	105	105	105	80	88	963	1.00
$t+30$	80	90	90	100	100	100	105	105	105	80	955	0.75
$t+40$	80	80	90	90	100	100	100	105	105	105	955	0.49

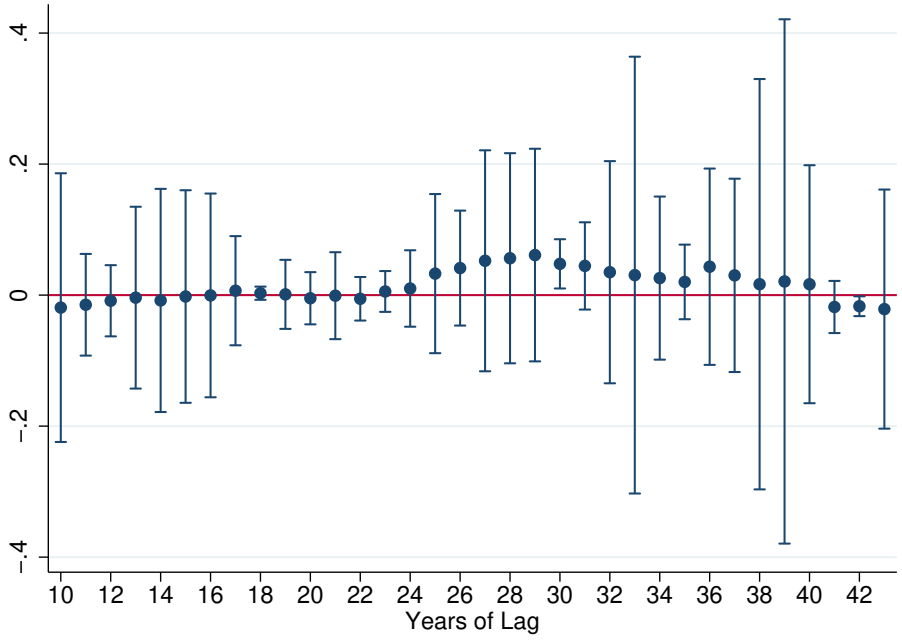
Note: We normalize the population to be 1,000 in the first year. The adult cohorts (30-59) are the most numerous to represent a demographic boom. The subsequent ones consist of less individuals to represent a slowdown in natality. We assume that if socialized to the honor culture an individual has an homicide rate of 2.36 (in order to obtain 1.26 in year t, which is also the pre-1986 average homicide rate of Barbagia). If not socialized to a culture of honor, any given individual has a homicide rate of 1.17. We assume that only individuals aged 20-69 can kill. We set the migration rate between t and $t+1$ at 2.5%, while between t and $t+10$ at around 10%.

Year	J-Statistic	Year	J-Statistic	Year	J-Statistic
1971	0.992	1986	0.215	2001	0.115
1972	1.754	1987	0.034	2002	0.374
1973	2.235	1988	0.044	2003	0.315
1974	3.528*	1989	0.000	2004	0.443
1975	3.946**	1990	0.015	2005	0.281
1976	2.286	1991	0.041	2006	0.155
1977	0.448	1992	0.202	2007	0.193
1978	2.536	1993	0.679	2008	0.318
1979	2.450	1994	0.408	2009	0.113
1980	1.064	1995	0.098	2010	0.075
1981	2.515	1996	0.128	2011	0.036
1982	3.126*	1997	0.062	2012	0.004
1983	0.614	1998	0.031	2013	0.005
1984	0.780	1999	0.016	2014	0.007
1985	0.961	2000	0.014		

Table A.3: Hansen J-Statistics for Each Cross-Sectional Regression of Equation (8)



(a) β_2^s Estimates for Frauds



(b) β_2^s Estimates for Sexual Violence

Figure A.6: β_2 Estimates Under Non-Honor Crimes

Thesis Summary

Breaking Up the Vendetta Honor Code?

Francesco Boninsegna

In this thesis, we investigate the complex dynamics of honor cultures, focusing on the case study of the Sardinian region of Barbagia and its *codice barbaricino*, a code that regulated the lives of shepherds in the area, the *barbaricini*. We leverage a unique dataset on Sardinian demography, which allows us to track emigration counts at the municipal level for the entirety of 1964-2000 period. We couple it with historical data on honor culture's presence with the Agricultural census of 1930 and data on homicides from the National Statistical Institute. Our study aims to explore the relationship between shepherd emigration and the homicide rate, while also investigating the underlying mechanisms that drive the changes in honor culture.

Our analysis reveals compelling evidence of a strong association between shepherd emigration and a reduction in the homicide rate, particularly within honor-based communities. We find that it is the shepherds who carry the honor trait, as evidenced by the decline in murder rates in the years following their migration. This suggests that the self-help justice, which is a hallmark of honor cultures, diminishes when these honor-socialized herdsmen leave the community in the short run. We enhance our analysis by looking at the long run dynamics originating from the 1966-1971 peak in emigration. By removing adult socializers of the honor code, there is a lower fraction of young people who adopt and adhere to the honor code, leading to a weakening of the honor culture in the area.

Moreover, our research provides empirical support for two channels emphasized in models of cultural transmission and honor norms. Firstly, we examine the importance of oblique socialization mechanisms, one of the main socialization channels in models à la Bisin and Verdier (2001), whereby young cohorts acquire the cultural traits prevalent in society. Our findings demonstrate that the fading away of the honor culture in the pastoral community, particularly in Barbagia, can be attributed to the lack of adult socializers of the honor code. The natality boom

during the 1930s to 1950s resulted in emigration in the latter half of the 20th century, with shepherds being more involved due to the constraints of sheep farming. As these honor-socialized shepherds departed, the community experienced a decline in the fraction of young individuals embracing the honor code, subsequently leading to a reduction in the use of self-help justice, such as *vendettas*.

Secondly, our research aligns with predictions from game-theoretic models that suggest the sustainability of honor equilibrium depends on a sufficiently high fraction of the population being socialized to and adhering to honor norms. With the migration of shepherds, who served as enforcers of the honor code, the balance of the honor equilibrium was disrupted. As enforcement primarily rests with individuals within the community, the absence of punishers contributed to the gradual fading away of the honor code. Indeed when individuals don't credibly face the threat of retaliation by other members of the community, they are less likely to engage in costly revenges, especially for 'weaker' types who have a higher cost relative to others. Signalling as 'strong', moreover, loses importance as it is less likely that individuals will be dishonored as less people share honor norms.

Several alternative explanations are also investigated. Importantly, our study reveals that non-honor related crimes do not display a response to shepherd migration, and it suggests that enhanced police enforcement is unlikely to be the driving force behind our results. Furthermore, our measure of shepherd migration remains statistically significant even when accounting for measures of backwardness, indicating that the effect observed is specific to the emigration of shepherds and not a general trend common to all socio-economically disadvantaged areas. As a final check, we employ Instrumental Variables estimation using push factors for migration and find our results virtually unchanged.

Overall, this thesis provides a comprehensive examination of the evolution of honor cultures, utilizing the case study of shepherd emigration in Sardinia. Our findings suggest that honor norms are sensitive to the fraction of people who share obedience to the honor code to survive. Through an analysis of a migratory event taking place between 1965 and 1985, which was triggered by a fertility boom in the late 1930s, we find evidence of a reduction in the homicide rate both in the short and in the long run. By deepening our understanding of honor cultures and their dynamics, this research contributes to the broader literature on cultural evolution, social norms, and the complex interrelationships between migration, cultural change, and social structures.