Economic persistence despite adverse policies: Evidence from Kyrgyzstan

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Abstract

We study the long-run persistence of relative economic well-being in the face of highly adverse government policies using a combination of rich historical and contemporaneous data sources from Kyrgyzstan. Even after controlling for unobservable local effects, the economic well-being (measured by income, expenditures, or assets) of Kyrgyz households in the 2010s strongly correlates with the early 20th-century average wealth of the tribes from which these households descend. The degree of economic inequality at the tribe level in the 2010s correlates with the within-tribe wealth inequality in the early 20th century. In terms of channels of persistence, we find support for the inter-generational transmission of human capital, relative status, political power, and cultural traits. Transmission of material wealth, differences in natural endowments, or geographic sorting cannot explain the observed long-run persistence.

Keywords: Wealth distribution, long-run persistence, inter-generational transmission, traditional institutions, tribe, clan, Kyrgyzstan.

JEL codes: D31, D15, O15, O17, N35.

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1 Introduction

Questions of increasing inequality and declining social mobility, and the role of government policies in affecting these trends, are at the forefront of public debates. Relatedly, economics has been experiencing a recent boom in research on the distribution of income and wealth (see the reviews by Piketty and Zucman, 2015, and Benhabib and Bisin, 2018) and on inter-generational mobility in economic outcomes (see the review by Solon, 2018).

In this paper we analyze long-run persistence of the distribution in economic well-being in the face of massive (and violent) Soviet expropriative and redistributive policies, using a unique combination of rich historical and contemporaneous data from Kyrgyzstan. We document that even after controlling for unobservable local effects, the economic well-being (measured with income, expenditures, and assets) of Kyrgyz households in 2011-2013 strongly correlates with the early 20th-century average wealth of the tribes to which the household heads belong. Furthermore, the degree of economic inequality among tribe members today correlates with the wealth inequality within tribes in the early 20th century. This persistence is surprising, given the extreme equalizing policies conducted by the Soviet government from 1917 to 1991 (the collectivization drive, mass purges targeting the wealthy and the middle-class citizens, and the virtual absence of private property) and the Soviet campaigns to eradicate tribal identity.

Next, we focus on the potential channels behind this persistence. The Soviet policies allow us to rule out the transmission of wealth or other tangible assets. By using the local-level geographic fixed effects, we exclude that the observed correlation is driven by natural endowment differences (in the location of tribes) or by geographic sorting of erstwhile richer tribes into better-endowed locations. Using information about the parents of respondents in the contemporaneous data, we find support for the transmission of intangible assets, such as human and social capital. During the Soviet period, there is a positive correlation between the pre-Soviet wealth of tribes and the relative position in society that members of these tribes reached, with respect to the skill type of occupation and sector of activity, although not in terms of years of formal education. We also document significant differences in tribe-level cultural traits. Finally, combining the pre-Soviet data with the 1970s data on the political elite of Kyrgyzstan, we find that the once-wealthier tribes exhibit a disproportionally larger representation in the Soviet-period political elite.

Our findings have important implications for the policy debate on inequality and social mobility. Pareto (1897) argued that *"In all places and at all times, the distribution of income remains the same. Neither institutional change nor egalitarian taxation can alter this fundamental constant of social sciences"*. Our findings lend support to the Pareto's Law, by showing that wealth taxation - even in its extreme form as practiced by the Soviet government - does not seem to revert the fortunes within a society. This is because the groups that are ranked higher in terms of their pre-policy wealth adjust by shifting

to other non-taxable channels of inter-generational transmission of well-being and status.

We contribute to two large strands of literature. The first focuses on the long-run persistence in relative wealth and income levels. These studies analyse the datasets that link individual units across several generations, either through administrative records (see Chetty et al., 2014, 2017, for the United States; Boserup et al., 2016, for Denmark; and Adermon et al., 2018, and Black et al., 2020, for Sweden), or by relying on linking the units through surnames (Clark, 2014; for specific countries, see Clark and Cummins, 2015, for Britain; Barone and Mocetti, 2016, for Italy; Clark et al., 2017, for Australia). This literature agrees on persistence of economic well-being across generations, although the debate remains open regarding the degree of persistence. Our contribution is to study persistence in a context of strongly expropriative government policies, aimed precisely at halting persistence.

In all the contexts studied so far, with the exception of China, there was relatively little disruption in the overall economic system and social life across generations. Two studies for find results similar for ours. Clark (2014, chapter 9) compares people with the same surnames before and after the Cultural Revolution, and finds a surprisingly high degree of persistence in social status. An advantage of our analysis over the surnames-based method is that we can match all household records in a nationally representative survey while the analysis of surnames needs to focus on sufficiently rare surnames that can be tracked over time (which is a particularly challenging endeavour in the case of China). The study closest to ours is Alesina et al. (2020). They analyse the correlation in individual-level economic outcomes of three generations of Chinese citizens: current-day, their parents (grown up during the Cultural Revolution period), and their grandparents (who came of age before the 1950 revolution). Their main finding is that the equalizing effect of the Communist regime policies gives way to a strong re-emergence of the inequality and rankings in economic outcomes after the 1978 pro-market reforms. In terms of the main mechanism, the authors argue in favor of the transmission of cultural values, by using the comparison between current-day Chinese who grew up with their parents (and hence could inherit their cultural values) and those whose parents died early (and thus the cultural transmission mechanism was unlikely to be at play). Besides being focused on a different geographic setting, our paper differs from theirs in two aspects. First, the length of the period with expropriative policies was much longer in Kyrgyzstan, as compared to China (1928-1989 versus 1950-1978). Hence, our findings indicate that the non-wealth channels of transmission can operate under expropriative policies over several generations. Second, in terms of channels of persistence, Alesina et al. (2020) mainly focus on culture, whereas we find some support also for transmission of human capital (occupations) and political capital (top politician positions).

The second strand focuses on the role of traditional institutions in economic development. Beside the extensive analysis of the caste system (see Munshi, 2019, for a recent review of this literature), a growing literature in development economics and economic history has recently started to analyze the economic role played by institutions of clans and tribes. Some authors highlight the negative aspects of

tribal and clan-based institutions. For example, Moscona et al. (2020) find that ethnic groups that are organized around segmentary lineages are more prone to conflict. Other scholars (e.g. Acemoglu and Robinson, 2019; Greif and Tabellini, 2010, 2017; De la Croix et al., 2018; Enke, 2019), on the contrary, underline the positive aspects of tribal institutions, such as solidarity norms, democratic culture, and enforcing social cooperation. We contribute to this literature by showing that the tribal or clan-based social structure is highly resilient in the face of aggressive adverse government policies aimed at equalizing wealth distribution and undermining the traditional system (by deliberately replacing it with a more aggregate-level identity).

2 Historical context

A confederation of ethnically and linguistically close nomadic pastoralist tribes known today as the Kyrgyz people consolidated into three large groups of tribes in the early 16th - mid-18th century CE. During the 19th century, some of the Kyrgyz tribes seeked the protection of the Russian Empire (from the neighboring powerful Kokand kingdom), and gradually the Russians acquired military control of the entire territory of modern-day Kyrgyzstan (see Figure 1 for the modern-day boundaries of Kyrgyzstan).

The abolition of serfdom in 1861 in Russia triggered the process of Russian peasant migration into Central Asia. It was a massive process, so that by the 1900s, the ethnic Kyrgyzs constituted only 60% of the population of the modern-day Kyrgyzstan's territory and towards the end of the 19th century, the Russian Empire fully converted the protectorate into a colony. The rising land pressure on the Kyrgyz tribes put under strain the nomadic pastoralist economic system, and the Kyrgyz population had to rely ever more on sedentary agriculture. This period was characterized by the impoverishment of the Kyrgyz population and numerous episodes of anti-Russian revolts that were violently repressed by the Empire (Asankanov et al., 2017: 105).

Kyrgyz society was structured by a hierachical system of tribal relationships. There were three large tribal groups (wings), which consisted of several tribes (*uruu*), further divided into clans (*uruk*) and sub-clans. Each of these units corresponded to families whose male descendants belonged (or believed to belong) to the same lineage. Traditionally, a clan was headed by an elderly male (*manap*), and the council of manaps of all the clans jointly ruled the tribe. There were about 35 main tribes (for a total population of ethnic Kyrgyzs of slightly more than 400 000 individuals around 1910). Political actions (settlement of large-scale land disputes, alliances with the Russian administration) were in the hands of clan elders. Clans actively intervened in and regulated the social behavior of its members. Marriages were often used as a way of reinforcing the strategic relationships and alliances between clans (Asankanov et al., 2017: 292). Clans also played a major role in regulating access to land and

coordinating seasonal migration (between winter and summer pastures). Livestock was the private property of individual households, but pasture land was owned by clans.

After the 1917 Revolution, Bolsheviks launched several land redistribution reforms. These reforms involved the collectivization of land and livestock and the formation of kolkhozs. They targeted rich members of society, which led to the clan leaders and their households (about 500 households in Kyrgyzstan) being singled out for the confiscation of their wealth and for exile into Siberia and Ukraine (Sarsenbaev, 2013). By 1935, 85% of the all the land suitable for agriculture in Kyrgyzstan was collectivized (Junushaliev, 2003: 160). The clan structure received a further blow from the policy that explicitly forbade the formation of villages on the kinship basis during the transition from nomadic pastoralism to the sedentary life (Junushaliev, 2003: 129).

This set of policies was a huge shock to the economic system of Kyrgyzstan. The break-up of the social structure that followed the expropriation and the exile of the manaps, coupled with the poorly organized kolkhoz system and the generalized lack of trust of the population, led to a collapse in agricultural productivity and the famine in 1932-1933. This was aggravated by the in-migration of Kazakh families escaping an even more severe famine driven by the same factors. Yet, facing these massive social problems, the party rule only insisted in its ideological drive.

Under the Soviet regime, Kyrgyzstan remained economically marginal within the USSR: in 1979, Kyrgyzstan was the second-poorest republic in the Soviet Union (Anderson, 2013). Similar to the rest of the USSR, income and wealth inequality in Kyrgyzstan were highly compressed. In addition to collectivization, the state regulation of the labor markets guaranteed minimum income and employment. The transmission of material assets through inheritance was extremely limited, not so much because inheritance was forbidden but because "the preponderant public ownership of the means of production considerably constrained the accumulation of private wealth" (Bergson, 1984).

The Soviet state apparatus also conducted active policies against clan-based institutions. The clan identifiers (recorded by the pre-Soviet scholars and statisticians) were suppressed in almost all the data collected in the Soviet period (Junushaliev and Ploskikh, 2000). The Soviet ideological apparatus transformed Kyrgyz traditional milestone ceremonies (marriages, funerals), eliminating from them any clan-based elements. More generally, the objectives of the State ideology were the leveling of national ethnic features and the creation of a new community of people along the Communist ideal. On surface, the majority of traditional social norms and structures was lost; however, in the years of post-Soviet transformation, many elements of this past cultural life re-emerged (Asankanov et al., 2017: 501).

The break-up of the Soviet Union in 1991 triggered a deep economic crisis in all the ex-Soviet republics, and those at the periphery of the Union (including Kyrgyzstan) were particularly affected. Ex-state firms and their employees found themselves with virtually no effective demand for their goods (Blanchard and Kremer, 1997; Suesse, 2018). Most of these firms went bankrupt and lost most of their

(often skilled) personnel. In Central Asian republics, many citizens reverted to small-scale trade. This crisis led to a sharp rise in poverty: the poverty headcount ratio in Kyrgyz Republic in 1993 stood at 86%, the highest among all the transition economies (Milanovic, 1998).

3 Data

Our sources can be divided into three groups: pre-Soviet data from Russian colonial expeditions of 1907-1913, the Soviet data (from ethnographic expeditions and administrative registries of elected politicians in the 1970s), and the post-Soviet household survey of 2011-2013.

3.1 Pre-Soviet data

For the tribes' economic situation at the beginning of the 20th century, we rely on the materials of two Russian colonial expeditions, conducted between 1907 and 1913 in the territories that cover present-day Kyrgyzstan and Kazakhstan (Rumyantsev, 1916a; Rumyantsev, 1916b; Skryplev, 1911; Skryplev, 1913a; Skryplev, 1913b; Skryplev, 1915).[1]

These materials contain information on the composition of families and their economic well-being at the extended family level. Most importantly, they include information on kinship (sub-clan names) of each extended family, which allows us to identify the tribe to which each extended family belongs. After matching to tribes, we obtain a sample of 4702 extended families from 34 different tribes. The right panel of Figure 1 shows the approximate location of the pastures of all the major Kyrgyz tribes in the early 20th century. There is no clearly marked geographic separation of tribes and a given tribe is typically present in several territories.

On the basis of this data we construct measures of material well-being in the past at the tribe level. We rely on two main variables, available at the extended family level: livestock ownership per capita (expressed in adult horses equivalent) and cultivated land per capita (expressed in desyatinas).[2] As livestock rearing and farming were the two main sources of income in 1910s, these variables capture a family's productive capital. We also build an index of wealth for each extended family, by aggregating the two types of capital after normalizing (by subtracting the sample average and dividing by the sample standard deviation). Averaging over extended families of each tribe yields a measure of tribe's wealth, expressed as a z-score. The first panel of Table 3 (Online Appendix) provides descriptive statistics for these measures, aggregated at the tribe level.

[1] For more information about the expedition materials, see Aldashev and Guirkinger (2012) and Guirkinger and Aldashev (2016).

[2] 1 desyatina = 1.093 hectare.

3.2 Soviet data

For the Soviet period, we rely on two main sources: the materials of the 1953-55 ethnographic expedition and the 1972-76 administrative data on biographies of members of the parliament (MPs), intended mostly for the internal use of the Communist party.

Materials of the ethnographic expedition of 1953-1955

In 1953-55, an ethnographic expedition headed by prominent Soviet orientalists, Abramzon, and Vinnikov (respectively, for Northern and Southern Kyrgyzstan) studied the tribal composition of Kyrgyzstan, using a carefully constructed combination of historical materials and first-hand collection of qualitative data from several hundred elderly respondents with a good knowledge of tribal history. The materials of this expedition were published in 1956-1960 and include tribes' genealogical trees (divisions into clans and sub-clans), and the information about the geographic location of all the clans around 1950 (Vinnikov, 1956; Abramzon, 1960).

We rely on the genealogical trees of this expedition to match the clans (both in the pre-Soviet and post-Soviet data) to tribes, as explained below. In addition, we use this data to associate each village reported in this expedition to the tribes occupying it, which later allows us to associate Kyrgyz politicians of the 1970s to tribes.

Biographies of MPs of Kyrgyz SSR, 1972-1976

Political power in the Soviet Republics belonged to the Central Committee of the Republican branch of the Communist Party (appointed by the USSR Central Committee). However, considerable privileges were given to the Supreme Soviet (the Republican Parliament), whose 340 members were elected. From 1960s until 1991, after each election of the Supreme Soviet, the Soviet government printed a short biography of all elected members. Starting in 1972, these biographies contain detailed information on the place of birth of elected officials. We use data from 1972 and 1976.[3] There are a total of 360 members elected either in 1972 or in 1976 who are ethnic Kyrgyzs (the other members are from other ethnic origins). Matching this data with the tribe composition of villages (from the 1953-55 expeditions), we attribute to each member of Kyrgyz origin his/her tribe (if there are several tribes present at the location, we weigh the probability of belonging to each of these tribes with the population share of the tribes at this location).[4]

[3] The two volumes accessible online, respectively, at: dlib.rsl.ru/viewer/01007110337 and dlib.rsl.ru/viewer/01006984364.

[4] For 15 members, we couldn't identify their villages of origin on the maps.

3.3 Post-Soviet data

Our source for the modern-day economic outcomes is the "Life in Kyrgyzstan" (hereafter, LiK): a nationally representative survey conducted in five waves (2010, 2011, 2012, 2013, and 2016) and including about 2800 households and 8000 individuals.[5] About two-thirds of respondents are ethnic Kyrgyzs. The 2012 wave is of special interest to us, because it contains a section on custom and traditions, with questions about the tribal/clanic belonging of the household head. The tribe is the smallest level of aggregation (or the "lowest common denominator") between historical and contemporaneous data. In the LiK dataset, 80% of ethnic Kyrgyzs reported a tribe or a clan name. We were able to match 91% of them to one of the Kyrgyz tribes. Our main sample thus contains 1344 households belonging to one of the Kyrgyz tribes. The details of the matching procedure are provided in the Online Appendix.

This data allows to construct measures of per capita income and consumption at the household level. To reduce the noise arising from short-run fluctuations in income or expenditures, we average these across 2011-2013. We also build normalized measures of income and expenditure (z-scores) by subtracting the corresponding sample average and dividing by the standard deviation.

The dataset contains measures of asset ownership and human capital. For asset ownership, we use the variables on land ownership (any land owned, land area owned per capita, and irrigated land owned per capita). We also build a composite asset that aggregates all household assets recorded in the survey using principal component analysis.[6] For measures of human capital, we rely on the years of education completed, height, body mass index (BMI), and the birthweight of the first-born (for women aged 25 or above).[7]

In addition, the data contains information on key outcomes for the parents of respondents. This allows us to go back one generation and to construct measures of human capital and proxies for wage income during the Soviet period. Specifically, we know the education of fathers of men, and the skill type (skilled versus unskilled) and the sector of their occupation (agricultural versus non-agricultural). The first variable is a measure of human capital while the three others are indicators of the level of wage income. Unskilled and agricultural occupation were associated with a lower wage level than skilled and non-agricultural occupation (Gregory and Kohlhase, 1988; Rutland, 1993). Finally, we also build a variable to capture whether they belong to the top quintile in terms of the prestige of their occupation

[5] The database and accompanying documentation are accessible at http://lifeinkyrgyzstan.org/

[6] The asset categories include real estate, vehicles, domestic appliances, furniture, media appliances, communication devices, and livestock. For each item, the survey recorded whether the household owned it. We build an index using the first principal component, separately for urban and rural households.

[7] For human capital indicators, we restrict attention to individuals above 23, because individuals would typically have achieved their formal education by that age. As tribal identity is reported only for males, we focus on males for education and height levels. These outcomes are largely driven by parental investment and, due to a relatively well-respected tribal exogamy rules, women are likely to have grown up in a tribe different from that of their husbands. We include women in the BMI analysis, as the body mass depends on the current level of nutrition. We focus on the birthweight of first-born children to avoid birth order effects.

(again as a proxy for wage income).[8] We focus on the fathers of male respondents, as tribal identity is transmitted from fathers to sons . Descriptive statistics for all the variables used in the analysis are provided in Table 3 (Online Appendix).

4 Persistence of material well-being over the long 20th century

Section 2 highlights that the Soviet period was characterized by a massive expropriation of physical assets and a disruption in wealth accumulation in Kyrgyz society. Parents could not transmit physical assets to their offspring, but they could transmit intangible assets such as education or knowledge about tribal connections and history. Bergson (1984) and Gregory and Kohlhase (1988) find that even the most drastic collectivization policies of the Bolshevik government did not fully expropriate the human and social capital embodied in labor income (i.e. the economic returns to education and connections were positive). This suggests that we may observe partial persistence in income levels across generations through the Soviet period. The Online Appendix presents a simple model that illustrates how parents may adapt to an expropriative government policy by investing more in the transmission of human and social capital to their offsrpings.

In this section we test empirically for persistence over the century of Soviet rule. Specifically, we first estimate persistence in indicators of material well-being. Second, we investigate the correlation between pre-Soviet and post-Soviet intra-tribe inequality. Third, we go back one generation and estimate whether the respondent's parents fared better (under the Soviet system) if they belonged to a wealthier tribe in the pre-Soviet period.

4.1 Pre-Soviet tribal wealth and post-Soviet individual/household outcomes

Empirical strategy

To investigate the link between the post-Soviet economic outcomes and the average pre-Soviet wealth of the tribe (from which the individual descends), we run simple linear regressions where the dependent variable is an individual (or household) outcome obtained from LiK and the tribe-level wealth measures in the 1910s serve as explanatory variables. We estimate the following model (where Y_{itg} is the outcome for individual i, belonging to tribe t and living in area g, the vector X_i includes other individual characteristics and X_t the tribe characteristics in the past):

[8] Specifically, we classify the position of the father in terms of its prestige in the socio-economic ranking of the Soviet period. The categories included are: legislator, senior official, manager, professional, and technician. One fifth of fathers occupied such a position, and therefore belong to the top quintile in terms of the prestige of their occupation.

$$Y_{itg} = \alpha' X_i + \beta' X_t + \varepsilon_{itg} \quad (1)$$

Tribes have different sizes and averages (included in X_t) are computed over different numbers of extended families for different tribes; therevore, we weigh the observations by the population size of the tribe in 1910s. Standard errors are clustered at the tribe level.

A natural channel that could explain the persistence of tribe's material well-being is geography (Alesina et al., 2016). If regions differ in their natural endowments (climate, land productivity, etc.) and migration over the 20th century was relatively limited, then households living in 2010s in the better-endowed regions have better economic opportunities, which would also hold for their ancestors. Under this scenario, the correlation in material well-being between 1910s and 2010s would require no mechanism of inter-generational transmission and rely uniquely on the region of residence. We mute this channel by including neighbourhood fixed effects in the above model, so that the estimation of the coefficients β is based on the comparison of individuals living in the same geographic area but belonging to different tribes.[9]

Household consumption, income, assets, and human capital in 2011-13 and tribes' pre-Soviet wealth

The first panel of Table 1 reports the results of the estimations of equation (1) with neighbourhood fixed effects using household income, expenditures, and assets as dependent variables. The parameter estimates are provided for two specifications, corresponding to different measures of pre-Soviet tribe wealth. Average levels of material well-being over the 20th century are remarkably persistent, and this persistence cannot be attributed to tribes' geographic endowments: the regression coefficients on the 1910 tribe characteristics are statistically significant and economically important. For example, the results reported in column 1, panel 1, specification 1 indicate that one additional standard deviation of tribe wealth in the past implies an additional 0.195 standard deviations of income today. Area cultivated and livestock holding in 1910s do not have the same influence on current day outcomes: the second specification reveals that only the area cultivated has a statistically significant effect on both present-day income and expenditure. Asset ownership is positively correlated with tribe wealth in the past even if the estimated coefficient is statistically significant only for specification 1 (column 5). In contrast, land ownership is negatively correlated with tribe wealth in 1910s (columns 6 to 8): members of tribes who cultivated larger areas in the past own less land today.

[9]There are 108 neighborhoods in the 2012 sample. They correspond to a village in rural areas and to a town quarter in urban areas. These neighborhoods are the primary sampling units from which the 2010 LiK sample was drawn. The average number of tribes represented in the same neighborhood is 3.8, corresponding to 13 households. Single-tribe neighbourhoods are 18.5% of the sample.

The estimated correlation between the present-day income and the pre-Soviet tribe wealth is substantial, as compared to the persistence rates in the existing literature. The two data points are distant by 3.3 generations (using the conventional 30-year span for one generation). The correlation of 0.195 between the pre-Soviet tribe wealth and the current income implies a persistence rate of 0.61 between generations.[10] In the societies studied by Clark (2014) using surnames, the estimated persistence rate in social status across generations is slightly higher (between 0.7 and 0.9). However, in the rest of the literature, persistence rates are much lower and vary strongly over space and time (Solon, 2018). For example, using surnames data from the United States, Chetty et al. (2014) find a persistence rate of about 0.4. Our estimated degree of persistence in tribes' relative well-being is therefore surprisingly large, given the political and economic turmoils experienced by Kyrgyz people over the 20th century.

Columns 1 to 4 of the second panel of Table 1 reproduce the analysis using indicators of human capital as dependent variables. Past tribe wealth (of the husband's tribe) appears strongly positively correlated with the BMI and birthweight (for instance, one standard deviation increase in tribe wealth in 1910 translates into an additional 120 g in newborn weight in the present), but less so with education and height.[11]

Correlation between intra-tribe levels of inequality in the pre-Soviet and the post-Soviet periods

The granularity of the data allows us to go beyond averages and investigate the persistence of inequality *within* tribes. To compare the levels of inequality in the pre- and post-Soviet periods across tribes, we construct pseudo-Kuznets ratios for area and livestock per capita in 1910s and income and expenditure in 2011-13. For each variable, we divide the average measure in the top quintile of the distribution by the average in the bottom two quintiles.[12] Figure 2 plots the obtained measures for livestock per capita in 1910s and expenditure per capita in 2011-13. Each dot denotes a tribe; the size is proportional to the population size in 1910. The figure suggests a positive correlation between these inequality measures. Tribes in which the top quintile owned less than three times the average livestock of the bottom two quintiles (pseudo-Kuznets ratio <3) in 1910s have a pseudo-Kuznets ratio below three in expenditure per capita in 2011-13. The highest level of inequality today (pseudo-Kuznets >3) are in tribes that also experienced relatively high inequality in the past (pseudo-Kuznets >3). The Online Appendix reports similar figures using alternative measures of wealth in the past and of well-being in 2010 and

[10] Assume a simple AR(1) model for the correlation between adjacent generations and solve for x in the following expression: $0.195 = x^{3.33}$. We thereby can abstract from the fact that we have two different measures of material well-being at the two points in time (wealth for 1910s and income for 2010s), implicitly assuming that the distributions of wealth and income in 1910s are similar.

[11] Results are similar if we measure past wealth in levels instead of normalizing land and livestock per capita into z-scores (see the Online Appendix).

[12] We consider the distribution across *individuals* of the same tribes. We attribute to each member of the extended family (household) the average per capita measure of the extended family (household).

a matrix of correlation coefficients across the various measures of inequality.

4.2 Going back one generation: Soviet period outcomes and pre-Soviet wealth

Human capital and labour income in the Soviet period versus tribes' pre-Soviet wealth

Columns 5 to 8 of the second panel of Table 1 report the results on the correlation between pre-Soviet tribe wealth and individual outcomes for the *parental* generation. The results on education are similar to those obtained for the current generation: the coefficients on past tribe wealth are small and insignificant, suggesting no correlation between pre-Soviet tribe wealth and the Soviet-period years of education. Regarding occupation, descendants of pre-Soviet wealthier tribes are significantly less likely to have an unskilled job or to work in agriculture. For example, column 6 suggests that an additional standard deviation in pre-Soviet tribe wealth is associated with a decrease of 11 percentage points in the probability of being in an unskilled occupation (for fathers of LiK respondents). These effects are even stronger for older fathers (a 21 percentage point lower probability). As for the top of the distribution of occupational status (column 8), it is positively correlated with pre-Soviet tribal wealth, but the coefficient is statistically insignificant. Table 8 in the Online Appendix reproduces these results for the sub-sample of fathers born before 1965 (entering their professional life during the Soviet period). The coefficients tend to be larger for this subsample confirming that persistence in well-being was perceptible during the Soviet period. In summary, even during the Soviet period, the relative social position held by individuals correlates positively with the pre-Soviet wealth of tribes from which they descend.

Social capital in the Soviet period versus pre-Soviet wealth

To measure the level of social/political capital of a tribe, we rely on its representation among the political elite in the 1970s. Specifically, we compute the proportion of elected members of the Supreme Soviet belonging to a each tribe: $SharePolElite_t = \frac{Nelite_t}{\sum_k Nelite_k}$ where $Nelite_t$ is the number of members of the political elite belonging to tribe t. We then explore whether tribes that were richer in the pre-Soviet period were over-represented among the political elite, controlling for the share of the tribe in the general population, $ShareTribe_t = \frac{N_t}{\sum_k N_k}$ (with N_t the size of tribe t).

We thus run simple linear regressions at the tribe level, with $SharePolElite_t$ as the dependent variable:

$$SharePolElite_t = \alpha' X_t + \beta' ShareTribe_t + \varepsilon_t$$

The vector X includes measures of pre-Soviet wealth at the tribe level. We weigh the observations by the pre-Soviet population size of the tribe.

Results are reported in Table 2. The parameter estimates on the pre-Soviet wealth measures indicate that the 1970s' political representation of a Kyrgyz tribe is positively correlated with the tribe's pre-Soviet wealth, controlling for the population share of the tribe. The correlation is statistically significant when the wealth is measured as an index (column 1) or in levels of land and livestock (column 3). One standard deviation increase in the wealth index of a tribe in 1910 is associated with an increase of 3.7 percentage points in the proportion of the political elite belonging to that tribe in 1970s (based on estimates in column 1). Hence, tribes that were richer in the pre-Soviet period were over-represented among the political elite in the Soviet times.

5 Discussion

As argued above, the transmission of material assets through inheritance was extremely limited during the Soviet period and cannot account for the persistence in relative well-being of Kyrgyz tribes over the 20th century. We now briefly discuss the relevance the transmission of intangible assets (human capital and social capital) in the historical context .

5.1 Transmission of human capital

The existence of an inter-generational transmission of education levels in the Soviet Union has been widely documented (see Bergson, 1984, for a review). Yet, we find little evidence that members of wealthier tribes in 1910 acquired a higher level of education.

Besides formal education, families may also transmit cultural traits, some of which might facilitate economic success under the market system (for example, values of entrepreneurship). We cannot directly trace the persistence of cultural traits. However, a necessary condition for this explanation is that tribes exhibit sufficiently marked differences in cultural traits. We can test this using the 2012 wave of LiK that includes information on respondents' cultural values regarding family. The comparison of these traits across tribes (controlling for geography) confirms that there is substantial heterogeneity in the extend of bride capture practices, the acceptance of a son-in-law or a daughter-in-law from another ethnic background (non-Kyrgyz) and co-residence patterns (see Online Appendix, Figures 6-8). For example, in some tribes, multi-generational co-residence is considered as exceptional, whereas in some other tribes, more than 75% of households are vertically extended. In short, tribes differ significantly in some key cultural traits. While this is not *per se* a mechanism that explains the persistence in relative levels of material well-being we have documented earlier, it nevertheless suggests that tribes possess and transmit highly specific cultural traits.

5.2 Transmission of social / political capital

A related but distinct mechanism of transmission is based on social networks. If the allocation of scarce resources (for example, prestigious positions or jobs) relies on clan-based networks, then tribes and clans who initially held powerful positions in the Soviet administration may have endowed their next-generation members with better opportunities. Then, even in the absence of inter-generational transmission of wealth or human capital, we might observe a persistence in levels of relative prosperity over several generations.

Historians and political scientists provide qualitative evidence that in Kyrgyzstan clan and tribe networks were important in the political elite sphere during the colonial and Soviet era. Ohayon (2016) writes that in the 1920s and 1930s, *"despite purges and other phenomena that weakened the political resources of the lineages, it appears that the political duplicity that emerged through the meeting between two forms of power and loyalty lastingly structured local power in the Kyrgyz Soviet Republic, sometimes working to thwart the Soviet state's ideal and project, and sometimes ensuring its implementation.*" Thus, even when politicians were appointed by the top for their loyalty to the regime, to effectively rule locally these politicians had to play along clannish and tribal lines. Similarly, Junushaliev (2003) provides ample evidence for the use of tribal relations for the occupation of key political positions in the 1920s and 1930s.

After the fall of the USSR and the introduction of democratic elections in Kyrgyzstan, tribal or clan-based loyalties appear to resume their key role in politics. Several scholars have underlined how powerful politicians skillfully exploit clan identities to win votes, at least in the context of local elections (Gulette, 2006; Jacquesson, 2012; Radnitz, 2012). Jacquesson (2012) provides examples where the instrumentalization of clan identity by contenders of local elections in rural areas led to unprecedented antagonism between clans. Ismailbekova (2017) builds a detailed account of how both real and putative kinship ties are exploited by local political entrepreneurs to construct patron-client relations that shape the economic and social life at the sub-national level. The main insight that emerges from these studies is that tribal and clan-based identity is a rich and malleable resource that political entrepreneurs use in their contest for power.

6 Conclusion

Our findings have important implications for the key debate concerning the effectiveness of public policies in reducing inequality and enhancing social mobility. Although recent studies (e.g. Jakobsen et al., 2020) find that the elasticity of taxable wealth with respect to the net-of-tax return is large (at the top of the wealth distribution), we argue that wealth taxation - even in its extreme form - is ineffective in reverting the fortunes within a society, because the groups ranked higher in pre-policy

wealth adjust by exploiting other non-taxable channels of inter-generational transmission of well-being and status. Thus, we lend support to the Pareto's Law discussed in the introduction. A natural question for future work is whether these patterns hold in other societies that massively taxed wealth but whose social structures are less reliant on tribal identity (e.g. Russia).

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Figures and Tables

Figure 1: Modern-day frontiers of Kyrgyzstan and the historic tribal areas

Sources - Left panel: Perry-Castañeda Library Map Collection, University of Texas; right panel: based on Bregel (2003, Map 39), overlaid with the current-day borders of Kyrgyzstan. The darker area in the right panel corresponds to the current-day territory of Kyrgyzstan. Ong Qanat ("Right Wing") tribes are in red/orange, Sol Qanat ("Left Wing") tribes are in green, Ichkilik ("Inner") tribes in blue.

Figure 2: Pseudo-Kuznets ratios for expenditures 2011-13 and for livestock in 1910s (dots proportional to tribe size)

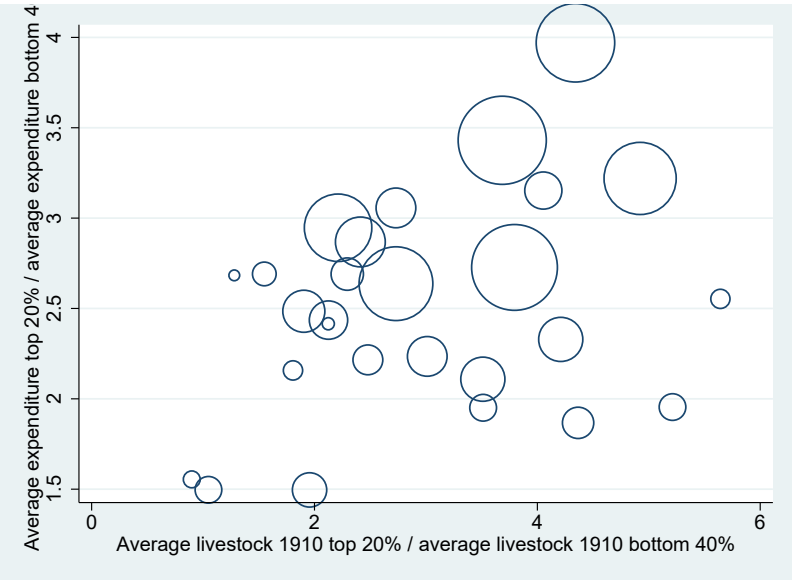


Table 1: Household and individual outcomes as a function of past tribe wealth

Panel 1: Household per capita income, per capita expenditure and asset

	(1) z-sc. inc. 2011-13	(2) z-sc. exp. 2011-13	(3) mean inc. 2011-13	(4) mean exp. 2011-13	(5) asset index	(6) any land owned	(7) land per cap	(8) irrig. land per cap
Specification 1: composite index of 1910 wealth (z-score)								
wealth 1910	0.195**	0.171***	0.472**	0.271***	0.348*	-0.028	-0.090**	-0.095**
	(0.076)	(0.049)	(0.184)	(0.078)	(0.193)	(0.051)	(0.042)	(0.038)
N	1324	1343	1324	1343	1343	1343	1343	1343
Specification 2: 1910 land and livestock ownership (z-score)								
land	0.105**	0.127***	0.254**	0.201***	0.200	0.017	-0.047*	-0.053**
	(0.040)	(0.026)	(0.097)	(0.042)	(0.160)	(0.015)	(0.024)	(0.022)
livestock	0.078	-0.025	0.189	-0.039	0.104	-0.096**	-0.040	-0.032
	(0.128)	(0.108)	(0.310)	(0.172)	(0.210)	(0.043)	(0.030)	(0.029)
N	1324	1343	1324	1343	1343	1343	1343	1343

Panel 2: Individual human capital and men's father's socio-economic status

	(1) educ (years)	(2) height	(3) BMI	(4) 1st born weight	(5) father educ	(6) father unskill.	(7) father ag.	(8) father good pos.
Specification 1: composite index of 1910 wealth (z-score)								
wealth 1910	0.116	0.548	0.930***	0.118***	-0.155	-0.111*	-0.175*	0.098
	(0.449)	(1.239)	(0.256)	(0.036)	(0.436)	(0.056)	(0.097)	(0.079)
N	1590	1555	3253	1459	1143	1079	1106	1079
Specification 2: 1910 land and livestock ownership (z-score)								
land 1910	-0.065	1.131**	0.515***	0.049***	0.088	-0.039	-0.082	0.086*
	(0.205)	(0.497)	(0.147)	(0.015)	(0.199)	(0.034)	(0.051)	(0.046)
livestock	0.438	-2.405**	0.321	0.090***	-0.536	-0.097	-0.102	-0.044
	(0.379)	(1.024)	(0.306)	(0.028)	(0.640)	(0.060)	(0.098)	(0.071)
N	1590	1555	3253	1459	1143	1079	1106	1079

Each column and specification (within a panel) reports estimates of a separate regression.

Regressions are weighted by the number of extended families in 1910.

Neighbourhood fixed effects (2010 sampling unit) are included throughout.

Controls include the household head age and its square (panel 1) or the individual age and its square (panel 2).

We include men above 23 for education and height (panel 2, columns 1 and 2), women and men for BMI (panel 2, column 3) and women above 25 for weight of first born (panel 2, column 4).

We focus on men's fathers for fathers' outcomes (panel 2, columns 5 to 8) because, due to exogamy, only tribe of men's father can be inferred.

Cluster robust s.e. in parentheses (at tribe level). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: The representation of the tribes among the political elite in 1972-1976 and wealth in 1910s

	(1)	(2)	(3)
	sh elite from tribe	sh elite from tribe	sh elite from tribe
share tribe in pop 1910	0.850***	0.848***	0.802***
	(0.099)	(0.105)	(0.095)
tribe wealth 1910 (z_score)	0.037*		
	(0.019)		
tribe land / cap 1910 (z_score)		0.018	
		(0.011)	
tribe livestock / cap 1910 (z_score)		0.019	
		(0.015)	
tribe land / cap 1910 (desyatinas)			0.063**
			(0.026)
tribe livestock / cap 1910 (horses)			0.018**
			(0.007)
constant	0.005	0.005	-0.066***
	(0.008)	(0.009)	(0.023)
N	33	33	33

Standard errors in parentheses.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Online Appendix

A simple model of intergenerational transmission of economic well-being under an expropriative government policy

Our paper argues that the Soviet period was characterized by a massive expropriation of physical assets and a disruption in wealth accumulation in Kyrgyz society. Nevertheless (and despite the "modernization" campaigns), the tribal and clan-based institutions continued to play some role in the economic life of Kyrgyzs. Even though parents were no longer able to transmit to their offspring physical assets, they transmit intangible assets such as knowledge about tribal connections and history. The policies of the Soviet regime could not fully block such transmission. Here we present a simple model that illustrates the mechanisms underlying the transmission of economic well-being across generations in Kyrgyz society and investigates how such mechanisms may change in the presence of an expropriative government policy.

Consider an overlapping-generation model of consumption and investment, along the lines of Barro (1974) and Becker and Tomes (1979, 1986). Time evolves in discrete periods: $t = 0, 1, 2, ...$ In each period, there are **families** composed of one individual who is young and one who is old. At the beginning of each period, each old individual gives birth to one offspring and decides on the allocation of resources. At the end of the period, old leave bequests and die. In addition, each family belongs to a **tribe** (τ).

Endowments. The endowments are stocks of three forms: physical capital (livestock), human capital (education), and social capital. This latter form of capital is the tribe's network and connections, which we assume to be a local public good, common for all the members of the same tribe. Old individuals use their endowment to generate income from two sources, livestock production and wage, as described by the technologies below. Labor supply is inelastic and is equal to 1 for each individual.

Technologies. The production of livestock is described by a technology with a unique input, k_t, with diminishing marginal returns:

$$y_t = f(k_t), \text{ with } f' > 0 > f''.$$

Livestock capital depreciates at a constant rate of $\delta \in [0, 1)$. Hence the end-of-period value of capital (livestock) is

$$f(k_t) + (1 - \delta)k_t.$$

Human capital investments (by parents) and social capital investments (by all tribe members) positively

affect the wage earned:

$$w_{t+1}^i = h\left(e_t^i, \sum_{j\in\tau} g_t^j\right),$$

and also exhibit diminishing marginal returns (to both types of investments):

$$h_1 > 0 > h_{11},$$
$$h_2 > 0 > h_{22}.$$

In each generation, (old) members decide on how to allocate the resource between consumption (c) and investment into the three forms of capital (s_t^i, e_t^i, and g_t^i, respectively) that determine the income of the next generation. Note that the investment in physical capital (livestock) is just a simple transfer of livestock to the next generation:

$$s_t^i = k_{t+1}^i.$$

Preferences. We assume filial altruism, such that an individual cares about his consumption and the future income of his child (as in conventionally assumed in the literature; see, for instance, Lambrecht et al., 2006), which is composed of the livestock production and labor income. For simplicity, let's assume that the utility is separable and each component is logarithmic:

$$U(c_t^i, d_{t+1}^i) = \ln c_t^i + \gamma \ln d_{t+1}^i,$$

where

$$d_{t+1}^i = f(k_{t+1}^i) + (1-\delta)k_{t+1}^i + w_{t+1}^i.$$

Then, the optimization problem of an old individual living in period t becomes

$$\max_{c_t^i, s_t^i, e_t^i, g_t^i} \ln c_t^i + \gamma \ln d_{t+1}^i,$$

subject to the budget constraint

$$f(k_t^i) + (1-\delta)k_t^i + w_t^i = c_t^i + s_t^i + e_t^i + g_t^i,$$

and where

$$d_{t+1}^i = f(k_{t+1}^i) + (1-\delta)k_{t+1}^i + w_{t+1}^i = f(s_t^i) + (1-\delta)s_t^i + h\left(e_t^i, g_t^i + \sum_{j\neq i} g_t^j\right).$$

The Lagrangian of this optimization program is

$$\begin{aligned} L &= \ln c_t^i + \gamma \ln \left(f(s_t^i) + (1-\delta)s_t^i + h\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right) \right) + \\ &\quad + \lambda \left[f(k_t^i) + (1-\delta)k_t^i + w_t^i - c_t^i - s_t^i - e_t^i - g_t^i \right]. \end{aligned}$$

The corresponding first-order conditions are

$$\begin{aligned} \frac{\partial L}{\partial c_t^i} &= \frac{1}{c_t^i} - \lambda = 0 \\ \frac{\partial L}{\partial s_t^i} &= \frac{\gamma[f'(s_t^i) + 1 - \delta]}{f(s_t^i) + (1-\delta)s_t^i + h\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right)} - \lambda = 0 \\ \frac{\partial L}{\partial e_t^i} &= \frac{\gamma h_1 \left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right)}{f(s_t^i) + (1-\delta)s_t^i + h\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right)} - \lambda = 0 \\ \frac{\partial L}{\partial g_t^i} &= \frac{\gamma h_2 \left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right)}{f(s_t^i) + (1-\delta)s_t^i + h\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right)} - \lambda = 0 \\ \frac{\partial L}{\partial \lambda} &= f(k_t^i) + (1-\delta)k_t^i + w_t^i - c_t^i - s_t^i - e_t^i - g_t^i = 0 \end{aligned}$$

Combining the first two conditions, we get the standard consumption-saving tradeoff:

$$\frac{1}{c_t^i} = \frac{\gamma[f'(s_t^i) + 1 - \delta]}{f(s_t^i) + (1-\delta)s_t^i + h\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j \right)}.$$

At the optimum, the marginal benefit of consuming a unit equals to its marginal cost (one unit less of capital transferred to the offspring implies the net loss of $(f'(s_t^i) + 1 - \delta)$ times the forgone utility of the offspring, weighted by γ).

Combining the second, third, and fourth conditions, we obtain the no-arbitrage condition between the

three types of investment (in physical, human, and social capital):

$$f'(s_t^i) + 1 - \delta = h_1\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j\right) = h_2\left(e_t^i, g_t^i + \sum_{j \neq i} g_t^j\right).$$

Intuitively, the least-cost allocation of resources into investment for the offspring is such that marginal returns on a unit of resource invested is the same between the three forms of investment.

Consider now the individuals belonging to two tribes. Let tribe 1 be richer in livestock (i.e. having inherited a larger amount of livestock from their parents) than tribe 2. The private optimality conditions noted above imply that the generation-t members of tribe 1 invest more in all the three forms of capital for their offspring.

Proposition 1: Members of richer tribes invest more in physical, human, and social capital for their offspring. The income of this offspring, both capital and labor (wage), is higher than that of the offspring of members of the poorer tribes.

Suppose now an (unanticipated) Bolshevik government decides to fully expropriate physical capital of one generation (those who come of age in period $t+1$) and, moreover, puts the return to physical capital to zero (through collectivization). The government also redistributes the share $\theta \in [0,1]$ of the expropriated capital as a lump-sum transfer to every individual. Notably, the government cannot cannot fully expropriate the wages (though it can tax wages proportionally, at rate ϕ).

What would this imply for the optimization problem of the adults in generation $t+1$? The problem of an old individual living in period $t+1$ becomes

$$\max_{c_{t+1}^i, s_{t+1}^i, e_{t+1}^i, g_{t+1}^i} \ln c_{t+1}^i + \gamma \ln d_{t+2}^i,$$

subject to the budget constraint

$$(1-\phi)w_{t+1}^i + \theta K_{t+1} = c_{t+1}^i + s_{t+1}^i + e_{t+1}^i + g_{t+1}^i,$$

and where

$$d_{t+2}^i = (1-\phi)w_{t+2}^i = (1-\phi)h\left(e_{t+1}^i, g_{t+1}^i + \sum_{j \neq i} g_{t+1}^j\right).$$

Here, K_{t+1} is the total expropriated livestock, in per capita terms.

The Lagrangian of this optimization program in the presence of the expropriative government policy

is

$$\begin{aligned} L &= \ln c_{t+1}^i + \gamma \ln \left((1-\phi) h \left(e_{t+1}^i, g_{t+1}^i + \sum_{j \neq i} g_{t+1}^j \right) \right) + \\ &\quad + \lambda \left[(1-\phi) w_{t+1}^i + \theta K_{t+1} - c_{t+1}^i - s_{t+1}^i - e_{t+1}^i - g_{t+1}^i \right]. \end{aligned}$$

Obviously, $s_{t+1}^i = 0$ (no investment in physical capital). Similar to the above, the resulting optimality conditions are thus:

$$\frac{1}{c_{t+1}^i} = \frac{\gamma h_1 \left(e_{t+1}^i, g_{t+1}^i + \sum_{j \neq i} g_{t+1}^j \right)}{h \left(e_{t+1}^i, g_{t+1}^i + \sum_{j \neq i} g_{t+1}^j \right)} = \frac{\gamma h_2 \left(e_{t+1}^i, g_{t+1}^i + \sum_{j \neq i} g_{t+1}^j \right)}{h \left(e_{t+1}^i, g_{t+1}^i + \sum_{j \neq i} g_{t+1}^j \right)}.$$

The generation-t adults put all the resources they decide to invest into their offspring's wage income sources (human capital, e_t^i, and social capital, g_t^i). However, even under Bolshevik collectivization, the descendants of tribes that were relatively richer in period t have more resources to invest in their children, because they have a higher after-tax wage income $(1-\phi)w_{t+1}^i$, driven by the higher investment in human and social capital made, in turn, by their own parents. Hence, for the descendants of these tribes, the optimal human capital and social capital investment (respectively, e_{t+1}^i and g_{t+1}^i) would still be higher than for those of the descendants of the poorer tribes (the first argument in $h_1(.)$, and the second argument in $h_2(.)$ above take higher values for richer tribes, i.e. when c_{t+1}^i is larger). Consequently, the children of the former would have a relatively higher living standards because of their higher wage incomes $(1-\phi)w_{t+2}^i$. This is *a fortiori* true if after the fall of Communism, the new government relaxes the taxation of labor income (reduces ϕ).[13]

Proposition 2: The descendants of tribes that were relatively richer in period t (before Communist era) invest more in human, and social capital for their offspring under Communism. The labor income of this offspring is higher than that of the offspring of members of the poorer tribes.

An additional implication of this model concerns the inequality within tribes. How would it evolve under the expropriative policies? The tribal social capital is a local public good; hence, by assumption, all the members of the same tribe enjoy its fruits equally. The expropriative policies eliminate the differences in physical capital. However, there remains the channel of human capital investment, which guarantees at least partial transmission of within-tribe inequality. To see this clearly, consider the following example of two tribes. Suppose in period t the first tribe has no inequality (in physical

[13] More generally, this result holds even for non-linear progressive income taxation (i.e. individuals with higher wages facing higher marginal tax rates), as long as the after-tax and pre-tax wages remain positively correlated.

capital), whereas the second tribe is very heterogeneous in physical capital. Despite the equalizing effect of the tribal social capital and expropriative policies in $t+1$, the second tribe would - through the channel of human capital - still exhibit a larger dispersion of wage outcomes in $t+2$ than the first tribe. Hence, across-tribe differences (for instance, the relative ranking of tribes) in within-tribe inequality persist and re-appear in the post-Soviet period.

The main lesson from this simple model is that, even if the government fully expropriates physical capital and taxes labor income, as long as after-tax wages are positively correlated with human and social capital, we should observe positive inter-generational correlations in the levels of (various dimensions of) capital, income, and consumption. This is because the inputs to the wage function are intangible and cannot be expropriated by the government.

For empirical work, our model suggests the following inter-generational relationships:

Persistence in wealth rank over the century: A tribe's productive capital in the pre-Soviet period is positively correlated with income, consumption and human capital levels of the post-Soviet generation.

Persistence of intra-tribe inequality: Intra-tribe inequality in incomes/consumption levels of the current generation and in the wealth of the pre-Soviet generation are positively correlated.

Correlation between the pre-Soviet and Soviet period outcomes: A tribe's productive capital in the pre-Soviet period is positively correlated with the human and social capital of the Soviet generation.

Matching procedure for historical data

A small share of historical clan names could not have been automatically matched to a tribe. One of the reason was that the administrative units in Central Asia during the Russian colonization did not separate regions by ethnicity and hence several administrative units (volosts) did not necessarily contain Kyrgyz clans. Based on the materials of 1953-55 expeditions, we could identify several volosts which were not populated by Kyrgyzs (but by Kazakhs) and excluded them from the matching procedure. Some of the volosts' borders contain territory of both the current-day Kyrgyzstan and Kazakhstan. In those volosts the clan names that we could not match to a tribe are most likely Kazakh clans.

Some spelling problems posed certain difficulties for matching some clans. In 1907 the clan names were recorded by Russian geographers based on oral responses of the Kyrgyzs. The Kyrgyzs responded to the interview through an interpreter. These interpreters were usually Tatars (or Kazakhs who came under the Russian protectorate earlier than Kyrgyzs); therefore, recorded clan names could correspond to the Tatar or Kazakh phonetic rules rather than Kyrgyz ones: for example, Даулет (Daulet, Kazakh spelling) instead of Дөөлөт (Döölöt, Kyrgyz spelling). In some cases, Russian geographers recording the responses misspelled certain names because the Kyrgyz names sounded phonetically unfamiliar to Russians. When we could not find the direct match of recorded clan name, we checked for the

possibility of another clan name which could sound very similar. If the close match was found, we used the matched clan name. If no close match was found, we left the clan unidentified. Example: Бор (Bor, misspelled name) and Боор (Boor, correct Kyrgyz spelling). In such cases the match was considered as sufficiently close.

Given that clan names usually reflect the name of a historic person from whom the clan or extended family stems, it is not uncommon to have the same sub-clan names belonging to different clans. This is the difficult case where the name does not uniquely identify a clan. In these cases, we looked at the uezd (province) in which the clan resided in the distant past (the expeditions of 1907/13) and compared it with the area in which the clan resided in the 1950s. If the areas of residence in 1907/13 and 1950s overlapped, we considered the clan to be matched. Example: Белек (Belek). The clan with this name exists within the Solto tribe and within the Sarybagysh tribe. The clan Belek in the 1907 survey lived in Vostochno-Sokulukskaya volost (currently Sokulukski raion near Bishkek). According to the materials of the expedition in the 1950s Belek as part of Sarybagysh tribe lived in At-Bashy raion (in Naryn oblast). However, Belek as part of Solto tribe lived in Sokulukski raion. Hence, it is clear that the clan Belek in 1907 data is more likely to be part of the Solto tribe.

Additional figures and tables

Figure 3: Plot of pseudo-Kuznets ratios for expenditure 2011-13 and for cultivated area in 1910 (dot proportional to tribe size)

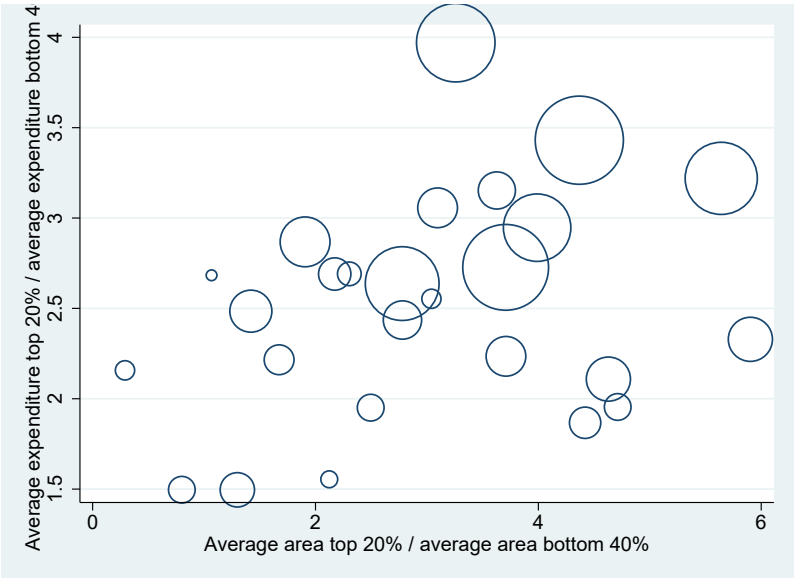


Figure 4: Pseudo-Kuznets ratios for income 2011-13 and for livestock in 1910s (dots proportional to tribe size)

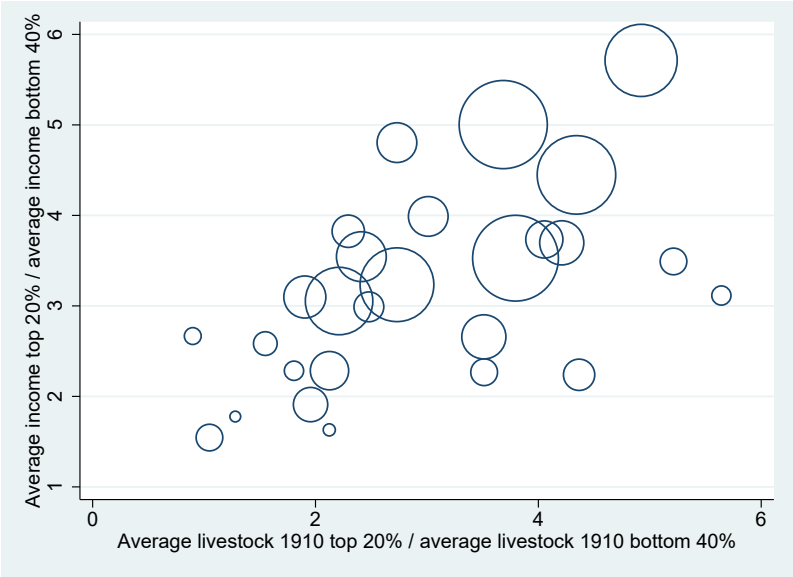


Figure 5: Pseudo-Kuznets ratios for income 2011-13 and for area in 1910s (dots proportional to tribe size)

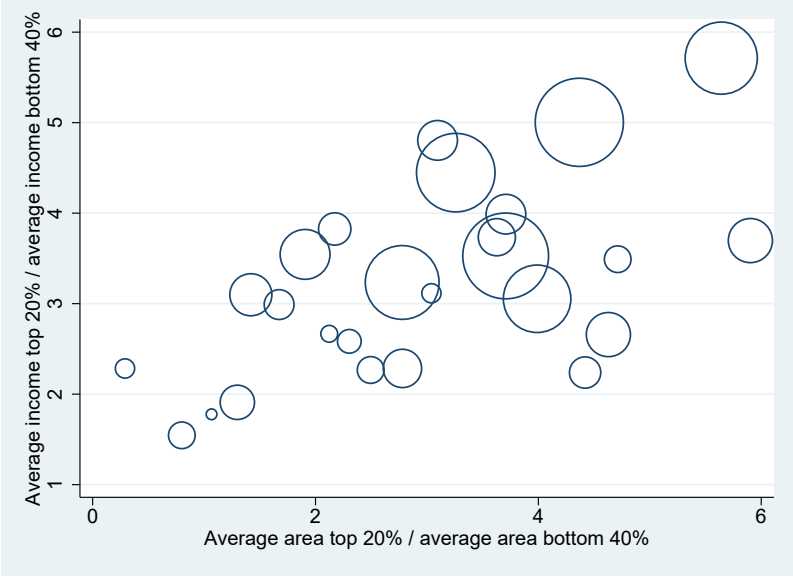
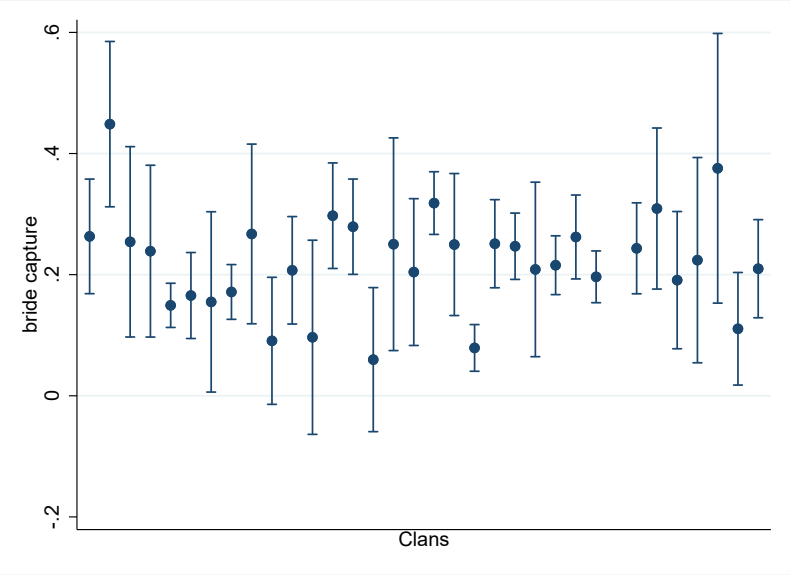
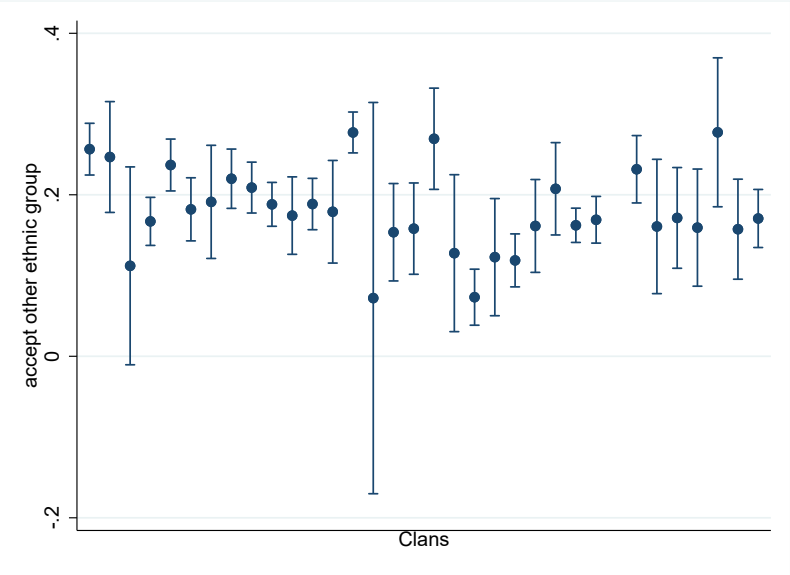


Figure 6: Differences across tribes in prevalence of bride capture: predicted tribe average with 95% confidence interval (controlling for neighborhood)



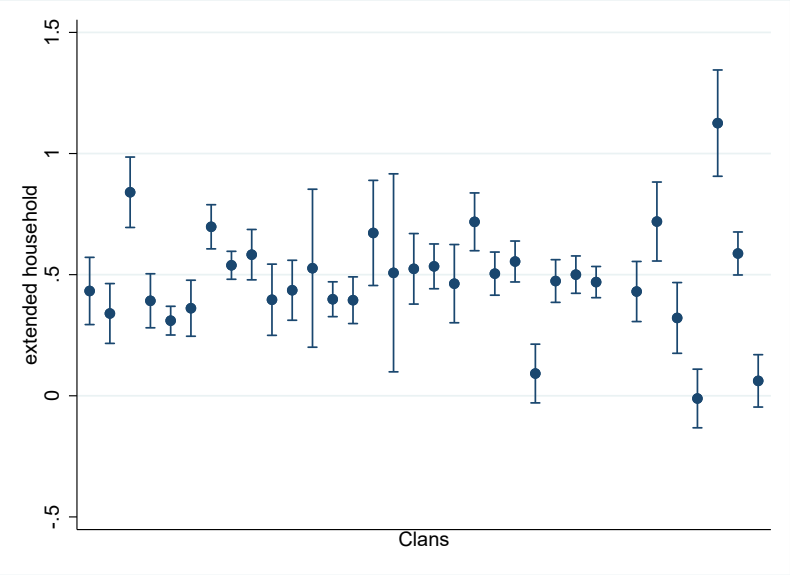
Note: Each dot corresponds to a different tribe and indicates the average predicted value of the outcome considered, after running a linear regression with neighborhood and tribe fixed effects (no other controls).

Figure 7: Differences across tribes in openness to accepting a daughter-in-law or a son-in-law from another ethnic group: predicted tribe average with 95% confidence interval (controlling for neighborhood)



Note: Each dot corresponds to a different tribe and indicates the average predicted value of the outcome considered, after running a linear regression with neighborhood and tribe fixed effects (no other controls).

Figure 8: Differences across tribes in co-residence between parents and married children: predicted tribe average with 95% confidence interval (controlling for neighborhood)



Note: Each dot corresponds to a different tribe and indicates the average predicted value of the outcome considered, after running a linear regression with neighborhood and tribe fixed effects (no other controls).

Table 3: Descriptive statistics

	count	mean	s.d.	min	max
Historical data (1910)					
tribe wealth (z_score)	34	0.019	0.30	-0.46	0.99
tribe land / cap (z_score)	34	0.11	0.63	-1.11	2.68
tribe livestock / cap (z_score)	34	-0.072	0.48	-0.76	1.57
tribe land / cap (desyatinas)	34	0.54	0.23	0.067	1.50
tribe livestock / cap (horse equivalent)	34	2.28	0.95	1.13	5.35
number of extended families in tribe	34	143	214	1	745
size of tribe (# members)	34	11436	13483	91	48757
share of tribe in population	34	0.03	0.03	0.00	0.12
Deputy data (1972 and 1976)					
share of tribe in elected deputies	33	0.03	0.03	0.00	0.14
Household level data (2012)					
income / cap (2011-13)*	1324	3152.9	2472.0	316.8	47318.5
expenditure / cap (2011-13)*	1344	2665.4	1520.4	248.0	14012.4
asset index	1343	-0.061	2.34	-5.00	12.5
any land owned	1344	0.79	0.41	0	1
land area / cap	1344	0.21	0.46	0	8.20
irrigated land area / cap	1344	0.18	0.39	0	5.80
age hh head	1344	51.7	13.7	18	94
Individual level data (2012)					
years of education (men>23)	1590	11.1	2.24	0	17
height (men>23)	1555	172.2	6.05	149	192
body mass index (bmi) (>23)	3253	24.6	3.13	11.7	44.1
1st born birthweight (women>23)	1459	3.14	0.42	1.40	5.20
fertility (# birth) (women>40)	1013	3.75	2.07	0	10
Fathers of men past outcomes					
father's education (years)	1143	8.31	4.42	0	16.7
father in unskilled occupation	1079	0.53	0.50	0	1
father in agriculture	1106	0.68	0.47	0	1
father had a good position	1079	0.12	0.33	0	1

* Expenditure and income are in per capita term and expressed in 2010 Soms (adjusting for inflation using local consumer price indexes)

Table 4: Average household income and expenditure (per capita) in 2011-13 as a function of past tribe wealth

	(1) z-score inc 2011-13	(2) z-score exp 2011-13	(3) income 2011-13	(4) expenditure 2011-13
tribe wealth 1910 (z_score)	0.291**	0.563*	705.100**	893.636*
	(0.137)	(0.309)	(330.582)	(490.433)
N	1324	1343	1324	1343
tribe land / cap 1910 (z_score)	0.246***	0.296	594.337***	469.985
	(0.057)	(0.209)	(139.121)	(331.041)
tribe livestock / cap 1910 (z_score)	-0.086	0.247	-209.165	392.603
	(0.147)	(0.184)	(355.030)	(292.670)
N	1324	1343	1324	1343
tribe land / cap 1910 (desyatinas)	0.694***	0.772*	1679.961***	1224.683*
	(0.185)	(0.456)	(446.923)	(723.149)
tribe livestock / cap 1910 (horses)	-0.066	0.259***	-159.528	410.489***
	(0.079)	(0.092)	(191.313)	(146.432)
N	1324	1343	1324	1343

Each horizontal panel (and column) reports separate linear regressions.

Weights = # extended families in 1910.

Clustered robust standard errors in parentheses (at tribe level).

Controls include the household head age and its square.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5: Correlation between measures of tribe inequality in the past and in the present

	Pseudo-Kuznets ratios (average for top 20% / average for bottom 40%)			
	expenditure 2011-13	income 2011-13	land 1910	livestock 1910
expenditure 2011-13	1.00			
income 2011-13	0.79***	1.00		
land 1910	0.34	0.55**	1.00	
livestock 1910	0.52**	0.63***	0.74***	1.00

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Tribes are weighted by their size in 1910.

Table 6: Household and individual outcomes as a function of past tribe wealth (without neighbourhood fixed effects)

Panel 1: Household per capita income, per capita expenditure and asset

	(1) z-sc. inc. 2011-13	(2) z-sc. exp. 2011-13	(3) mean inc. 2011-13	(4) mean exp. 2011-13	(5) asset index	(6) any land owned	(7) land per cap	(8) irrig. land per cap
Specification 1: composite index of 1910 wealth (z-score)								
wealth 1910	0.291**	0.563*	0.705**	0.894*	0.410	-0.097	0.122	0.021
	(0.137)	(0.309)	(0.331)	(0.490)	(0.763)	(0.090)	(0.195)	(0.131)
N	1324	1344	1324	1344	1343	1344	1344	1344
Specification 2: 1910 land and livestock ownership (z-score)								
land	0.246***	0.296	0.594***	0.470	0.367	0.003	0.120	0.032
	(0.057)	(0.209)	(0.139)	(0.331)	(0.444)	(0.038)	(0.106)	(0.081)
livestock	-0.086	0.247	-0.209	0.393	-0.174	-0.169*	-0.078	-0.039
	(0.147)	(0.184)	(0.355)	(0.293)	(0.503)	(0.100)	(0.100)	(0.079)
N	1324	1344	1324	1344	1343	1344	1344	1344

Panel 2: Individual human capital and men's father's socio-economic status

	(1) educ (years)	(2) height	(3) BMI	(4) 1st born weight	(5) father educ	(6) father unskill.	(7) father ag.	(8) father good pos.
Specification 1: composite index of 1910 wealth (z-score)								
wealth 1910	-0.135	3.497***	-0.194	0.118***	-0.407	-0.286***	-0.199***	0.070*
	(0.459)	(0.788)	(0.188)	(0.036)	(0.475)	(0.057)	(0.049)	(0.038)
N	1590	1555	3253	1459	1143	1079	1106	1079
Specification 2: 1910 land and livestock ownership (z-score)								
	-0.132	2.393***	0.097	0.011	-0.440	-0.130***	-0.082***	0.044*
	(0.252)	(0.208)	(0.084)	(0.014)	(0.302)	(0.037)	(0.029)	(0.022)
livestock	0.092	0.130	-0.567**	0.027	0.360	-0.172**	-0.141***	0.015
	(0.453)	(0.532)	(0.276)	(0.027)	(0.456)	(0.074)	(0.048)	(0.024)
N	1590	1555	3253	1459	1143	1079	1106	1079

Standard errors in parentheses

Each column and specification (within a panel) reports estimates of a separate regression.

Weights= extended families in 1910. Cluster robust s.e. in parentheses (at tribe level).

Controls include the household head age and its square (panel 1) or the individual age and its square (panel 2).

We include men above 23 for education and height (panel 2, columns 1 and 2), women and men for BMI (panel 2, column 3) and women above 25 for weight of first born (panel 2, column 4).

We focus on men's fathers for fathers' outcomes (panel 2, columns 5 to 8) because, due to exogamy, only tribe of men's father can be inferred.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Household and individual outcomes as a function of past tribe wealth (measuring past tribe wealth in levels)

Panel 1: Household per capita income, per capita expenditure and asset

	(1) z-sc. inc. 2011-13	(2) z-sc. exp. 2011-13	(3) mean inc. 2011-13	(4) mean exp. 2011-13	(5) asset index	(6) any land owned	(7) land per cap	(8) irrig. land per cap
land 1910	0.316***	0.324***	0.764***	0.514***	0.648	0.037	-0.117*	-0.140**
	(0.114)	(0.078)	(0.276)	(0.124)	(0.469)	(0.061)	(0.069)	(0.065)
livestock 1910	0.014	-0.007	0.035	-0.011	-0.011	-0.045	-0.041**	-0.028
	(0.065)	(0.044)	(0.158)	(0.070)	(0.149)	(0.029)	(0.019)	(0.020)
N	1324	1343	1324	1343	1343	1343	1343	1343

Panel 2: Individual human capital and men's father's socio-economic status

	(1) educ (years)	(2) height	(3) BMI	(4) 1st born weight	(5) father educ	(6) father unskill.	(7) father ag.	(8) father good pos.
land 1910	0.013	3.092**	1.323***	0.136**	0.189	-0.087	-0.150	0.196
	(0.502)	(1.477)	(0.396)	(0.061)	(0.540)	(0.083)	(0.143)	(0.121)
livestock 1910	0.154	-0.882	0.005	0.026	-0.071	-0.068	-0.102**	0.031
	(0.265)	(0.537)	(0.199)	(0.025)	(0.388)	(0.047)	(0.043)	(0.037)
N	1590	1555	3253	1459	1143	1079	1106	1079

Each column and specification (within a panel) reports estimates of a separate regression.

Regressions are weighted by the number of extended families in 1910.

Land (at the tribe level in 1910) is measured in desyatinas and per capita. Livestock is measured in equivalent horses per capita.

Neighbourhood fixed effects (2010 sampling unit) are included throughout.

Controls include the household head age and its square (panel 1) or the individual age and its square (panel 2).

We include men above 23 for education and height (panel 2, columns 1 and 2), women and men for BMI (panel 2, column 3) and women above 25 for weight of first born (panel 2, column 4).

We focus on men's fathers for fathers' outcomes (panel 2, columns 5 to 8) because, due to exogamy, only tribe of men's father can be inferred.

Cluster robust s.e. in parentheses (at tribe level). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Father's education and occupation as a function of past tribe wealth (men born before 1965), with neighborhood fixed effects

	(1) men's father's education (years)	(2) men's father's in unskilled occupation	(3) men's father's in agriculture	(4) men's father's held a good position
tribe wealth 1910 (z_score)	0.95	-0.21*	-0.56**	0.07
	(1.07)	(0.11)	(0.24)	(0.07)
N	556	528	539	528
tribe land / cap 1910 (z_score)	-0.01	-0.05	-0.33***	0.01
	(0.39)	(0.08)	(0.10)	(0.04)
tribe livestock / cap 1910 (z_score)	1.89	-0.22***	-0.15	0.11
	(1.33)	(0.07)	(0.20)	(0.09)
N	556	528	539	528
tribe land / cap 1910 (desyatinas)	0.82	-0.15**	-0.11	0.11**
	(0.72)	(0.07)	(0.10)	(0.04)
tribe livestock / cap 1910 (horses)	-0.22	-0.03	-0.73**	-0.03
	(1.30)	(0.24)	(0.28)	(0.11)
N	556	528	539	528

Each horizontal panel (and column) reports separate linear regressions.

Weights = # extended families in 1910.

Clustered robust standard errors in parentheses (at tribe level).

Fixed effects at the 2010 sampling unit level. Controls include the inferred age of the father and its square.

Each observation is an individual.

We focus on men's fathers because due to exogamy, only tribe of men's father can be inferred.

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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