

Culture and gender roles: Evidence from a natural experiment in Post-Soviet Central Asia

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Abstract

Examining characteristics of traditional nomadic herding cultures and traditional sedentary farming cultures, both of which are deeply established in Central Asian history, I contribute to the literature on the foundations and persistence of gender roles in culture. Using a natural experiment resulting from a series of events in Kyrgyzstan during the Soviet rule of Central Asia that exogenously determined district-level cultural composition, I investigate whether there is greater gender inequality today amongst individuals from traditional sedentary farming cultures (in contrast to traditional nomadic herding cultures). This approach is unique from the standard epidemiological approach to studies of culture, which look at immigrants in new setting with a set of institutions and environment, to which they typically only bring their culture. In contrast, the Soviet rule of Central Asia provides a setting in which, once the district-level cultural compositions were exogenously arranged, a set of new standardized policies and institutions were universally implemented to wipe out the gender inequality in the region. Results indicate that the Soviet policies were quite effective at improving educational institutions; however, it appears as though differences between cultures in other indicators of gender inequality persist, including those that might affect females' ability to participate in the labor force. These include the use of contraception and gender roles in time intensive home production activities, such as water collection. Results also indicate that perceptions of domestic violence differ along these historical cultural lines.

JEL codes: D10, J16, N30.

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“The delineation of the five Central Asian republics “fixed ancient cultural and linguistic distinctions: between the nomads of the steppes (Kazakhstan), of the desert (Turkmenistan) and of the mountains (Kyrgyzstan), and the sedentary Turkic (Uzbekistan) and Persian speakers (Tajikistan).”

Capisani (2000)

“The liberation of women was one of the principal goals of [Soviet] antireligious campaigns aimed at eliminating traditional practices of veiling, polygamy, bride payments, and prearranged child marriages. In Central Asia, the emancipation of women contrasted with the norms of traditional society. Women were veiled and secluded from all aspects of social, political, and economic life...”

Roudik (2007)

1 Introduction

Research has highlighted the importance of history for economic development, via channels such as institutions, knowledge, and culture (Nunn, 2009). Culture, which can be thought of as “shortcuts or norms of behavior” or heuristics that are particular to a set of individuals or a society, guides people’s decision-making and how they view the world. History can alter culture, but certain cultural characteristics persist and change can be slow (Nunn, 2012). Recent work has shown the role of culture in shaping views about gender roles. Fernandez and Fogli (2009) use the labor force participation and total fertility rates a woman’s country of ancestry to instrument for culture and find that such cultural proxies are positively and significantly related to such outcomes for individuals today. Alesina, Giuliano, and Nunn (2012) provide evidence that gender roles originate with the type of traditional agriculture one’s ancestors practiced. They find that second-generation immigrants in the US and Europe who are descendants of societies with traditional plough use have beliefs that are consistent with less gender equality. These immigrants, however, might have sought out communities that are reinforcing or at least accepting of the individuals’ cultures. Can such culturally-induced gender biases endure in the presence of institutions designed specifically to eradicate them?

To investigate this question, I use a natural experiment resulting from a series of historical events in Central Asia between 1924 and 1938. Together, these events led to exogenous variation in the cultural composition of rural districts in Kyrgyzstan. These events, which resulted from Soviet intervention in the region, include the delineation of borders in the region (1924-1926), the collectivization and settlement of the population (1929-1932), and a purge of the Kyrgyz intellectual and political elites (between 1933-4 and again between 1937 and 1938). Utilizing data from the 1939 census as an instrument for current cultural composition, I exploit the exogenous variation that resulted from those historical events to investigate whether culture is a source of differences in gender roles today. The general logic for this instrumental variable is depicted in Figure 2.1.

<< INSERT FIGURE 2.1 HERE >>

The specific origins of cultures that I explore differ from Alesina, Guiliano, and Nunn's (2012) study of plough-based agriculture; however, the distinction is along similar lines. I compare two types of traditional cultures that are indigenous to Central Asia: a traditional sedentary farming culture and a traditional nomadic herding culture. The norms of these two groups differed historically with respect to a variety of issues, including interactions with the land, religion, and leadership, but particularly those related to gender roles in the household. The traditionally sedentary farmers had more conservative views, with women remaining veiled and working primarily in the house. In contrast, the nomadic women, worked alongside the men herding animals, were unveiled, and dressed similarly to the men (Hiro, 2009).

In light of these traditional cultural differences, I investigate whether households in districts today that are comprised of higher proportions of traditional sedentary farming cultures, as instrumented for by the proportion of such cultures in those districts in the 1939 census data, are more likely to have biases against women. Specifically, I look for differences in certain variables that could either be considered indicators of gender equality or factors facilitating gender equality and labor force participation. These include levels of education, roles in the household, access to contraception, and views regarding domestic violence.

The three abovementioned historical events worked to create exogenous variation in cultural composition of districts in the following way. First, between 1924 and 1926 the Russians divided Central Asia into five republics in an effort to prevent a consolidated governing power of Central Asian Muslims. Originally, the concept for the territorial delimitation was to define territories to differentiate between the settled and nomadic populations. Given that the two groups had lived closely and interacted regularly for centuries, distinguishing territories belonging solely to the settled and nomadic populations proved too difficult. Instead, the Soviets chose to allocate entire districts according to the language of the population's majority (Capisani, 2000).

In the 19th century, there had been no clear administrative delimitation in the territory populated by the nomadic tribes. In a general sense, the Russians based the new borders in Central Asia according to ethnicity of populations, but in actuality Moscow reshaped administrative borders according to its own administrative needs and thus crossed many centuries-old tribal boundaries (Abazov, 2007). Their process of defining boundaries between the republics was particularly difficult in the extremely diverse Ferghana Valley and, as a result of the border imposed, substantial numbers of ethnic Uzbeks, Tajiks, and Kazakhs came to dwell within the Kyrgyz borders. At that time the Ferghana Valley was densely populated, leading to substantial numbers of people living immediately on the borders of the republics. This pattern persists today, as shown in Figure 2.2.

<< INSERT FIGURE 2.2 HERE >>

In addition, the borders within Kyrgyzstan were exogenously defined. After abolishing the customary law in 1876, the territory that is now Kyrgyzstan was not divided according to the administrative units that had previously existed (Abazov, 2007). The administrative boundaries within Kyrgyzstan are shown in Figure 2.3.

Between 1929 and 1932 the population went through a period of forced settlement and collectivization. For the historically nomadic populations, settlement meant being abruptly forced to settle in a location and giving up their way of life. As a part of the collectivization, the traditional farmers were forced to give up their farmland.

The third “event” was between 1933 and 1934 and then again between 1937 and 1938. During these periods, Stalin directed purges of the intellectual and political Muslim elites. These groups were viewed as a threat to Soviet power in the region and this was part of the strategy chosen to mitigate their strength (Roudik, 2007).

This natural experiment differs from the “epidemiological approach” to cultural economic studies in several respects. Such studies typically look at the behavior of immigrants to a country or immigrants’ descendents, so that the sample includes individuals from the same economic and institutional context (Fernandez, 2011). Using that approach, the studies isolate the impact of culture in a new context or country than the one of origin (or their ancestors’ origin). However, some immigrants may have sought out environments that are particularly supportive of their culture, providing institutions that promote certain norms.

In contrast to the epidemiological approach, this analysis assesses the impacts of culture in the region of their ancestors’ origin. Rather than study immigrants of different cultures in a homogeneous in the US or Europe, this study analyzes the gender norms of both the traditionally nomadic herders and the sedentary farmers, with the people of both cultures subject to the application of this new and uniform set of institutions. The institutions constructed under the Soviet Union were designed to eradicate many of the differences between the two cultures. These included mandatory education, programs designed for female empowerment, the secularization of the region, and the settlement of nomadic populations.

Using the exogenous variation in the district-level cultural compositions created by the events in Soviet Central Asian history, I find that culture impacts gender roles within households, use of contraception, and women’s perceptions of domestic violence. Specifically, as the proportion of

the population that is of traditional sedentary farming cultures increases, the share of households with water collection duties primarily carried out by women also increases. The differences in gender of water collector are shown in Figure 2.3.

<< INSERT FIGURE 2.3 HERE >>

In contrast, there are no cultural differences in educational attainment, which suggests that the Soviet institutions promoting mandatory education succeeded in increasing educational attainment. There is some evidence that contraception use is lower amongst women in districts with high traditional farming cultures, which potentially signals less access to the labor markets for these women. In addition, women in districts with greater proportions of traditional farming cultures are more likely to believe that domestic abuse is acceptable. All of these results hold even when controlling for an overall diversity via a district-level ethnic fractionalization. The fact that these differences persist in spite of strong Soviet institutions casts doubt on the extent to which policies for female empowerment can succeed in the presence of cultures with strong gender inequalities.

The remainder of the paper proceeds as follows: Section 2.2 explains in greater depth the differences between the nomadic and sedentary cultures. Section 2.3 addresses the Soviet arrival in Central Asia, the resistance that met them, the steps that they took to temper such resistance (the delineation of the region into five republics, the collectivization of farms and settling of nomads, and the purges of the intellectual and political elite), and the institutions created during their rule. Section 2.4 describes the empirical strategy and the data sources. Section 2.5 covers the results and Section 2.6 concludes.

2 Traditional cultures of farmers and herdsman in Central Asia

Although the majority of the land area in Kyrgyzstan is mountainous, the country does include a portion of the Ferghana Valley, which is one of the most fertile areas of Central Asia. The valley is approximately 180 miles long and 90 miles wide (Matley, 1994) and covers portions of what are now Uzbekistan, Kyrgyzstan, and Tajikistan.

When the Ferghana Valley came under Russian rule in the late 1800s, the region was home to a tremendous diversity of ethnicities. At that time the following ethnicities were identified as living within Ferghana: Sarts (who, as of the 1926 census, were divided into Uzbeks and Tajiks (Matley, 1994)), Uzbeks, Tajiks, Kyrgyz, Kipchaks, Turks, Kara-Kalpaks, and Kurama. According to calculations from the first all-Russian census, carried out in 1897, the largest ethnic group in valley was the Sarts, followed by the Kyrgyz, Uzbeks, Tajiks, and Turks (Koichiev, 2003).

Although of various ethnicities, the populations can be thought of as belonging to one of two overarching cultures: traditional herding and sedentary farming. The nomadic and sedentary lifestyles gave rise to very distinct and different cultures, as described in the following section. In spite of the very different cultures, these groups had coexisted in close proximity for centuries (Capisani, 2000).

2.1 Traditional sedentary farmers

Only the Tajiks and Uzbeks (including the Sarts) were sedentary at the time of Russian arrival to the region and together these populations together controlled much of the lower part of the valley (Koichiev, 2003). The sedentary farmers practiced both dry and irrigated farming. Given the dry climate in the region, the primary crops that can be grown in areas of dry farming are grains, mainly wheat and barley. The more lush areas that have regularly flowing water sources, such as the Ferghana Valley, can sustain a wider variety of crops; however, in these areas the main crops are wheat, barley, and sorghum as well (Matley, 1994).

Previous research has hypothesized that gender norms develop as a result of traditional agriculture practiced (Boserup, 1970). Evidence supporting that hypothesis has shown that agriculture requiring substantial strength (i.e. plough agriculture) is associated with less gender equality (Alesina, Guiliano, and Nunn, 2012).

The traditional sedentary farming cultures of Central Asia exhibit similar patterns, as they grow plough-based crops (wheat and barley) and exhibit signs of gender inequality. Although they spoke distinctly different languages, the sedentary farming culture was so similar across ethnic groups that the Soviets had difficulty defining the differences between the ethnic groups (Hiro, 2009).

The sedentary farming culture is relatively conservative with respect to gender roles, with men working on the farms and women laboring in home production. In addition, homes typically are divided into a section for male use and another for female use (Capisani, 2000).

2.2 Traditional nomadic herdsmen

In contrast, to the sedentary farmers, the nomadic herdsmen lived in yurts to facilitate moving with their herds of sheep and cattle (Roudik, 2007). The Kyrgyz nomads practiced “vertical nomadism” through which they spent winters in the valleys and then moved their herds to the higher altitude pastures in the summer (Abazov, 2007). Through “subsistence semi-pastoral nomadic animal husbandry,” the tribes raised livestock such as sheep, cattle, goats, and horses. As a part of this nomadic way of life, they sought to minimize their impact on the land (Abazov, 2007).

The nomadic lifestyle impacted most facets of daily life. It inhibited take-up of religion, as it made the practice of regularly praying at a specific location difficult (Hiro, 2009). As a result, religion has not been very influential for any of the three nomadic groups in the region (Roudik, 2007).

Historically, the role of the women in nomadic tribes differed from those of some of the other cultures in Central Asia. The nomadic women worked along with the men, herding the livestock. In addition, they remained unveiled and dressed very similarly to men (Hiro, 2009). In addition to greater parity in household labor, the traditional herding practices did not facilitate segregation within the home. With a family living in a single yurt, the nomadic lifestyle did not permit separate living quarters as practiced by the sedentary populations. As such, women in traditional herding cultures experienced greater equity within the household than their sedentary counterparts.

3 The Soviets in Central Asia

The history between Russia and what is now the Kyrgyz Republic spans an extensive period of time and is quite complex. This section is not meant to provide an exhaustive description of that history, but rather focus on the major events that determined the ethnic composition of rural districts in the early 20th century.

3.1 Soviet arrival in Central Asia

The Ferghana Valley came under Russian rule in 1876, at which time it became a province that was comprised of sub-regions. These boundaries, however, did not match the ethnic groups spread throughout the region and typically even the lowest level of regional divisions consisted of multi-ethnic entities and both nomadic and sedentary populations.

In the late 19th and early 20th centuries, the people of Central Asia expressed discontent with Russian rule via numerous measures, including the formalized requests made by Muslim intellectuals for collaboration in government and the violent raids carried out by the *Basmachi*

bandit revolts. The Red Army took numerous steps to remove these sources of opposition from the region, with different tactics required to weaken the power of the *Basmachi* and the Central Asian Muslim intellectuals.

With the arrival of the military commander Mikhail Frunze in 1920, the Red Army's efforts against the *Basmachi* were more increasingly successful. The army overtook Bukhara and Dushanbe in 1921, with the Emir fleeing to Afghanistan. After many years of fighting the Soviets, *Basmachi* power was severely weakened by 1922 with its leader retreating to Afghanistan in 1926 (Marshall, 2003).

Over the same time period, the Soviets repeatedly rejected the attempts of the Central Asian Muslim intellectuals to be formally involved in government of the Turkestan region. In 1917, a group of Muslims gathered the Third Congress of Central Asian Muslims in Tashkent to agree upon a universal approach to government in the region. As a result, the congress proposed the formation of a coalition government with the Soviets; however, this proposal was rejected by Soviet leaders (Bergne, 2003). In the early 1920s, the Fifth Conference of the Turkestan Communist Party, representing local Muslim intellectuals, requested more autonomy for the region in the form of control over the region's foreign policy, a separate Turkic Communist Party, and Turkic Red Army. Soviet leaders in Central Asia opposed "such nationalist deviations arising" and these demands were also rejected by Red Army leaders (Marshall, 2003).

3.2 Steps to prevent threats to Soviet power

In the 1920s and 1930s, the Soviets took many steps to thwart perceived threats to their power in the region of Central Asia. These events exogenously determined the cultural composition of districts within the region, including Kyrgyzstan. The measures implemented by the Soviets include these historical events: the delimitation of borders within Central Asia, collectivization and settlement, and purges of Kyrgyz political and intellectual elite.

Border delimitation

According to many historians, the division of the Turkestan region into the Autonomous Soviet Socialist Republics was, at least partly, an effort to prevent the consolidated government power of the Central Asian Muslims (Hiro, 2009). The delimitation process is seen by many as a “divide and rule policy” (Roudik, 2007), designed to weaken attempts of a union by enforcing policies to keep the different nationalities separated (Capisani, 2000). However, it has been documented that up until this time, the Soviet leaders in Moscow knew very little of the ethnicities of the region. In 1920, when Lenin initially discussed the need for national delimitation in Central Asia, the idea was to draw an ethnographic map of the region, separating it into “Uzbekiya, Kyrgyziya, and Turkmeniya” (Koichiev, 2003). These groupings were obviously much more limited than the diversity of ethnicities represented and, as such, deliberation ensued regarding which ethnic populations would be assigned to each of the new territories (Koichiev, 2003).

Originally, the process of territorial delimitation was to define territories by dividing lands between sedentary and nomadic populations; however, because the two groups had lived closely to one another and interacted regularly for centuries, distinguishing territories was quite difficult. Instead, the Soviets chose to allocate entire districts according to the language of the majority group in that region. As a result, each of the republics came to have substantial numbers of ethnic minorities (Capisani, 2000).

During 1924, the Central Asian Bureau of the Russian Communist Party developed the following criteria for the delimitation:

- “Ethnic: to unify the members of a given group within a single ‘national unit’.
- Economic: to produce rational and economically coherent units.” (Koichiev, 2003)

The bureau resolved that the delimitation should result in five new administrative units: the Kyrgyz and Kara-Kalpak Autonomous Soviet Socialist Republics (ASSRs), which later included the areas settled by Kazakhs), the Uzbek Soviet Socialist Republic (SSR), the Tajik ASSR, and the Turkmen SSR. During the demarcation process, decisions regarding ethnic composition of districts were typically based on the 1917 census. Both Kyrgyzstan and Uzbekistan were

displeased with the border delimitation in the Ferghana Valley, as ethnic unification was not achieved in either case. In the end, the official border demarcation had largely followed the administrative boundaries set in the late 1800s, when the Russians first created the Ferghana Oblast and the districts within. As such, the boundaries set in this demarcation process were not according to ethnicities (Koichiev, 2003).

Parity commissions were arranged to deal with settling the ethno-territorial disputes that arose as a result of the demarcation process. Particularly challenging were the areas with substantial ethnic minorities, such as the Ferghana Valley. Both the Kyrgyz and the Uzbeks challenged the designation of certain regions to the other. Although the commissions did make some adjustments, they tried to maintain the eastern and southern boundaries set in the 1924 demarcation of the valley. Therefore, most of the protests were rejected either on the basis of the ethnic or economic criteria set forth for the delimitation process (Koichiev, 2003).

Collectivization and settlement

The second “event” contributing to the exogenous variation in district cultural composition was the processes of collectivization and settlement. These events, which started in 1929, exogenously shifted the population of ethnic Kyrgyz within the country and determined the composition of ethnic Kyrgyz within the countries boundaries.

Following the delimitation process, Stalin decided to begin a movement towards collective farming as a way to decrease the strength of rich farmers and other authority figures (e.g. tribal chiefs, heads of cleans, and village elders) whose power might challenge the Soviet authority. Collectivization began in 1927 on a voluntary basis, but became mandatory beginning in December 1929 (Hiro, 2009).

Resistance to collectivization occurred in much of Central Asia; however, many believed this process was most difficult for the nomadic populations (Hiro, 2009). They were not only required to give up their herds of livestock through collectivization, but forced through settlement to replace their nomadic lifestyle with a sedentary lifestyle on collective farms. The

forced collectivization of agriculture and settlement continued through 1932. Once settled, the ability to move was quite limited. Soviets peasants were not given passports until the 1960s and, even so, the peasants could not change their employment or location of residence (Roudik, 2007).

Purges of Kyrgyz intellectual and political elite

Between 1933 and 1934 and then again between 1937 and 1938 Stalin directed purges of Muslim communists (Roudik, 2007). These purges were directed at influential pre-Soviet intellectuals and Kyrgyz tribal leaders. Initially, the Soviets sought to weaken the political power of these individuals via deportation to the other regions of the Union of Soviet Socialist Republics (USSR). Stalin's purges, however, turned much more brutal, with more than 10,000 Kyrgyz executed, imprisoned, or sent to Siberian labor camps (Abazov, 2004).

3.3 Soviet institutions

As part of the Soviet Union, there were numerous large-scale institutional changes for those living in Central Asia. These included Soviet efforts to promote universal education, secularization of the population, and empowerment of females.

Mandatory education

The Soviets attempted to use school policy to undertake large social and cultural changes. New education policy led to the opening of new schools and required the eradication of illiteracy, mandatory elementary school attendance, and increased production of publication in native languages (Roudik, 2007). The efforts to increase literacy were successful. At the time of the demarcation process, much of the population in Central Asia was uneducated, with the literacy rate between two and seven percent. By the 1939 census, more than 70 percent of the population was literate (Hiro, 2009).

Secularization

The effort to increase literacy via educational programs was part of the Communists anti-religious and pro-communist campaigns, as social and cultural reforms drove school policy. Education began with teaching the people of Central Asia “the ideals of the Russian worker” (Roudik, 2007). Much of the Soviet anti-religion propaganda in this area came verbally via school classrooms and meetings of trade unions and the Communist Youth League (Hiro, 2009).

Female empowerment

The Soviet efforts to influence gender roles in Central Asia began quite early on. In 1926, the socialist family code came into effect throughout the entire Soviet Union. The code introduced rules that were inconsistent with Islam and, as a result, was greeted with opposition in Central Asia. While the centralized Soviet government in Moscow decided to relieve Muslim regions from following the code, the republic-level governments implemented many related changes. These included ending the practices of polygamy and wearing veils, as well as closing the customary courts (Hiro, 2009).

One of the primary aims of eliminating religion was the emancipation of women; however, this goal was at odds with the traditional culture in the region, where women were veiled and excluded from participating in social, political, and economic activities. An unveiling campaign was implemented in the latter half of the 1920s, but strong opposition existed (Roudik, 2007).

With the free access to schooling, came improvements in the role of women in Central Asia. The rate of labor force participation of females jumped from nine percent in 1925 to almost forty percent by 1939 (Hiro, 2009); however, the positions women held in the work force were mostly unskilled (Roudik, 2007).

4 Empirical Strategy

4.1 Natural experiment resulting from Soviet involvement in Central Asia

To identify the role of culture on current gender roles and perceptions of women in the Kyrgyz Republic, I use the exogenous determination of ethnic compositions of rural populations at the district-level that arose from a natural experiment in Kyrgyz history. The natural experiment consists of three major “events” in the 1920s and 1930s as described above. I use district-level ethnic composition immediately following these events, as measured through 1939 census data, as an instrument for current ethnic composition. Figure 2.4 shows the correlation between the 1939 census results and the 1999 census data results.

<< INSERT FIGURE 2.4 HERE >>

Two-stage least-squares estimates are calculated through the set of equations as follows. The first-stage equation is:

$$C_j = \alpha + \gamma Z_j + X_i' \Pi + v_j \quad (2.1)$$

in which C_j is the cultural composition of district j as calculated with 1999 census data; where Z_j is, the composition of district j as calculated with 1939 census data, and serves as the instrument in this two-stage least squares; X_i is a vector of controls; and v_j is a random error term.

The second stage is as follows:

$$Y_{ihj} = \mu + \delta C_j + X_i' \Omega + \varepsilon_i \quad (2.2)$$

in which Y_{ihj} is an outcome, such as school attainment, for individual i in household h in district j ; and ε_i is a random error term.

To alleviate concerns that the estimate is picking up the effect of overall diversity, some specifications also control for ethno-linguistic fractionalization, a measure of diversity that has been used in previous studies of ethnic diversity (Alesina and La Ferrara, 2000; Miguel and

Gugerty, 2005; and Glennerster, Miguel, and Rothenberg, 2011). Ethno-linguistic fractionalization (ELF) is calculated via the following equation:

$$ELF = 1 - \sum_i (\text{proportion of group } i)^2 \quad (2.3)$$

ELF is the probability that two people randomly sampled from a population will be from different ethnic groups (Miguel and Gugerty, 2005).

4.2 First-stage results and the issue of emigration

The empirical strategy employed in this paper relies on the fact that cultural compositions (the proportion of the population comprised of various ethnic groups) of district-level populations have remained relatively consistent between the events of the natural experiment until now. This assumption would not hold if the different ethnic populations emigrated from the rural districts of the country at different rates. It is well-documented that ethnic Russians, Ukrainians, Germans, and others have emigrated from Kyrgyzstan following the country's independence in 1991. This emigration should not however affect this study, as the Russians and other Slavs had settled primarily in the cities of Kyrgyzstan (Matley, 1994; Hiro, 2009) and therefore much of this emigration following independence was from industrially-developed urban areas of the country (Kyrgyz National Statistics Committee, 1999).

This is supported by the results of district-level first-stage regressions, in Table 2.1. These show that 1939 district-level ethnic composition is a strong instrument for 1999 district-level ethnic composition.

<< INSERT TABLE 2.1 HERE >>

4.3 Data sources

Three sources of data were used to perform this analysis: archival data from the 1939 census implemented in the former Soviet Union, 1999 census data collected by the Kyrgyz Government, and data from the Multiple Indicator Cluster Survey implemented by the UNICEF in 2005.

Archival data from the 1939 census in the Soviet Union

The Soviet government implemented a census several times in Central Asia during the early 1900s, as they were eager to learn about the population inhabiting the region. The initial surveys were only of the larger urban areas in the country and thus were likely undercounting the nomadic populations that primarily inhabited the hills and mountainous regions. To my knowledge, the first census to collect data on the rural populations in Kyrgyzstan was implemented in 1939, which conveniently is immediately following the series of historical events comprising the natural experiment.

Data from the 1939 population census were collected from the Kyrgyz Republic's National Archives in Bishkek. These data contained the ethnic compositions of populations in urban and rural districts throughout the country.² District-level 1939 census data were manually matched with district-level 1999 Kyrgyz National Population Census (described below) data.³

Data from the 1999 Kyrgyz National Population Census

Rural population data from the 1999 census were collected from the Kyrgyz National Statistics Committee. These data include population numbers for various ethnic groups⁴, as well as other village-level data, such as the number of people per village, the number of people per village

² Reported ethnicities in the 1939 census data include: Kyrgyz, Uzbek, Russian, Ukrainian, Kazakh, Tatar, German, Tajik, Uigher, and other ethnicities.

³ This process was particularly challenging. The Russians assigned Russian names to locations upon settlement. However, names of villages, towns, or regions were changed in many cases to Kyrgyz names following the country's independence in 1991. Thus, the 1939 census data often had the Russian names for locations, whereas the 1999 census had the new Kyrgyz names. The Kyrgyz National Statistical Committee provided a list recording some such name changes; however, there remained numerous unmatched locations. In such cases, I found the 1939 location name in Soviet maps made in the late 1980s and matched the location in post-independence maps created in 1995. Once I found the new name on the map, I was able to match it with the location in the 1999 census data.

⁴ Ethnicities in the 1999 census are reported at a more detailed level than in the 1939 census. To be consistent with the 1939 census, any ethnicities reported in 1999 beyond those listed in the footnote above are put into the "other ethnicities" category.

receiving state benefits (e.g. pensions, disability benefits, and others), the number of people receiving income from various sources (e.g. self-employment, formal employment, and others). Given that the 1939 ethnicity data for rural populations are at the district level, I collapse these data to district-level for the rural population. Both this 1999 census data and the 1939 data were matched with the household-level survey data described below. Table 2.2 provides descriptive statistics for the forty rural districts, by quintile, using data from the 1999 census.

<< INSERT TABLE 2.2 HERE >>

UNICEF Multiple Indicator Cluster Survey (MICS)

United Nations Children’s Fund (UNICEF), in conjunction with the country’s National Statistical Committee, implemented the Multiple Indicator Cluster Survey (MICS) in the Kyrgyz Republic during 2005. This is part of UNICEF’s larger mission to monitor the situation of women and children through the world.

The survey was designed to be representative at the national level and for urban and rural areas, using a multi-staged stratified cluster sampling approach. Four hundred enumeration areas (CEAs), or clusters, were selected based on population size calculations from the 1999 Kyrgyz national census. Positioning of clusters is shown in Figure 2.5. Of the 400 clusters, 168 were rural. Thirteen households per cluster were selected. This results in a sample of more than 2,100 rural households (UNICEF, 2007).

<< INSERT FIGURE 2.5 HERE >>

Given that the MICS survey is implemented to assess the situation of women and children, the dataset is designed to monitor outcomes related to gender equality. In particular, the dataset contains variables such as the characteristics of households and their women and children, access to water and sanitation, details on marriage, maternal mortality, literacy and school participation,

as well as opinions on the acceptability of domestic violence. As such, I use the MICS data to test for evidence of persisting effects of culture on view on gender roles and equality in the household. These measures include: educational attainment, division of labor within the household, access to family planning, and attitudes regarding domestic violence.

Access to education: Although worldwide trends indicate increases in educational attainment, lack of access to education remains a concern throughout much of the world. With two-third of the world's illiterates being female and differences between levels of boys' and girls' school enrollment, particularly at the secondary level, disparities in access to education persist (UNSTATS, 2010). Such differences in education can be viewed as both an indicator of and a contributor to gender inequality.

Division of labor within the household: In many developing countries, households do not have water accessible within their household. As a result, someone with the household must collect water to bring to the household. In aggregate, billions of hours are spent collecting water in developing countries every year (Cosgrove and Rijsberman, 1998). And in many cases, the burden of water collection falls on females. For example, in Africa, 90% of the gathering of water and wood used for household purposes is performed by women (UNSTATS, 2010). This is time that could otherwise be used for potentially income-generating activities (Harvey and Taylor, 2000; Blackden and Wodon, 2006).

On average, women worldwide spend more than double the amount of time on domestic work than men. When counting both paid and unpaid work, women labor for more total hours per day than men (UNSTATS, 2010). To this end, the existence of an imbalance in the burden of water collection can be viewed as an indicator of gender inequality. For these reasons, the Millennium Development Goal (MDG) Task Force on Education and Gender Equality identified investment in infrastructure to reduce the female time burden of water collection as a strategic priority to achieve gender equality, to “empower women and alter the historical legacy of female disadvantage” (UN Millennium Project, 2005; UNSTATS, 2010).

Access to family planning: Contraception can provide women increased autonomy, however, the decision-making dynamic within a couple often determines the actual decision-making regarding whether or not to use contraception (and, if so, the type of contraception) (UNSTATS, 2010). As such, measures of use of contraception can be considered one indicator of female empowerment and the potential for females' participation in the labor market.

Attitudes regarding domestic violence: According to the 1993 UN Declaration on the Elimination of Violence against Women, violence against women is "... any act of gender-based violence that result in, or is likely to result in, physical, sexual, or psychological harm or suffering to women, including threats of such acts, coercion or arbitrary deprivation of liberty, whether occurring in public or private life" (UNICEF, 2007). Wife-beating is considered to be a demonstration of male dominance that can represent both a cause and consequence of gender inequality. Cultural norms are so strong in some contexts that many women may believe it to be acceptable for a husband to beat his wife for particular reasons. However, many believe that education can impact how acceptable women feel such violence is, with more educated women being less likely to believe beating is permissible (UNSTATS, 2010). As such, measures of women's own attitudes regarding domestic violence are a good indication of a culture's norms and attitudes towards women.

5 Results

The results for the instrumental variable estimates are located in Tables 2.3 through 2.6. Reduced form results, which are very similar to the instrumental variables results, are in the Appendix.

5.1 Education

Almost all women in the sample attended secondary school or higher, with only 3 of the approximately 3,000 female respondents only attending primary school. None of the

respondents indicated that they had not at least attended primary school. There is variation in the attendance of schooling higher than the secondary level, with approximately 13% of respondents having attended something higher than secondary school.

<< INSERT TABLE 2.3 HERE >>

I investigate whether women in districts with higher population proportions comprised of traditional farming cultures are less likely to continue on to higher education. Table 2.3 shows results from the instrumental variables estimates. Importantly, there are no differences between cultures with respect to the level of education achieved. Given that the population in Central Asia was predominantly illiterate upon the arrival of the Russians in the region, it appears that their mandatory education was successful at getting females to school, regardless of culture.

5.2 Role of women in the household

With more than 2,210 rural households in the MICS sample, there are 1,675 households that do not have water at their home and therefore must collect water (or pay someone to deliver water) for household use. Unlike many other developing countries, water collection is primarily an adult responsibility. Only 21% of households report a child being the primary water collector, which is evenly split between boys and girls. Adults of both genders participate in water collection for their households nearly equally, with 53% of the water collection performed by adults being carried out by women.

<< INSERT TABLE 2.4 HERE >>

As shown in Table 2.4, households located in districts with higher proportions of traditional farming cultures are much more likely to report that a female is the household's primary water collector. This result is significant and exists when controlling for diversity as well (shown in

column 2). Greater time allocated to time intensive home production activities, such as water collection, is less time available for market work. In spite of universal education, these results indicate that cultural differences persist with respect to gender roles in the household.

5.3 Use of contraception

Given that use of contraception is often correlated with women's labor market participation, it is important to understand if differences exist between cultures. Of the female respondents that are between the age of 15 and 49 years old that are reportedly able to get pregnant (and are not already pregnant), 47% report currently using some form of contraception.

<< INSERT TABLE 2.5 HERE >>

Results in Table 2.5 show that women living in districts with higher proportions of their populations from traditional farming cultures are less likely to use contraception. Results are significant when controlling for diversity (column 2), albeit only at the 10% level.

5.4 Views on acceptability of domestic violence

In the sample of 3,181 women living in rural villages, 39% believe that it is acceptable for a husband to hit his wife for at least one of the five reasons listed in the survey. Individually, approximately one-quarter of respondents believe that it is acceptable for a husband to hit his wife for going out without his permission, neglecting her children, or arguing with him (22%, 25% and 28%, respectively). Fewer respondents believe that burning food (13%) or refusing sex (11%) are legitimate reasons for hitting.

<< INSERT TABLE 2.6 HERE >>

Results presented in Table 2.6 indicate that women living in districts with higher proportions of the population of traditional farming cultures are more likely to state that it is acceptable for a husband to beat his wife for all reasons, except for one. In Panel A, which presents the second-stage results of the instrumental variables results, these difference is significant at the 10% level in two cases (columns 3 and 6). Once controlling for diversity, the results are more striking, with women in districts of traditional farming cultures 72% more likely to think that it is acceptable for a husband to hit his wife for any reason.

6 Conclusions

This paper contributes to the literature on the impacts of culture on gender roles. I use a natural experiment from the Soviet history in Central Asia, which resulted in the exogenous variation of two traditional cultures in the region: one of nomadic herdsman and the other of sedentary farmers. Although these are different cultural distinctions from the traditional plough-based versus non-plough-based agricultural culture discussed in Alesina, Giuliano, and Nunn (2012), the concept is similar: one culture is more equitable with respect to gender equality than the other culture and this difference ties to the historic source of livelihood and women's role in the production of that source of livelihood.

This paper is unique in several respects. First, using the exogenous variation in the cultural composition of districts in rural Kyrgyzstan, I study respondents who inhabit the land of their ancestors. This differs from the standard “epidemiological approach” to such studies of culture. Second, given that Soviet policies designed to promote female empowerment were implemented after the exogenous creation of district-level cultural composition, I am able to study whether cultural differences with respect to gender roles persist in spite of institutions that were designed to specifically to eradicate such inequalities.

On average, the sample population appears to be doing relatively well with respect to gender equality in some respects. Educational attainment is relatively high for women and, on average,

men and women share the burden of water collection almost equally. However, 40% of respondents believe that it is acceptable for a husband to hit his wife (for one of the five reasons listed). Results from similar UNICEF surveys in the region show that 10% of women in Kazakhstan ((UNICEF and Agency of the Republic of Kazakhstan on Statistic, 2007) and 75% in Tajikistan (State Committee on Statistics of the Republic of Tajikistan, 2007) believe it to be acceptable for a husband to hit his wife.

Those results are just the averages for the country's entire rural sample. Using the exogenous variation in the district-level cultural compositions, I find that there are cultural differences in gender roles and views on domestic violence. Most striking is that increases in the proportion of the population that is of traditional sedentary farming cultures increases, the share of households with water collection primarily carried out by women also increases. In addition, contraception use decreases and acceptance of domestic violence increases as the proportion of the district population from traditional farming cultures increases. There are no differences in educational attainment, however, which suggests that the Soviet establishment of educational institutions was successful. At this time, I cannot determine how the cultures interacted with the creation of Soviet institutions, except to say that there is evidence that some of these cultural differences with respect to gender roles persisted in spite of explicit attempts to empower women.

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Figure 2.1: Depiction of the instrumental variable

Diagram of instrumental variable: natural experiment from history created exogenous variation in cultural composition of districts in Kyrgyz Republic

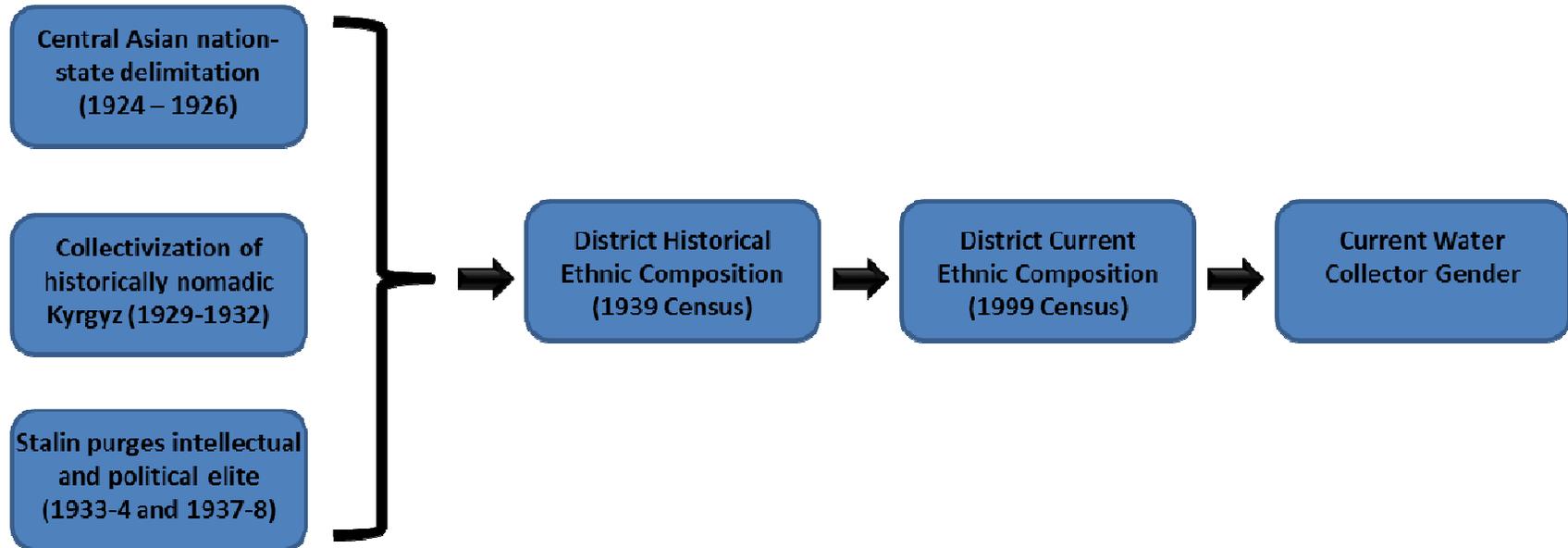
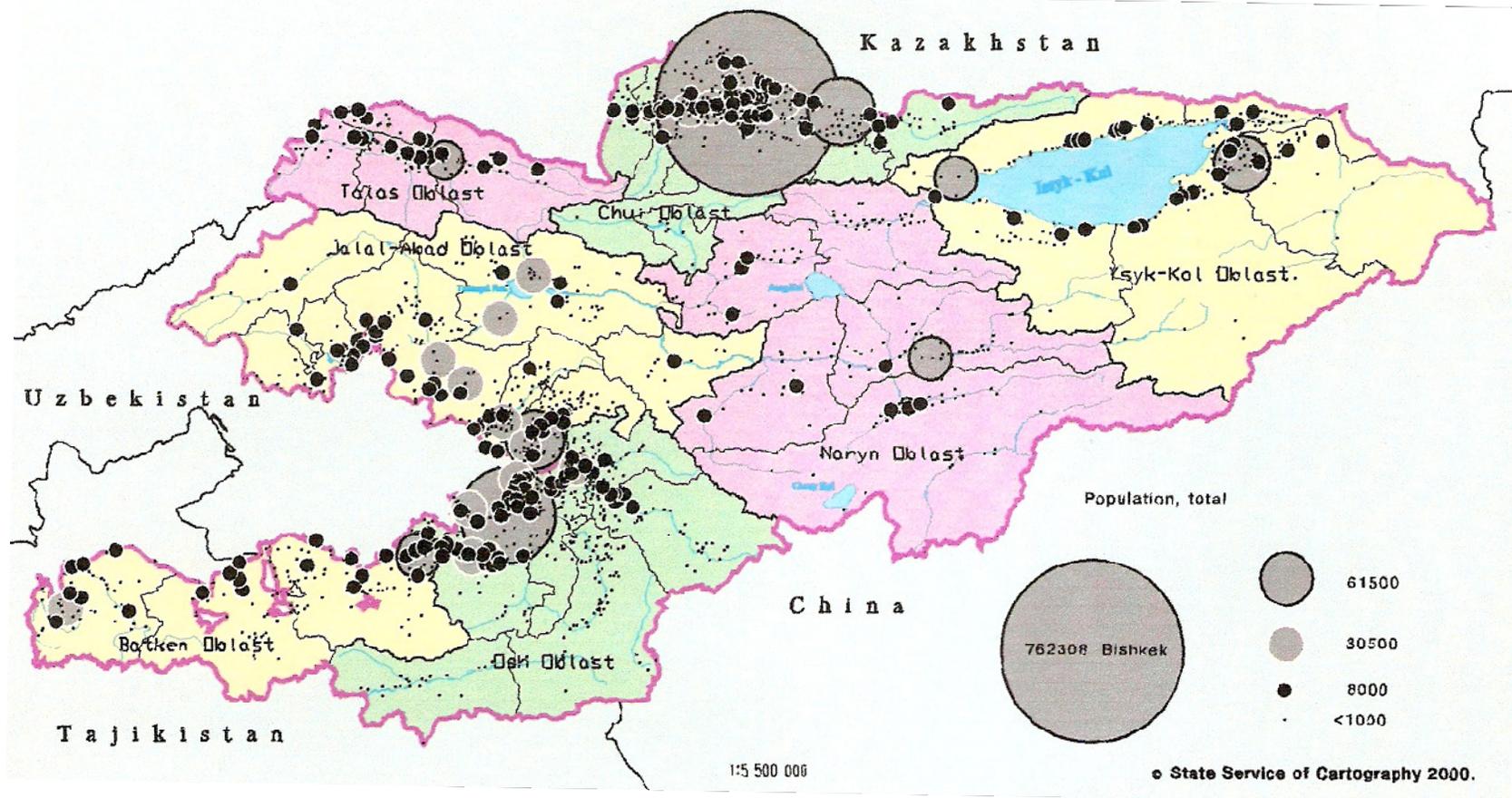
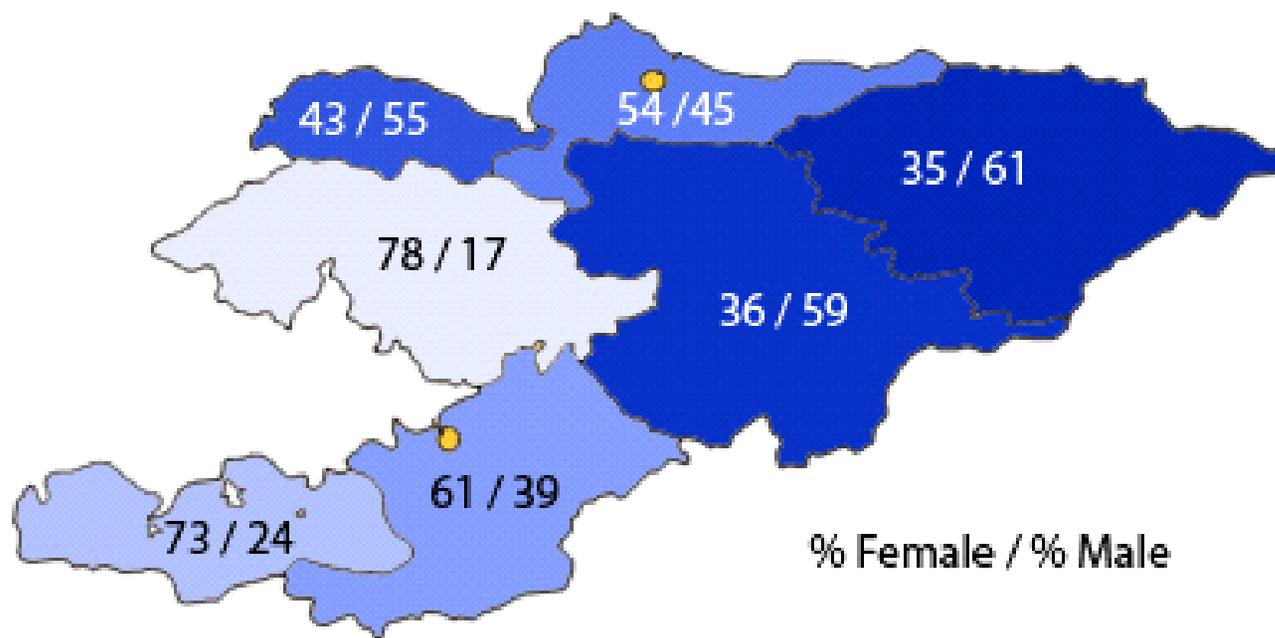


Figure 2.2: Population Distribution of the Kyrgyz Republic (1999 Census)



Source: Kyrgyz National Statistics Committee (1999).

Figure 2.3: Gender of Primary Household Water Collector by Province (%)



Notes: Based on data from the UNICEF Multiple Indicator Cluster Survey.

Figure 2.4: First-stage relationship between population composition in 1939 and 1999

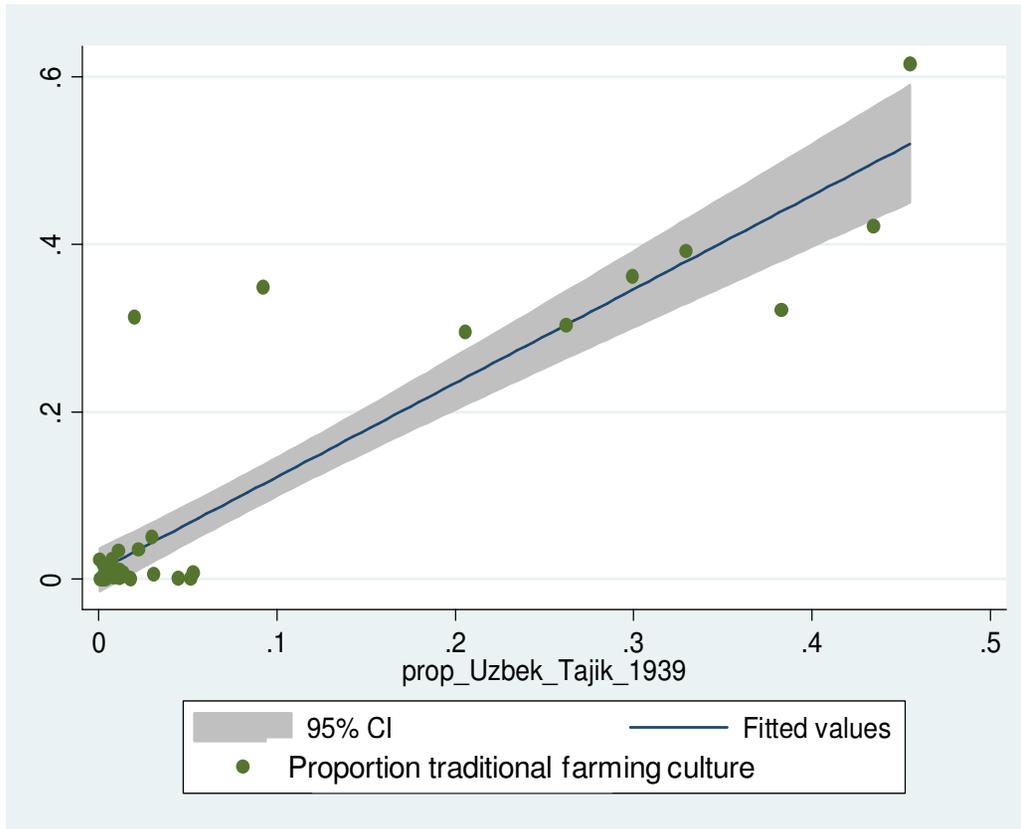


Table 2.1: First-stage results: Relationship between rural district population in 1939 and 1999

Dependent variable: Proportion of 1999 district population from traditional farming ethnicities

	(1)	(2)
District population farming ethnicities 1939	1.120 (0.0948)***	1.061 (0.106)***
District diversity 1999		0.0899 (0.0407)**
Constant	0.0103 (0.0114)	-0.0120 (0.00546)**
Observations	40	40
R-squared	0.818	0.837

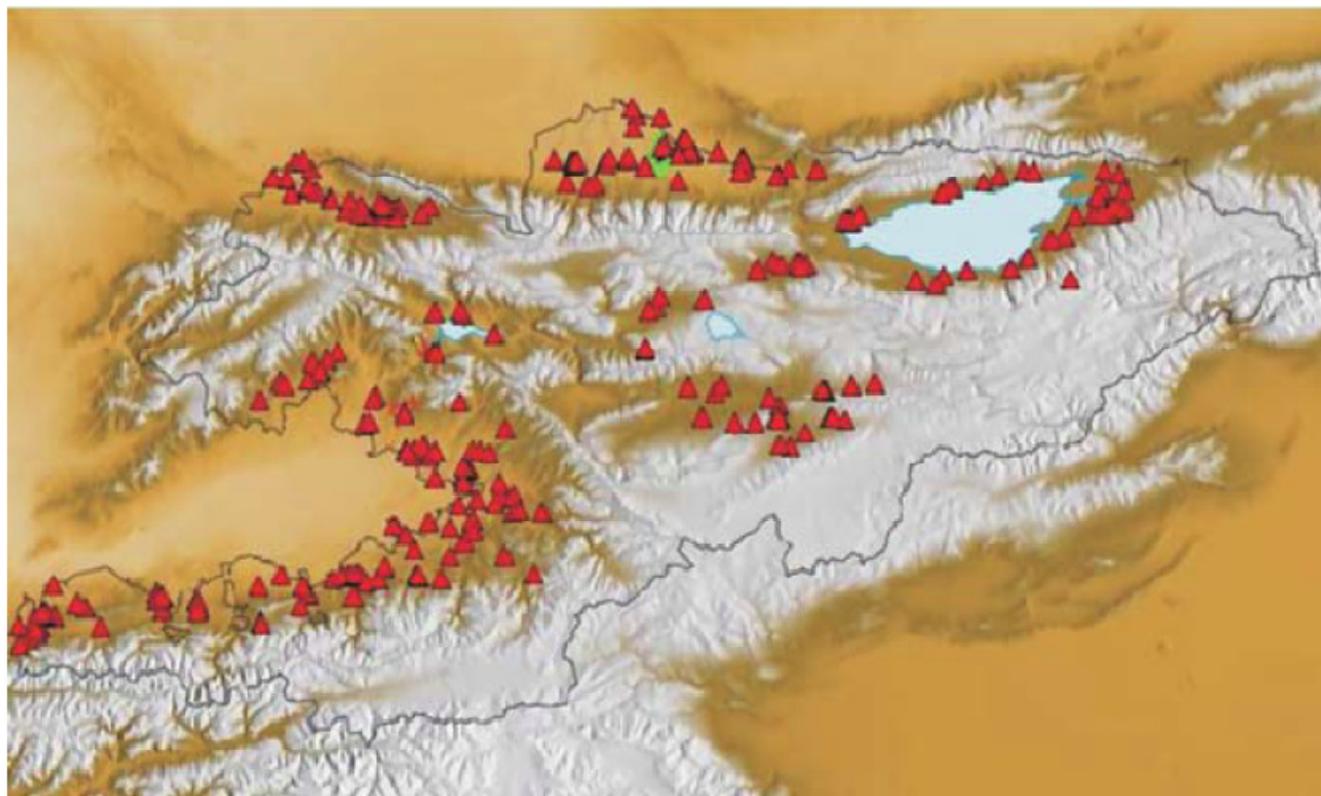
Notes: Robust standard errors are in parentheses (***) $p < 0.01$, ** $p < 0.05$, * $p < 0.1$). District diversity is a measure of ethnic fractionalization for 1999.

Table 2.2: Descriptive statistics

	All districts in sample	Quartiles: population proportion of traditional farmers			
		(1)	(2)	(3)	(4)
Average population	77031 (8463)	46781	64467	83569	105059
Average number of households	15495 (1589)	9917	15608	15781	19108
Average household size	5.140 (0.0861)	4.970	4.738	5.332	5.517
Proportion of (working age) population not employed	0.260 (0.0233)	0.322	0.202	0.254	0.278
Proportion of HHs receiving income from					
Formal employment	0.381 (0.00588)	0.373	0.363	0.394	0.395
Govt pensions	0.0866 (0.00297)	0.0950	0.0971	0.0852	0.0692
Govt assistance	0.0115 (0.00197)	0.0131	0.0203	0.00580	0.00605
Self-employment	0.515 (0.00474)	0.516	0.508	0.511	0.527
Proportion with at least secondary education completed (adults)	0.568 (0.00630)	0.538	0.564	0.575	0.593
Observations (# of districts)	40	10	10	10	10

Notes: Sample is limited to the rural population in these districts.

Figure 2.5: Spatial distribution of sample clusters in the UNICEF MICS dataset



Source: UNICEF (2007).

Table 2.3: IV estimate of relationship between cultures and education of women**Outcome variable: Higher education for adult women**

	(1)	(2)
<i>Panel A: Two-Stage Least Squares</i>		
Population proportion of traditional farmers: 1999	-0.0570 (0.0744)	-0.0473 (0.0870)
Woman's age	0.000107 (0.000655)	0.000111 (0.000656)
Number of people in household	-0.00832 (0.00437)*	-0.00849 (0.00438)*
Number of children under 5 years old	0.0148 (0.0103)	0.0147 (0.0102)
Number of rooms in house	0.000598 (0.000395)	0.000586 (0.000400)
House constructed of earthen walls	-0.0736 (0.0197)***	-0.0752 (0.0206)***
District diversity 1999		-0.0132 (0.0340)
<i>Panel B: First Stage</i>		
Population proportion of traditional farmers: 1939	1.032 (0.117)***	0.919 (0.142)***
First-stage F-statistic	1695.03	1379.61
Observations (adult women)	2933	2933

Notes: Robust standard errors reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All standard errors are clustered at the district-level. The outcomes variable and control variables are calculated using UNICEF Multiple-Indicator Cluster Survey implemented in 2004. "Traditional farmers" variable is the proportion of district population (i.e. Uzbek and Tajik ethnicities) that were from traditional farming cultures. District diversity is a measure of ethnic fractionalization for each district based on 1999 Kyrgyz census.

Table 2.4: IV estimate of relationship between cultures and gender of primary household water collector

Outcome variable: Household primary water collector is female

	(1)	(2)
Panel A: Two-Stage Least Squares		
Population proportion of traditional farmers: 1999	0.801 (0.207)***	0.669 (0.258)**
Number of people in household	0.000778 (0.00704)	0.00153 (0.00713)
Number of children under 5 years old	0.0101 (0.0189)	0.0105 (0.0188)
Number of rooms in house	0.000158 (0.000525)	0.000247 (0.000537)
House constructed of earthen walls	0.0230 (0.0368)	0.0345 (0.0376)
District diversity 1999		0.146 (0.114)
Panel B: First Stage		
Population proportion of traditional farmers: 1939	1.020 (0.123)***	0.910 (0.145)***
First-stage F-statistic	899.85	1071.41
Observations (households)	1675	1675

Notes: Robust standard errors reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All standard errors are clustered at the district-level. The outcomes variable and control variables are calculated using UNICEF Multiple-Indicator Cluster Survey implemented in 2004. Gender of water collector is only calculated to those households that have to collect water for their home (because they do not have water at their house or at least in their household's complex). "Traditional farmers" variable is the proportion of district population (i.e. Uzbek and Tajik ethnicities) that were from traditional farming cultures. District diversity is a measure of ethnic fractionalization for each district based on 1999 Kyrgyz census.

Table 2.5: IV estimate of relationship between cultures and contraception use

Outcome variable: Whether the person is of child-bearing age and uses contraception		
	(1)	(2)
<i>Panel A: Two-Stage Least Squares</i>		
Population proportion of traditional farmers: 1999	-0.172 (0.0816)**	-0.209 (0.105)*
Women's age	0.00918 (0.00102)***	0.00916 (0.00102)***
Number of people in household	-0.0156 (0.00570)***	-0.0150 (0.00566)**
Number of children under 5 years old	0.0928 (0.0148)***	0.0934 (0.0147)***
Number of rooms in house	0.00103 (0.000522)*	0.00107 (0.000514)**
House constructed of earthen walls	0.0388 (0.0193)*	0.0449 (0.0197)**
District diversity 1999		0.0511 (0.0664)
<i>Panel B: First Stage</i>		
Population proportion of traditional farmers: 1939	-0.178 (0.0735)**	-0.192 (0.0903)**
First-stage F-statistic	1695.03	1379.61
Observations (adult women)	2933	2933

Notes: Robust standard errors reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All standard errors are clustered at the district-level. The outcomes variable and control variables are calculated using UNICEF Multiple-Indicator Cluster Survey implemented in 2004. "Traditional farmers" variable is the proportion of district population (i.e. Uzbek and Tajik ethnicities) that were from traditional farming cultures. District diversity is a measure of ethnic fractionalization for each district based on 1999 Kyrgyz census.

Table 2.6: IV estimate of relationship between cultures and beliefs about domestic violence

Outcome variable: Female respondents believe it is acceptable for a husband to beat his wife:

	(1)	(2)	(3)	(4)	(5)	(6)
	if she goes out without telling him	if she neglects the children	if she argues with him	if she refuses sex with him	if she burns the food	in at least one of these scenarios
<i>Panel A: Second stage of 2SLS</i>						
Population proportion of traditional farmers: 1999	0.115 (0.212)	0.214 (0.182)	0.451 (0.251)*	-0.112 (0.0806)	0.107 (0.238)	0.429 (0.225)*
Woman's age	0.00319 (0.000970)***	0.00401 (0.00104)***	0.00562 (0.00106)***	0.00264 (0.000597)***	0.00211 (0.000768)***	0.00618 (0.00102)***
<i>Panel B: Second stage of 2SLS with district diversity (1999) controls</i>						
Population proportion of traditional farmers: 1999	0.317 (0.223)	0.348 (0.206)*	0.657 (0.275)**	-0.0408 (0.0764)	0.203 (0.256)	0.721 (0.240)***
Woman's age	0.00328 (0.000944)***	0.00407 (0.00102)***	0.00572 (0.00105)***	0.00268 (0.000601)***	0.00216 (0.000758)***	0.00631 (0.000982)***
District diversity 1999	-0.278 (0.132)**	-0.184 (0.124)	-0.283 (0.162)*	-0.0974 (0.0679)	-0.132 (0.0945)	-0.401 (0.162)**
Observations (adult women)	2933	2933	2933	2933	2933	2933

Notes: Robust standard errors reported in parentheses: *** p<0.01, ** p<0.05, * p<0.1. All standard errors are clustered at the district-level. The outcomes variable and control variables are calculated using UNICEF Multiple-Indicator Cluster Survey implemented in 2004. All regressions include household-level controls, which are: the number of people in the household, the number of children under 5 years old in the household, the number of rooms in the house, and whether the house is constructed with earthen walls. "Traditional farmers" variable is the proportion of district population (i.e. Uzbek and Tajik ethnicities) that were from traditional farming cultures. District diversity, which is included in Panel B, is a measure of ethnic fractionalization for each district based on 1999 Kyrgyz census.