

ORIGINAL RESEARCH

## What household structure encourages innovation? Comparative analysis of a case study of female labor in Kyrgyzstan and Kazakhstan

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### Abstract

This study examines the impact of patrilocality on women's work in Kyrgyzstan and Kazakhstan. It demonstrates how the dominance of the husband in decision-making affects women's activity in the labor market. This hinders the innovative development of the country and limits the country's entrepreneurial potential. The authors use Life in Kyrgyzstan 2019 data in econometric analysis, with OLS and Tobit models. This statistical analysis focuses on the relationship between household structure and labor force participation of married women in Kyrgyzstan. Since similar data is not available for Kazakhstan, the comparative analysis is based on a review of the literature. The authors assume that the patriarchal structure of families has become widespread in both neighboring countries due to the similar mentality, traditions, and history of the Kyrgyz and Kazakhs. The authors find that women in patrilocal households spend more hours at home compared to women in households with other family structures. Moreover, the husband's dominance in family decision-making correlates positively with the number of hours the wife works outside the home. This demonstrates a positive effect of intrahousehold income distribution mechanisms. The findings highlight the need for policies to support women's economic activity in both countries. The authors conclude that addressing barriers created by traditional male-headed households can increase women's contributions to innovation and entrepreneurship, thereby contributing to economic growth and development in Central Asia.

**Keywords:** Patrilocality hypothesis; Innovation; Entrepreneurship; Household work allocation; Kyrgyzstan; Kazakhstan, Econometric analysis; Female labor supply; Marriage arrangements.

### Introduction

In many developing countries, women are much more likely than men to perform domestic chores due to traditional family structures. This in turn limits their participation in economic activity, especially their chances of fully participating in the labor market and of becoming entrepreneurs. Such gender inequality is particularly evident in patrilocal households, where women are forced to live with their husband's family after marriage. Findings from other countries indicate that such family living arrangements make women care for the household and children, thus subjugating their career and education goals. This excludes more than half of the country's workforce from contributing to innovation and entrepreneurship (Chen & Mace, 2023; Jayachandran, 2015). This is in line with the patrilocality hypothesis which posits that such cultural setups reduce the supply of female labor in the market. This reduces actual and potential economic growth.

Patrilocality is a common cultural practice in Central Asian countries. It is linked with cultural practices concerning child care and family loyalty. The embedding of such practices blocks the integration of women in economies of developing countries. This is documented by the OECD (2019) and Jayachandran (2020). They find that unpaid care work is largely shouldered by women, worsening their chances of a career. The problems that are associated with patrilocality are most pronounced in two Central Asian states, Kyrgyzstan and Kazakhstan, which have much in common in their historical and cultural traditions that shape today's gender roles and family structure.

The current study focuses on these two Muslim-majority nations of the former Soviet Union. They are highly patrilocal and thus offer a unique opportunity for comparative studies of gender equality. In Kyrgyzstan, data from the Life in Kyrgyzstan Panel Study 2019 reveal how living conditions affect women's participation in the labor market. The findings are consistent with an earlier study by Landmann et al. (2018), which shows that patrilocal households often increase women's care responsibilities and reduce their oppor-

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tunities for outside employment. There has not been much research on similar quantitative data for Kazakhstan, but the 2018 data of the Bureau of National Statistics provide strong evidence that women in Kazakhstan are also affected by the same challenges. The gender division in domestic work is evident in all regions of Kazakhstan with women having the responsibility of household chores to a greater extent as compared to men.

This paper also examines an alternative household structure where gender equality dominates and where both spouses jointly make such economic decisions as where the woman will work. The authors believe that this type of household is the most preferable for modern society, as it empowers women and stimulates their entrepreneurial activity. This leads to innovation in all spheres of society. For example, according to the OECD (2019), infrastructure investments, namely improving access to childcare, were identified as critical public interventions to ease the burden of unpaid care work for women and increase their participation in the labor force. In Kazakhstan, policies aimed at reducing gender inequality should focus on specific assistance to rural women. They must take on more domestic work than urban women.

This paper makes several contributions. First, it fills a gap in the existing literature by empirically testing the patrilocal hypothesis in the context of labor and innovation economics. Such research has not been conducted before with a large database. Second, it demonstrates that gender-equal family structures can mitigate the damage done by traditional norms and religion in Central Asian countries. Third, it provides actionable policy recommendations for promoting gender equality in Central Asia.

### *Literature review*

#### **Global Perspectives on Patrilocal and Gender Dynamics**

Patrilocal is a common household structure in most parts of the world. Using cross-cultural data from South Asia, Sub-Saharan Africa, and East Asia, studies find that patrilocal subordinates women, enhances women's burden of unpaid domestic work, and constrains their access to education and employment (Landmann et al., 2018; Meseguer-Sánchez et al., 2020).

For instance, Ebenstein (2014) connects patrilocal with the durability of gender inequality. He explains that norms that compel women to live with their in-laws oppress daughters-in-law. Such customs define gender roles at the economic expense of women. Likewise, in China, Chen and Mace (2023) find that women living in patrilocal households do significantly more physical work than men. This trend is also observed in rural India (Dhanaraj et al., 2019).

Women's family care and other roles in household economies are also not given the attention they deserve and in some cases are not recognized at all, especially in the context of poverty. Okeyo (1979) points out that women are vital in the subsistence economy of rural Kenya. Their responsibilities include agricultural production, income earning, and caregiving. The same pattern is seen across the world, as Antonopoulos (2008) found in studying the relationship between care work and formal labor markets. The care work done by women supports economic structures but is not accounted for in standard economic measures.

The role of women in households affects both paid and the unpaid work. Riggio et al. (2010) found a significant link between household duties and the level of self-efficacy of young women. The more experience young women had with household chores, the better prepared they were for the labor market. In the same manner, Zunaidi and Maghfiroh (2021) studied the women's roles in Indonesia and the economic pressures that forced them to work in the formal sector while taking care of domestic responsibilities in rather adverse conditions.

This dual burden, called the "second shift," is a common concept in global studies. The World Survey on the Role of Women in Development (United Nations, 2019) highlights that poverty of income and time prevents women from breaking free from poverty and achieving their economic potential.

While patrilocal is more common in Central Asia, findings from egalitarian societies show that gender equitable policies can bring about positive change. Grönlund et al. (2017) concluded that policies supporting the sharing of household responsibilities increased the attachment of women to the labor market in the Scandinavian countries. The above findings are in line with the bibliometric analysis of family economies in poverty contexts by Meseguer-Sánchez et al. (2020). They support the need for incorporating Sustainable Development Goals into gender-specific policies.

In Central Asia, Landmann et al. (2018) examined the effects of patrilocal residence on women's labor market participation in Kyrgyzstan and found that women's work participation is diminished by care-giving responsibilities. The quantitative data on Kazakhstan is quite limited and therefore it is impossible to directly compare it with the data of Kyrgyzstan, but it is necessary to mention that the two post-Soviet countries are

very similar in terms of context and cultural beliefs that keep women from engaging fully in innovation and entrepreneurship as noted by Okeyo in 1979 and Zunaidi and Maghfiroh in 2021.

### **Developing Economies and Central Asia**

The role played by household structures in determining women's labor force participation, and the consequent effects on innovation and entrepreneurship, is one of the most important issues in development economics. This section reviews current research, analyzing the influence of patrilocality, care work, and socio-cultural standards that restrict women's economic participation in Central Asia, and specifically Kyrgyzstan and Kazakhstan.

In Central Asia, patrilocality has a significant impact on women's participation in labor markets and their ability to promote and develop goods and services. In addition, according to Jayachandran (2015), patrilocality worsens gender inequality by perpetuating conventional family structures that prevent women from exercising control over their lives and from engaging in outside home work (farming). In patrilocal households' women are expected to spend a lot of time in unpaid domestic work. This leaves them with little time and energy to engage in professional and business activities (Urbaeva & Lee, 2018). This hurdle thus prevents women from being more entrepreneurial as this entails many hours of one's time.

Urbaeva and Lee (2018) studied patrilocal households in post-Soviet countries. Women's household status was a key factor in their use of maternal health care services. The implications were extensive: The structure of patrilocal households and the lack of authority that women have in them hamper women's autonomy, which is necessary to their economic participation and creativity.

Unpaid care work is still a major obstacle to women's economic empowerment. The OECD (2019) pointed out that women still take on most of the responsibility of unpaid domestic work such as childcare, caregiving, and household work. These tasks are labor-intensive and often go unrecognized by families. Consequently, they hamper women's employment opportunities in the formal sector. It has been suggested that improvements in infrastructure like childcare and clean energy can alleviate these burdens and allow women to participate more actively in the economy.

Jayachandran (2020) also examines how social norms reinforce gender divisions of labor. To redistribute duties within households, and therefore throughout the wider economy, policy and community-based interventions must address the cultural norms that define women as the caregivers. Persistence of such norms underlines the importance of developing context-appropriate approaches to encourage more equal gender norms.

Cultural norms affect the level of economic agency that women exhibit. Jayachandran (2020) notes that such norms change with economic growth. However, such change is not consistent; strict norms are common in rural and conventional communities. In Kyrgyzstan and Kazakhstan, where patrilocality is practiced with other patriarchal norms, women are restricted from the labor market. These restrictions are not just social but structural, since they concern caregiving, family work, and women's purity.

Studying West Africa, Ogundana et al. (2021) build a growth model based on gender that focuses on the need for financial inclusion, market information and management education for women entrepreneurs. The implications vary with the region. For instance, in Central Asia, banks should not compel the husband or his parents to co-sign the wife's application for a loan.

The Central Asian context is unique for the way that urbanization and Soviet social reforms, which encouraged the education of women and their involvement in the labor market, have brought the influences of modernity to cultural capitals such as Almaty in Kazakhstan and Bishkek in Kyrgyzstan. But rural culture remains traditional. Thus, urban women are more liberated than rural women (OECD, 2019).

Kyrgyzstan, with the data from the Life in Kyrgyzstan survey (2019), offered empirical evidence on these processes. Women in patrilocal households had a lower probability of being employed in the external labor market. This finding was consistent with regional studies that identified the social norms regarding caregiving and family obligations as barriers to women's labor force participation. In the case of Kazakhstan, although the same type of data was not available, qualitative research also indicated the need for research that was comprehensive and yet specific to the region for policy.

The analysis of Kyrgyzstan and Kazakhstan shows both the similarities and differences of the position of women in these societies. Although the data for Kazakhstan is lacking in the form of the Life in Kyrgyzstan survey (2019), the cultural and historical similarities between the two countries suggest that the findings from Kyrgyzstan may also be relevant to Kazakhstan. Especially in rural areas, patrilocal family arrangements prevent women from fully pursuing careers.

Innovation is a function of diversity and inclusiveness. By identifying structural obstacles posed by patrilocal and unpaid care work, policymakers can harness the dormant potential of women in Central Asia. Incorporating gender policies into national development plans would promote justice, innovation, and economic development.

This literature review focuses on the relationships between the household structure, socio-cultural norms and women's labor participation in Central Asia. By analyzing these factors, this study expands the understanding of how cultural norms influence the economic well-being of women. It provides a solid base for policies that target enhancing women's position and supporting innovation in economies making the transition to markets.

### **Kyrgyzstan**

Traditional norms of Kyrgyzstan greatly affect the socio-cultural development of the country, especially the patrilocal that shapes the economic activities of women. According to Landmann, Seitz and Steiner (2018) patrilocal residence in Kyrgyzstan increases women's domestic work, particularly caring for the elderly, while limiting their employment opportunities. This is because, in Kyrgyzstan, women receive less support from their in-laws in household duties and childcare compared to women in less patrilocal societies (Landmann et al., 2018).

The bias against careers for women is also seen in marriage practices. Bride kidnapping, or *ala kachuu*, remains a pervasive tradition, accounting for up to 30 % of marriages (Borbieva, 2012; Hofmann & Chi, 2022). These forced unions often lead to highly patriarchal household dynamics, restricting women's autonomy. However, Hofmann and Chi (2022) suggest that women in these households sometimes leverage labor migration as a means to escape patriarchal constraints, while others conform to traditional roles to maintain family unity.

Migration shapes gender dynamics. Economic pressures have driven significant male out-migration, leaving women to manage multi-generational households. Ismailbekova (2013, 2014) highlights the role of grandmothers and mothers-in-law in preserving patrilineal traditions, including the transmission of genealogies and the orchestration of marriages. This dynamic maintains the cultural norms of kinship but at the same time offers chances for women to shape the family.

Kyrgyzstan has not shaken off the influence of the traditional norms. Nedoluzhko and Agadjanian (2015) noted the changes in the society including the reduced practice of arranged marriages and the bride kidnapping which they attributed to changes in the socio-demographic environment after the breakup of Soviet Union. Women in Bishkek have higher chances of obtaining an education and finding employment. This increases women's autonomy and decreases dependence on traditional customs.

Integration of economic and family roles is difficult for women. Thieme (2008) states that opening up of new opportunities for migration and economic development has created more work for women and especially those who are left to take care of families. This "multi-local" livelihood makes women navigate between conventional roles and new possibilities.

### **Kazakhstan**

In Kazakhstan, the relation of traditional gender roles to modernization is visible. The gender roles in Kazakh society were influenced by the nomadic culture of the Kazakh tribe where women helped to manage the household and other public functions, including combat and governance (Abdikadyrova et al., 2018). However, the Soviet period made a rather counter-intuitive change: women were provided with education and jobs but were expected to also become wives and mothers (Kuzhabekova et al., 2018).

Kazakhstan shows wide differences between the participation of men and women in the labor market. This shows that women are still making 21.7 % less than their male counterparts partly because of systematic occupational segregation and gender-based discrimination in hiring and promotion (Kabylova, 2022). Although women are well-represented in the educational and health sectors, they are under-represented in management positions, and the issues they encounter are compounded by the cultural expectations of the family (Alpysbayev et al., 2024; Kuzhabekova et al., 2018).

Despite improvement in the public aspect of gender equality, the private aspect of gender roles is still conservative. The role of women has not changed much. They are still mainly responsible for unpaid care work while cultural norms and lack of state policy support only exacerbate the issue (Kabylova, 2022). Efforts to achieve an equal sharing of domestic responsibilities between men and women have been slow, largely due to the challenge of changing deep-rooted cultural beliefs (Kan, 2023).

But post-Soviet economic reforms have led to the increase of women's participation in the informal rural economy. According to Werner (2024), women traders along the New Silk Road navigate patriarchal structures to support their families. These traders fulfill their conventional gender roles while expanding their economic roles, thus withstanding the pressures of Kazakhstan's market system.

The discrepancy between the gender equality of public and private domains affects fertility plans. Gender-sensitive attitudes are more common in urban areas while traditional family culture still dominates rural areas. This conflict has resulted to low fertility desires among women who seek to work and care for their families (Kan, 2023; Kabylova, 2022).

Kazakhstan has adopted many legal measures on gender equality, signing and approving numerous international agreements and creating national councils on gender issues, according to Kuzhabekova et al. (2018). But the measures are mostly declarative and not effectively implemented. Other obstacles include cultural norms as well as geographical differences that block gender equality (Kan, 2023).

### **Kyrgyzstan and Kazakhstan: Comparative Dynamics**

The culture of patrilocality in Kyrgyzstan presents a clear example of how household structures shape women's economic activities. About 60 % of married women in the rural areas of Kyrgyzstan live with the husband's family and are likely to take on the responsibilities of a housewife raising children, which hampers her employment prospects (Kyrgyzstan National Statistics Committee, 2021). This is in harmony with the nationalist rhetoric which strengthens the patriarchal ideology in rural society (Belafatti, 2019). Furthermore, economic insecurity in Kyrgyzstan enhances these limitations, as families react to socio-economic pressures by subscribing to conventional gender roles (Junisbai, 2010).

While Kyrgyzstan has seen some benefits from its integration into the global economy, particularly in terms of women's labor force participation, Kazakhstan has experienced a much deeper level of integration. About 75 % of women in Kazakhstan are either working or looking for a job. This can be attributed to the efforts made in the areas of education and labor market (World Bank, 2022). Nevertheless, patrilocality and traditional gender norms still prevail in rural areas (Zadayev, 2024). These rural-urban differences reflect how and to what extent globalization and economic modernization affect gender relations in these two countries (Sadykova et al., 2022).

While both Kyrgyzstan and Kazakhstan feel the effects of patrilocality, the resulting difference in their economic development provide valuable insights. On the one hand, urbanization and more modern policy have led to higher economic activity of women in Kazakhstan in the two largest cities, such as Almaty and Astana. On the other hand, Kyrgyzstan is mainly rural, with a culture that still favors traditional gender roles hence a greater gender inequality (Junisbai et al., 2017). These challenges are further aggravated by the cultural globalization that influences the two societies (Sadykova et al., 2022).

These differences can be mitigated by such new strategies as improving education and enterprise for women in remote areas. Regional cooperation can also help achieve these goals. Kazakhstan's experience with advanced policy can pave a way for a brighter future for Kyrgyzstan. All in all, these initiatives can sustain development of the region and enhance its gender equality.

### **Methods**

The authors' analysis of patrilocality includes Ordinary Least Squares and Tobit models of the impact of household structure on the labor supply of married women in Kyrgyzstan. Kovaleva and Taylor (2023) provide the theoretical mathematical model for this broad line of research. It assumes that the husband determines the amount of housework his wife will do in order to maximize his own utility by avoiding household chores. This utility is offset by the loss of outside income that his wife could have worked as well as his loss of her affection. The husband balances these factors in deciding how much housework his wife should do.

Here is a model more specific to this note. Let us denote the wife's earned income as  $Y$ . This is the product of her wage  $w$  and the number of hours  $X$  that she works outside of the home. Thus  $Y = wX$ . In turn,  $X$  is a positive function of the share  $A$  of the wife's labor time that she spends outside of the home, that is, on her career,  $0 \leq A \leq 1$ . In turn,  $A$  is a positive but diminishing function of the wealth  $W$  of the husband and wife. Greater wealth endows the wife with more education and entrepreneurial opportunities. These factors increase the amount of time that she can spend on her career. In short, the wife's earned income is  $Y = w * X[A(W)]$ .

We assume that initially the wife lives with her husband's family, which compels her to work fully at home. To have a career, she and her husband must move to a residence of their own. The cost of this move is

TC, a function of location is L. The husband and wife will relocate if her career income exceeds the cost of the move. In sum, the wife's earned income is  $Y = w * X[A(W)] - TC[L]$ .

The model implies that the wife's earned income is higher when wealth is higher and when potential residences for the couple are nearer the home of the husband's family. Thus, the wife earns more in high-income urban economies than in other regions. Additionally, since she engages in more entrepreneurial activity in these economies, they also experience higher levels of innovation and economic growth.

The dataset for Kyrgyzstan comprises 11,913 observations from the Life in Kyrgyzstan (LIK) panel survey (2019), focusing on 3,063 married women. For Kazakhstan, we use the data collected by the Bureau of National Statistics in 2018 with a gender breakdown of the distribution of unpaid work by region and type of settlement (urban and rural). These data are incorporated into the comparative framework.

The Life in Kyrgyzstan (LIK) panel survey is a rich source of longitudinal data collected annually from households across Kyrgyzstan. The survey covers various socio-economic dimensions, including employment, education, household decision-making, and regional disparities. For Kazakhstan, while comparable panel survey data is unavailable, existing studies and reports suggest similar socio-economic patterns, particularly in urban-rural divides, educational attainment, and labor market participation.

We use both Ordinary Least Squares (OLS) and Tobit regression models to analyze the Kyrgyzstan data. The OLS model provides baseline estimates of the relationship between the dependent and independent variables. Given the substantial proportion of zero values in the *Hourstotal* variable — representing women who do not engage in outside work — the Tobit model is employed to address this truncation. For Kazakhstan, the findings from Kyrgyzstani data serve as a reference point, since the two countries are comparable in the labor market.

#### Variable Definitions:

- *Hourstotal*: The number of hours that women work per week outside the home. This measures their engagement in the labor market.
- *Move*: A binary variable that is 1 if the woman moved in with her husband's family and 0 otherwise to show patrilocal residence.
- *Decision*: A binary variable that denotes the husband as the head of the household making economic decisions for the woman.
- *Schooling*: Woman's years of schooling as a control variable for human capital endowment.
- *East*: A binary variable that classifies households as living in urban and high-income areas (for instance, Bishkek in Kyrgyzstan and Almaty or Astana in Kazakhstan).

This analysis assumes that the variable *Move* adequately captures patrilocality, which is common in both countries, although nuances such as the size and composition of extended families could further refine this measure. Additionally, while direct measures of innovation or entrepreneurial activity are unavailable, outside work hours and education serve as proxies for labor dynamics. For Kazakhstan, the comparative analysis is based on secondary sources, which may lack the granularity of primary data.

To ensure the validity of findings for Kyrgyzstan, we conducted several robustness checks, including:

- *Testing for multicollinearity among independent variables using variance inflation factors (VIFs).*
- *Comparing results across different model specifications, including interactions between schooling and decision-making variables.*
- *Examining regional sub-samples to explore geographic variations in the effects of patrilocality.*

In the case of Kazakhstan, Bureau of National Statistics data are analyzed descriptively for patterns of unpaid domestic work by gender and settlement type. The findings are expanded, using regional analysis to examine differences and their effects on the labor force participation of women.

Our choice of regression models reflects both theoretical and practical considerations. OLS offers simplicity and interpretability for baseline analyses, while Tobit regression addresses the limitations of censored data. The comparative framework emphasizes the socio-cultural and economic parallels between Kyrgyzstan and Kazakhstan, leveraging shared historical contexts to extend insights across both nations. This dual-country approach enriches our understanding of how household structures influence female labor supply and, by extension, the potential for innovation in Central Asia.

## Results

According to descriptive statistics (Table 1), the average married woman in Kyrgyzstan works 14.3 hours per week outside the home, has nearly 11 years of education, and is unlikely to have moved to her husband's family (*Move* = 0.013).

Table 1. Descriptive statistics

Variable	Observations	Mean	Standard deviation	Min	Max
Hourstotal	3,055	14.285	20.514	0	70
Move (=1)	3,055	0.013	0.112	0	1
Decision (=1)	2,785	0.198	0.399	0	1
Schooling	2,916	10.602	2.115	0	15
East (=1)	3,055	0.327	0.469	0	1

Note — compiled by the authors based on 2019 LIK data.

For instance, in Kazakhstan (Fig. 1), data from the Bureau of National Statistics (2018) show that women are engaged in unpaid domestic work on average for 13.4 % of their time while men are involved for 4.9 %. This indicates the gender gap. This is consistent with Kyrgyzstan where conventional extended-family systems still dominate in rural areas. Both countries are characterized by patrilocality and by male-headed households and by male decision-making, hampering economic activities of rural women.

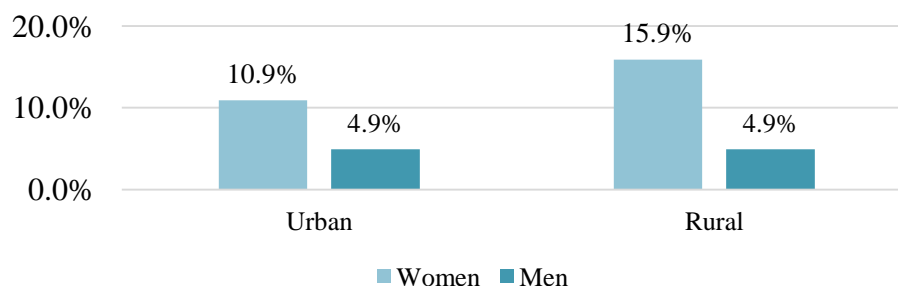


Figure 1. Unpaid domestic work in Kazakhstan by gender and region (2018)

Note — compiled by the authors

In urban Kyrgyzstan, such as Bishkek, women report higher education levels and greater labor force participation than in rural areas (Fig. 1). Likewise, as indicated in Figure 1, the data from Kazakhstan's Bureau of Statistics demonstrates that urban women were engaged in unpaid domestic work for 10.9 % of their time, while their rural counterparts were involved for 15.9 %. Urban Kazakhstani cities, such as Almaty and Astana, also reflect progressive trends, with urbanization driving higher female engagement in the workforce. Conversely, rural areas in both countries maintain stronger adherence to traditional family arrangements, demonstrating limited economic participation by women. These geographic and cultural similarities highlight the regional factors shaping women's economic opportunities across Central Asia.

Table 2 for Kyrgyzstan shows correlation matrix. Low correlations among independent variables, indicating minimal multicollinearity. The highest correlation (–0.225) is between Decision and East, which is highly significant (the t-statistic is –11.351). The general lack of simple collinearity suggests regional variation in cultural attitudes toward male decision-making: In the sample, husbands are more likely to determine the wife's work allocation in rural areas than in urban ones. Similarly, in Kazakhstan, urban-rural divides should influence intra-household decision-making dynamics, with urban households more likely to adopt egalitarian approaches. These patterns reinforce the regional similarities between the two countries.

Table 2. Correlation matrix

	Hourstotal	Move	Decision	Schooling	East
Hourstotal	1.0000				
Move	–0.062	1.000			
Decision	–0.002	–0.044	1.000		
Schooling	0.182	0.015	–0.067	1.000	
East	0.151	0.061	–0.225	0.125	1.000

Notes — compiled by the authors based on 2019 LIK data.

According to the Table 3 OLS regression, in Kyrgyzstan, the coefficient on Move is –12.62 ( $p < 0.001$ ), indicating that women in patrilocal households experience a significant reduction in outside work hours. Similar dynamics are anticipated in Kazakhstan, where patrilocal traditions persist, especially in rural areas. Decision positively affects outside work hours (+2.02,  $p = 0.045$ ) in Kyrgyzstan, suggesting that supportive husbands enable greater female economic participation.



Table 3. OLS and Tobit regressions for working hours

	OLS		Tobit	
<b>Move</b>	−12.623***	(0.000)	−48.290***	(0.000)
<b>Decision</b>	2.017**	(0.045)	5.942**	(0.026)
<b>Schooling</b>	1.664***	(0.000)	4.238***	(0.000)
<b>East</b>	6.278***	(0.000)	15.975***	(0.000)
<b>Sigma</b>			46.192	
<b>Constant</b>	−4.348**	(0.032)	−62.051***	(0.000)
<b>N</b>	2738		2738	
<b>Left-centered</b>			1718	
<b>R<sup>2</sup></b>	0.0562			
<b>Pseudo R<sup>2</sup></b>			0.0122	
<b>Log likelihood</b>			−6352.523	

Note — compiled by the authors based on 2019 LIK data.

This effect is likely mirrored in Kazakhstan, given its shared cultural backdrop. Furthermore, the regional analysis of Kazakhstan (Fig. 2) shows that women in certain regions such as South Kazakhstan (15.6 %), Kyzylorda (16.1 %), and North Kazakhstan (15.8 %) shouldered the greatest domestic responsibilities. This in turn reduced their ability to engage in paid work or start their own business.

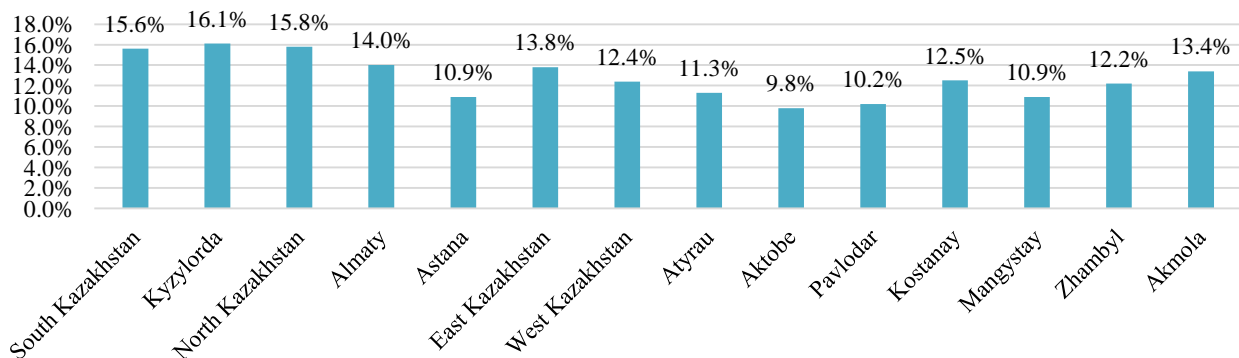


Figure 2. Regional domestic burdens for women in Kazakhstan (2018)

Note — compiled by the authors

Education emerges as a transformative factor in Kyrgyzstan, with each additional year of schooling increasing outside work hours by 1.66. Urban residence (East in Kyrgyzstan) also shows a positive effect on outside work hours. In Kazakhstan, the more educated regions, which are the urban areas including Almaty and Astana, have reduced gender gaps. Education enhances the employment prospects of women and increases their status in households, enabling them to spend less time on domestic chores and more on their careers (Fig. 2). Figure 2 also depicts the changes in social relations in urban settings where education changes the gender norms of division of labor within the household.

The Tobit model (Table 3) for Kyrgyzstan confirms the OLS findings, with Move reducing outside work hours by 48.29 ( $p < 0.001$ ) and Decision increasing them by 5.94 ( $p = 0.026$ ). The same trend can be observed in Kazakhstan where urbanization lightens the burden of domestic work on women, and urban women contribute less time to unpaid chores than their rural counterparts (Table 3). This highlights the importance of structural factors and policies that mitigate gender inequality. The results indicate that wives in patrilocal households spend little time working in the labor market. The Left-centered statistic shows that 1,718 observations reported no work hours outside of the home. The negative and significant intercept, -62.05 in the Tobit model, and the low R-squared or pseudo-R-squared values of the model, indicate that some factors reduce the woman's outside labor beyond those controlled for in the models. This is consistent with the large share of observations (62.7 %) that report no outside labor for the woman.

In Kyrgyzstan, urban women work 15.98 more hours per week outside the home compared to rural counterparts. Kazakhstan's urban centers similarly offer greater economic opportunities, with regional disparities playing a critical role in shaping labor market outcomes. Policymakers in both countries must address these divides to foster equitable labor force participation.



Interaction terms in Kyrgyzstan's analysis reveal that higher education levels mitigate the negative effects of patrilocal living arrangements. The authors argue, that these findings also apply to Kazakhstan, where education similarly provides women with the freedom to choose their household structure and moderates the influence of religion and tradition on the degree of patriarchy. For example, Women with a university education in patrilocal households have higher labor force participation rates than less educated women. The authors believe that such differences in labor force participation demonstrate the importance of women's attainment in both countries, particularly in rural areas.

In addition, the authors found that urban residence significantly increased the number of hours that married women worked outside the home in Kyrgyzstan. This reflects greater access to employment opportunities due to a larger labor market supply and better infrastructure. Similar patterns occur in urban Kazakhstan, where urbanization is known to facilitate economic participation in the labor market. However, cultural traditions and behavioral norms persist in both countries, limiting women's opportunities to participate in the labor market even in cities. The authors therefore conclude that policymakers should help address these cultural barriers through targeted interventions and social assistance.

Performed robustness checks for LIK 2019 data confirm the stability of the regression results. Alternative model specifications, which include lagged variables and sub-sample analyses, yield consistent findings. The inclusion of interaction terms between Decision and East highlights the progressive influence of urbanization on household dynamics. Similar robustness is expected in Kazakhstan, given the comparable socioeconomic and cultural contexts.

This comparative analysis underscores the similarities between Kyrgyzstan and Kazakhstan in terms of household structures, education, and regional disparities affecting the participation of women in the labor force. While both countries exhibit traditional norms that hinder women's economic opportunities, urbanization and education emerge as critical levers for change. Future research should focus on collecting comparable data for Kazakhstan to deepen the comparative insights and inform policy interventions aimed at reducing gender inequities in labor markets.

### *Discussions*

The statistical analysis confirms the patrilocality hypothesis. Women's working hours decrease significantly when they are in patrilocal households as compared to non-patrilocal households. This implies that patrilocal changes in the family structure reduce the labor force participation of women and aggravate the gender gap. This reflects that women in patrilocal households work longer hours at home than their counterparts in non-patrilocal households. Moreover, Kazakhstan data show that rural women do more unpaid care work than their urban counterparts; this is also seen in Kyrgyzstan. Apparently, cultural standards such as patrilocality and male-headed decision-making hinder women's employment, especially when compounded by gender bias. Cultural standards that deny women equal opportunities for paid employment and instead encourage them to become caregivers are especially evident in rural areas of Kazakhstan and Kyrgyzstan. The consequences are social as well as economic.

Kazakhstani data show that women spend 2 hours and 16 minutes on unpaid domestic work in urban areas and a tenth more time, 2 hours and 29 minutes, in rural areas. This supports existing findings of a significant difference between urban and rural areas in labor market participation; which is also seen in Kyrgyzstan.

Women in Kazakhstan spend more than three times as many hours that men do on unpaid domestic labor (3 hours 36 minutes vs. 1 hour 9 minutes). This gap is even bigger in the rural setting due to the cultural norms of households. These findings are consistent with those findings from Kyrgyzstan.

A vital point is that male-headed households correlate with women working more hours, holding constant the family arrangement. This result shows that intra-household factors affect labor market outcomes. For example, in urban settings, policies that support joint decision-making role by both spouses, as well as flexible working arrangements, can increase women's employment rates. New evidence reveals that in Kazakhstan, the decision-making role of husbands in running a household is related to higher levels of women's economic activities in urban areas.

Education turns out to be a powerful tool. Higher education counteracts the adverse impact of patrilocal living standards. In Kazakhstan, urban women with higher education spend an average of 2 hours and 7 minutes per day on unpaid domestic work, while for rural women with a similar level of education, this increases to 2 hours and 29 minutes. This is evidence of the importance of education and urbanization in the economic development of women and reduction of gender inequality.

The interaction terms in the Kyrgyzstan analysis show that education reduces the adverse impact of patrilocal living arrangements. These findings also pertain to Kazakhstan, where education enables women to have more choices in the choice of household structure and partially liberates them from religion and tradition. University-educated women who belong to patrilocal households in Kazakhstan are more likely to be involved in labor market activities than other women.

Kyrgyzstan and Kazakhstan are quite similar in household structure, education and regional traits that affect women's employment. Although both countries have preserved many archaic attitudes towards women's working rights, urbanization and education are drivers of change.

Graphical data for Kazakhstan show how women's unpaid domestic labor is unevenly distributed across regions. They perform the most unpaid work in the rural provinces of South Kazakhstan, Kyzylorda, and North Kazakhstan.

### ***Policy implications***

Kyrgyzstan and Kazakhstan have deep cultural and historical similarities from Soviet times, including intra-family norms, religion and a dominant patriarchal social structure. We believe that Kyrgyzstan and Kazakhstan can work together to develop policies that leverage their shared history and cultural similarities to empower women, stimulating economic transformation and innovation.

First, we would emphasize that Kazakhstan and Kyrgyzstan face challenges in providing decent education to rural women. The share of women with higher education in rural areas is significantly lower than in urban areas. The two countries should prioritize scholarships, accessible educational centers, and online learning platforms to expand opportunities for rural women. Or the government could expand access to quality education for rural women through scholarships and vocational training tailored specifically for patrilocal households as targeted social assistance.

Second, special programs aimed at informing families about the benefits of gender equality can change social attitudes over time. Such educational campaigns and actions should encourage joint decision-making by spouses, such as income management. These methods can enable women to participate more intensively in the labor market and in entrepreneurship, promoting innovation.

Third, encouraging women's participation in science, technology, engineering, and mathematics (STEM) fields is vital to advancing innovation. For example, according to a study in the United States by Hanushek (2001), changes in per-student spending, teacher salaries, and class size do not significantly impact student achievement; however, innovations in teaching methods play a crucial role. Similarly, we argue that in Kazakhstan, gender equality and role programs do not have to be expensive to succeed. The key factor is to engage students' critical thinking.

Fourth, economic reforms can increase gender equality. Tax credits to the wife's earned income can encourage joint responsibility for income. Flexible working arrangements, such as remote work and part-time work, can help women balance household responsibilities and professional aspirations, allowing them to start their own businesses. Enforcing anti-discrimination laws and providing legal aid services can protect women from workplace bias.

Furthermore, we advocate for the implementation of microloan programs, grants, mentorship initiatives, and networking opportunities to foster women's entrepreneurship in Kazakhstan and Kyrgyzstan. While early research on microfinance suggested that repayment rates were higher when borrowers' relatives acted as guarantors, more recent studies indicate that joint liability is not a prerequisite for the success of microloans. High repayment rates can also be achieved when borrowers' access to future loans is contingent upon the timely repayment of existing ones, as well as when lenders demonstrate flexibility by extending repayment periods during periods of financial hardship. (Cai et al., 2023; Meki & Quinn, 2024). But "microfinance loans are subject to intra-household dynamics," write Cai et al. (2023), "and interventions targeting women specifically need to be sensitive to gender norms and inequalities that favor aggregation of resources into male hands".

Kyrgyzstan's success with microfinance initiatives targeting women in rural and patrilocal households serves as a model for Kazakhstan. Adapting these programs to Kazakhstan's financial framework could empower women entrepreneurs in underserved regions, facilitating economic diversification and innovation.

Setting an example can succeed. Mentorship programs address skill gaps for women entrepreneurs in both countries. Kazakhstan's larger economy and infrastructure provide an opportunity to develop regional training hubs. Publicizing success stories of households where husband and wife have equal power avoid adverse patrilocality.

In addition, reorganizing infrastructure in favor of rural settlements can have positive effects. While urban centers such as Bishkek and Almaty have the most modern and comfortable infrastructure, rural areas require comfortable public transport and night lighting that enable women to commute and work safely. To overcome inequality between cities and villages, governments can improve high-speed internet coverage for remote education and develop mobile financial services specifically for rural areas.

In sum, transformation of household structures and promotion of gender equality within families are the key factors for unlocking female potential in Kazakhstan, Kyrgyzstan, and throughout Central Asia.

### ***Conclusions***

This study concerns how the patriarchal structure of families in Kazakhstan and Kyrgyzstan affects women. Through econometric testing of the patrilocality hypothesis, we find that traditional households' structures and norms affect women by increasing the domestic burden. This also limits their access to education and consequently their employment in the labor market, inhibiting entrepreneurial activity and innovation.

In addition, we conclude that women in patrilocal households work fewer hours outside the home. On the other hand, when spouses jointly decide income distribution, this enhances women's potential by promoting their greater participation in the labor market. This loosens restrictions of traditional patriarchal households. To empower women, education and urbanization are the most important levers. Urban women and women with higher levels of education demonstrate significantly higher labor force participation.

Our comparative analysis of Kyrgyzstan and Kazakhstan also applies to other post-Soviet Central Asian countries. Both countries face similar challenges related to patriarchal and religious traditions, but they also demonstrate how to address these challenges through targeted government interventions. Policies that promote gender equality in the labor market and at home will expand access for women to education and entrepreneurship. They will also create an environment conducive to innovation and economic growth.

However, interventions must be appropriate and consistent with local norms, traditions and customs to ensure public understanding and effective policies. Only then can deeply rooted gender roles be gradually transformed through targeted programs aimed at reforming traditional household education, along with financial incentives that promote an equitable division of labor between the sexes. Urbanization's role in providing access to resources and opportunities further emphasizes the need for bridging urban-rural divides.

The data presented by the Bureau of Statistics of Kazakhstan support these findings and show a large gap between the rates of engagement in the unpaid domestic work by individuals in urban and rural areas as well as by gender. In Kazakhstan, rural women spend more time on unpaid domestic work than urban women. This indicates that cultural norms are still a barrier to women's economic participation.

Future research should aim to collect and analyze comparable data for Kazakhstan to deepen the understanding of regional dynamics. Expanding this research to include other Central Asian nations could provide broader insights into the interplay between household structures, gender roles, and economic innovation. Additionally, longitudinal studies on policy impacts could offer valuable guidance for designing scalable interventions.

Also important is to identify factors affecting the woman's labor supply beyond the social and economic ones specified by the models. One possibility is that the woman's labor supply also depends on Kyrgyzstani or Central Asian culture. Because these two cultures affect all observations in our dataset, they would influence the intercept rather than the other coefficients. Adding Kazakhstani observations to the dataset could clear up this issue. Our work on other papers in this line of research indicates that significant factors include whether the locale is regional, whether the woman is willing to accept risk at work, whether the marriage is on the basis of love or instead is a bridal kidnapping, and whether there are small children, as well as the woman's age and Kyrgyz culture. In short, a woman's labor supply is influenced by geographical, psychological, demographic, marital, and national cultural factors, as well as by social and economic variables accounted for in the models. Nevertheless, the clear impact of social and economic factors is a valuable contribution of this paper. True, the uncontrolled factors such as the basis of the marriage probably correlate with independent variables in our models, potentially influencing their coefficients to some extent. But binary variables often do correlate, and for mathematical rather than social or economic reasons. So, the correlation of our independent variables with the omitted variables would not affect our basic conclusion that social and economic factors affect the woman's labor supply.

In conclusion, addressing the barriers posed by patrilocality is not only a matter of gender equity but a strategic imperative for unlocking untapped potential in Central Asia. Empowering women through equitable

household dynamics, education, and supportive policies can drive innovation, foster economic development, and create a more inclusive society across the region. By leveraging shared cultural and historical contexts, Kyrgyzstan and Kazakhstan can lead the way in fostering gender-inclusive growth and setting an example for neighboring countries.

**Acknowledgments:** This research was funded by the Ministry of Science and Higher Education of the Republic of Kazakhstan, grant IRN AP23487405, project titled “The Change and Determinants of Subjective Well-being in Kazakhstan. Impact Evaluation of Targeted Social Assistance Programs on Income, Subjective Well-being, and on Reduction of Poverty”. The authors thank the Institute for the Study of Labour for providing the Data for the Study “Life in Kyrgyzstan” panel survey and the help of KIMEP University.

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