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From Household Duties to Innovation: The Role of Gender Norms in Women's Economic Participation

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Abstract

This study examines how cultural norms and household structure affect women's participation in the labour force and their capacity to contribute to innovative activity, emphasizing patrilocality theory in Kyrgyzstan. According to the theory, women who reside with their husband's family are expected to spend more time on household duties and may be less likely to participate in income-generating and innovative activities outside the home. Econometric analysis uses data from the 2019 Life in Kyrgyzstan (LiK) panel survey. The Tobit model analyses the relationship between women's living arrangements, labour force participation and earnings. The analysis reveals that, other things being equal, women earn lower wages if they have many household responsibilities; however, this does not mean that women in patrilocal living arrangements have low earnings. It also shows that education, location, and other socio-economic factors are most important in determining the rate of women's economic participation and the innovation potential. Moreover, household decision-making power and cultural expectations are most likely to affect women's opportunities for labour market participation. The study finds that resolving gender inequalities in domestic responsibilities and power to make decisions is crucial to unlock the potential of women in innovation for the economy. The study contributes to the existing literature as the first empirical analysis of these dynamics in CIS countries and as policy recommendations to promote gender equity and economic growth.

Keywords: Innovation, Patrilocality hypothesis, Household structure, Women's labour, Gender roles, Cultural norms, Econometric analysis

Introduction

Anthropologists assert the "patrilocality hypothesis": when the wife moves into her husband's family house, as is often the case in developing societies, she may be forced to work in the household while he does not (Chen & Mace, 2023). The current article statistically tests the hypothesis with a model that examines how the household structure may affect women's labour market participation and their ability to engage in innovative activities. The study's central hypothesis is that women who live in patrilocal households — that is, with their husband's family — have greater domestic labour responsibilities. These have a detrimental impact on their outside income and restrict their ability to participate in creative economic endeavours.

The patrilocality hypothesis favours gender over resources or negotiation within the household as an explanation of how home chores are assigned. According to gender theory, which includes the patrilocality hypothesis, women perform the majority of housework since it is seen as their duty (Kolpashnikova & Kan, 2020). In contrast, resource theory states that the allocation of labour is contingent upon the man's and woman's time, labour, and capital. Finally, bargaining theory states that the allocation of labour is determined by psychological forces in the home. These theories may intersect. Allocating resources, for example, may impact household work patterns and negotiating strength. Because unequal labour loads can prevent women from participating in economic innovation, the structure of these allocations is crucial.

The introduction of new technology could also be a factor: labour-saving devices such as vacuum cleaners and washing machines may encourage men to work harder and do fewer household chores. To ensure that the disutility of doing the job himself does not outweigh the disutility of her being unhappy, the controlling spouse in our model avoids doing the housework. The husband does more housework due to

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technological advancements that lower the marginal disutility of the task. As a result, the woman has less labour to do around the house and can work outside the home. This gives her the chance to be creative

This technological progress can have other economic consequences. For instance, liberating women from domestic responsibilities may make them more capable of contributing to areas of the economy that are knowledge-based, such as education, entrepreneurship, and creative industries. On the other hand, the degree of the wife's dissatisfaction with imposed work depends on cultural expectations. Some cultures, like the one studied in this paper, expect her to do domestic work. This lowers her dissatisfaction and his disutility in imposing work on her. This consequence reveals how cultural norms can constrain women in the labor market and the extent to which they are prevented from innovating. In total, this paper combines gender, resource, and bargaining theories to create a complete framework for looking at household labour allocation and its economic implications.

This paper makes several contributions. It offers both the first econometric examination of the patrilocality hypothesis and the first econometric analysis of how it affects women's participation in domestic work and innovation. Additionally, it offers the first empirical examination of these problems in Kyrgyzstan. The study clarifies the connection between home labour and economic involvement through a statistical examination of personal traits, cultural beliefs, and living situations. In addition, it reveals how household structures and cultural factors may hinder or promote the ability of women to innovate. This has important policy implications for promoting gender equality and economic growth. In particular, the paper examines how these factors affect womens outside income and readiness to innovate. It analyses these key variables: age, education, ethnicity, location, employment, religious beliefs and love marriage.

Literature review

After marriage, it is more common for wives worldwide to live with their husbands' families than vice versa (Kovaleva & Taylor, 2023a). Patrilocality is more common when the wife and husband live away from their families. Chen and Mace (2023) found that in partnerships with patrilocal structure, the woman takes 12 thousand work steps per day (by milking cows and collecting mushrooms), whereas the man takes 9 thousand. They surveyed 561 persons from 6 national groups in the rural Tibetan region of China. In this setup, women continued to exert greater effort than men, even after adjusting for household size and age (Chen et al., 2023).

Bias in patrilocal relationships does not have to be eliminated by contemporary labour markets. According to a Spanish study by Moreno-Colom (2017), a woman's job did not ensure she would share household chores equally. The employment of women is an essential but insufficient prerequisite for the equality of gender, according to Moreno-Colom (2017). In the US, breadwinners still clean and cook (Kolpashnikova, 2018). Kolpashnikova and Kan (2020) also concluded that factors other than resource-based explanations continue to account for the majority of the gender gap and could include gender bias. However, the effect of gender is determined by the task. According to a Canadian study by Kolpashnikova (2016), economic reasons explained only 31 % of the gender difference in cooking time but 39 % of the gender difference in cleaning time. According to this research, societal conventions surrounding gender roles still exist in contemporary economies. These conventions affect the division of labour and might limit female access to fields that foster innovation.

This perspective is based on the assumption that women put in more effort than men, due to the pressure from their husbands' families, also known as the patrilocality hypothesis. A different hypothesis is that men demand women's labour to be free to fight. The level of competition between and within kin groups dictates gender roles, asserted Micheletti, Ruxton, and Gardner (2020). While the sex that competes more with outsiders is more likely to be serviced, the sex that competes more with relatives is more likely to serve the other sex. The authors explain that warfare can induce cooperative and altruistic behaviour because the winning groups have a reproductive advantage, reducing the competition among the kin. But the economic and societal barriers that keep women from becoming innovators and entrepreneurs may not be fully explained by such evolutionary ideas, despite their relative usefulness.

Patrilocality, where a wife lives after marriage with her husband's family, prevails in various societies and has profound implications for women's labour participation. In Kyrgyzstan, Landmann et al. (2018) find that a strongly patrilocal setting, living with in-laws has no discernible impact on women's labor force participation. Co-residing women, however, devote more time to elder care without getting the normal amount of help around the house. This constraint limits their options for paid work and reinforces traditional gender norms.

Living with in-laws restricts women's autonomy and labour force participation in India. Parents-in-law present in the household constrain mobile women and limit their decision-making power. This keeps them from the labour market (Heath & Tan, 2020).

Marriage practices, including early marriage and bridal dowries, greatly affect women's economic well-being. Early marriage is linked to low achievement in education and the labour market, prolonging poverty and financial dependence (Field & Ambrus, 2008). In African contexts, bride wealth practices can constrain women's autonomy and agency, limiting their economic participation (Anderson, 2007).

Economic shocks also play a role in marriage practices. For instance, adverse economic conditions may lower the age at which girls marry, that is, when families may turn to early marriage as a coping mechanism (Corno et al., 2020). Such practices disenfranchise women in the labour market and social spheres.

Some tax policies, such as joint filing in the United States, disincentivise the participation of married women in the workforce. Such policies include higher marginal tax rates on secondary earners, usually women. This suppresses the motivation to work full time and climb the career ladder. This exacerbates economic inequalities (Eissa & Hoynes, 2004).

The unequal distribution of household labour is a persistent problem worldwide. In Spain, equitable housework allocation is not guaranteed by women's employment. Gender equality cannot be attained solely through employment (Moreno-Colom, 2017). Even breadwinning wives in the US must handle a greater portion of the household chores. This obligation limits their capacity for creativity (Duxbury & Higgins, 1991).

In addition, having young children in the home reduces female labour force participation. Women with children under six years of age are less likely to work for pay and thus need help from public policy in balancing work and life (Kimmel, 1998).

Challenges posed by patrilocality, traditional marriage practices, and gender norms require comprehensive policy interventions. Policies that support shared decision-making in the household and childcare sector and reform of tax systems can improve women's labour market participation and economic outcomes. Policymakers must also meet the challenge of societal norms that limit women's autonomy to foster an environment conducive to innovation and economic growth.

This study of the literature demonstrates how women's employment habits in Kyrgyzstan are influenced by migration, household dynamics, gender norms, religious beliefs, cultural and marital customs, and commute times. In addition, they affect women's capacity to innovate by affecting their control over time, resources, and decision-making power directly or indirectly.

According to Landmann, Seitz, and Steiner (2018), women who live with extended families receive no parental assistance with housework but spend more time providing elder care than women who do not live with their parents. This disparity between genders in the division of labour limits women's opportunities for paid employment and entrepreneurship, which is essential in fostering innovation. The study views female labour supply as a family optimization problem in which family members would provide the scheduling flexibility that women need to work additional hours. However, co-residence is key in elder care: women who live with their extended family reduce their leisure time on caregiving responsibilities and have less chance to participate in innovative activities.

Empirical research shows that gender norms along with coercive marital practices and household dynamics limit women from participating in the economy and innovating. According to Haq et al. (2023) religiosity acts as a strong factor which reduces female participation in the workforce while strengthening patriarchal barriers against women's independence. The patrilocality hypothesis receives support from Becker et al. (2017) and Arabsheibani et al. (2021) who studied Kyrgyzstan to show how bride kidnapping and forced marriage decrease labor supply while increasing unpaid household work. The research by Karymshakov and Sulaimanova (2017) demonstrates that when men leave their homes for work the remaining women must handle more responsibilities which prevents them from taking paid employment. The research by Farré et al. (2020) and Foster and Stratton (2018) from higher-income settings shows that labor market events such as commuting time or job loss do not lead to household chore rebalancing because women maintain their dominant role in domestic work regardless of their employment status. The research demonstrates that women face ongoing economic limitations because of structural inequalities and gender norms which persist in both traditional and contemporary societies.

This literature study highlights economic, social, and cultural elements influencing females' patterns of employment in Kyrgyzstan. The elements limit women's time, income-earning opportunities, and innovation capacity, thus sustaining gender inequality and economic growth.

The literature could use a simplified model that can capture the complex interplay of these factors. The following section outlines a model to bolster gender equality and improve women's economic power and welfare. According to Flèche, Lepinteur, and Powdthavee (2020), longer workdays and an unbalanced distribution of domestic duties reduce women's life satisfaction. These are issues that could not only enhance life satisfaction but also increase the potential of women to participate in economic innovation.

Methodology

In our approach, the husband decides the extent of her work outside the home (Kovaleva & Taylor, 2023b). The inconvenience (disutility) of performing housework and child rearing himself, his wife's earnings and the emotional bond (her love) within the relationship affect his decision. This framework allows us to analyze how household dynamics influence women's ability to innovate by examining the constraints imposed by traditional gender roles.

Where X_h stands for the time the wife spends on household work, and X outside the home, if we denote her household labour as L_n and her outside labour as L_v, then her total work time z is the sum of involuntary labour L_n and voluntary labour L_v, $z = L_n + L_v$. For simplicity, we assume that $z = 16$ is the number of hours per day.

The husband's utility is derived from household work, commodity goods, and his wife's affection M. He determines the proportion a of his wife's labour allocated to household work, leading to the following labour division: $L_n = az$ and $L_v = (1–a)z$. The wife's affection M decreases due to the increase, meaning that the more household work she is required to do, the less affection she expresses. Her wage rate is P, so her total earnings from outside work are PX. These earnings are entirely spent on commodity goods.

To incorporate the innovation potential, we extend the model by assuming that L_v can contribute to creative or entrepreneurial work, which is more likely when the wife faces fewer household responsibilities.

The husband's utility maximization problem can be formulated as follows:

$$L = U\left[X_h\left(L_n(a)\right), PX\left(L_v(a)\right), M(a)\right] + \lambda_1[az - L_n] + \lambda_2[(1-a)z - L_v] + \lambda_3[z - L_n - L_v].$$

To derive the first-order condition for the husband's utility maximization problem, we take the derivative of the objective function with respect to a: $\frac{dL}{da} = \frac{dU}{dX_h}\frac{dX_h}{dL_n}\frac{dL_n}{da} - \frac{dU}{dX}\frac{dX}{dL_v}\frac{dL_v}{da} + \frac{dU}{dM}\frac{dM}{da} + \lambda_1 z - \lambda_2 z = 0$. $\frac{dL}{d\lambda_1} = az - L_n = 0$; $\frac{dL}{d\lambda_2} = (1-a)z - L_v = 0$; $\frac{dL}{d\lambda_3} = z - L_n - L_v = 0$. We assume that $\frac{dX_h}{dL_n} > 0, \frac{d^2X_h}{dL_n^2} \leq 0$; $\frac{dX}{dL_v} > 0, \frac{d^2X}{dL_v^2} \leq 0$.

That is, we assume that more labour increases household output, but at a diminishing rate: $f'(L_n)>0$, $f''(L_n)<0$. Household chores can vary from sweeping floors to child care. To capture this diversity, we express X_h as a vector of k distinct duties, each requiring a specific type of labor: $X_h = (X_{h1}, \ldots, X_{hk})$.

Thus, the derivative of total household work X_h with respect to household labor L_n is the sum of the marginal contributions of labor across all household duties: $\frac{dX_h}{dL_n} = \sum_{i=1}^{k} \frac{dX_{hi}}{dL_{ni}}$. In a simplified scenario, we assume $k = 1$: $\frac{dX_h}{dL_n} = \frac{dX}{dL_v} = 1$.

That is to say, for every hour of labor, there is an additional hour of work performed outdoors or in home. We also assume that: $\frac{dL_n}{da} = z, \frac{dL_v}{da} = -z$.

That is, if the husband wants the wife to work only in house, then his wife's total household work hours will be equal to the full workday, z. We assume that the utility function is: $U(a) = X_h^a X^{1-a} M^{-a}$.

This function then takes its logarithm, since it is a strictly increasing or decreasing function, it preserves the order of values. Since we assume a single optimum, taking the logarithm does not alter the optimal decision — it results in the same decision.

To measure how household constraints influence innovation, we extend the utility function to include innovation I, which depends positively on L_v. Thus, the revised utility function becomes: $U(a) = X_h^a X^{1-a} M^{-a} \mathrm{I(Lv)}^{\beta}$ where $\beta > 0$ captures the wife's ability to innovate as her outside work increases.

Under these assumptions, the first-order conditions result in: $\frac{dM/M}{da/a} = z + \lambda_1 - \lambda_2$. The elasticity of the wife's attachment with respect to the percentage of her involuntary labour is also negative since the right-hand side is negative (as indicated in the appendix). This implies that she shows less love for her husband the

more he makes her work from home. Moreover, as the share of outside work (L_v) increases, innovation (I) rises, highlighting how reducing household burdens can promote innovation.

The solution yields: $a = \frac{M}{dM/da}[z + \lambda_1 - \lambda_2]$. The variable *a* falls within the range of 0 to 1. The phrase inside the brackets must also be negative because on the right-hand side, the first term is negative.

Empirical model

This study seeks to understand if a woman's housing situation affects her earnings and innovativeness. To this end, her outside income is given by Income (i, t), where the subscripts i and it denote the particular woman and t denotes time, respectively. This system enables us to examine the effects of living arrangements on income and women's potential to innovate. Since many women in Kyrgyzstan are not employed, we use a Tobit model, corrected for zero censorship, to analyze the data. A frequently employed practical model is:

$$Income(i,t) = a + b*Love(i) + c*Loved(i) + d*Decision(i) + e*Move(i) + f*Move(i)*Love(i) + g*Move(i)*Loved(i) + h*Years\ of\ marriage(i;t) + i*Chores(i) + j*Children\ under\ 6\ (i,t) + k*Schooling(i,t) + l*Spous\_schooling(i,t) + m*Age(i,t) + n*Age^2(i,t) + o*Kyrgyz(i) + p*Religious(i) + q*Housework(i;t) + r*Rural(i) + s*East(i) + x(i,t) \quad (13)$$

These variables fall into four categories, capturing both traditional and innovation-related dynamics:

(1) *Type of marriage*: *Love, Loved,* and *Decision*.

(2) *Family characteristics*: *Move, Years of Marriage, Chores, Children Under 6*

(3) *Individual characteristics*: *Schooling, Age, Age^2, Kyrgyz, Religious, Housework, Wage, Hourstotal*

(4) *Location*: *Rural, East*.

Depending on the answers to the question about whether a wife in a love marriage has heavy duties, such as having to labor for her husband's family, the variable *Love* has a range of 0 to 3: 0 (impossible); 1 (possible); 2 (likely); 3 (very possible). According to this study, greater values of this variable are consistent with patrilocality, which implies the conviction that women in love marriages are subjected to heavy home labor demands.

Loved is a dummy variable equal to 1 if the woman got married by love and 0 for the other case. Her answer to the query, "How did you get married to your spouse?", is the basis for this variable. If she indicated an arranged marriage or bridal kidnapping, she signals a love marriage. If she reported a love marriage, the variable is set to 1; if she claimed a bridal kidnapping or an arranged marriage, the variable is set to 0. We anticipate a favourable coefficient. Then, those in involuntary marriages and women in voluntary marriages have a better chance of having the right to work outside the home and innovate.

Decision is a dummy variable indicating whether the husband makes labour decisions for the household. We expect a negative impact on women's wages under the patrilocality and related hypotheses.

Move is a dummy variable equal to 1 if the woman reported moving because of marriage, to be with her husband's family and 0 otherwise. We expect that $e<0$, women who move for marriage should bear a greater household labour burden since they live with in-laws and may have more domestic responsibilities. *Move*Love* and *Move*Loved* are multiplications.

The number of years that a couple has been married is known as their *Years of marriage*. Assuming that the wife has additional children as the marriage goes on, we utilize the *Number of Children Under 6* variable as a stand-in. We assume that $h > 0$, meaning that the wife's bargaining position strengthens as the marriage progresses. Therefore, it is unlikely that her position within the home would deteriorate over time, given her initial lack of authority.

Chores measures the strength of the wife's agreement with the statement that the husband should share in household work. The larger the value of Chores, the stronger her agreement. Its values are 0 (strongly disagree); 1 (disagree); 2 (agree); and 3 (strongly agree). We expect a positive coefficient, as greater household cooperation may free up time for income-generating and innovative activities.

Children under 6 indicates how many children and grandchildren live in the home and are younger than six.

Schooling represents the **total number of years of education** that the woman has completed, where university (bachelor, diploma, master) and PhD = 15 years, secondary technical/special = 11, secondary general and primary technical = 10, basic = 8, primary = 4, illiterate = 0 years.

The number of years that the male in a woman's home has completed his education is known as *Spouse Schooling*, since education boosts productivity and tolerance, we anticipate that $k > 0$ and $l > 0$; this could improve the wife's economic prospects and the dynamics of the home.

Age indicates the woman's age. Because older women have more work experience and are not responsible for tiny children, we think that m > 0. This can only increase their productivity and income. *Age²* equals the woman's age squared. Given that the benefits of becoming older diminish with age, we expect $n < 0$: while experience enhances wages at the beginning, the effect becomes smaller over time, and such factors as age or the obsolescence of skills may even decrease earnings.

If the woman is ethnically *Kyrgyz,* the dummy variable *Kyrgyz* equals 1; if not, it equals 0. Since *Kyrgyz* social networks are known to safeguard and advance the interests of their members, which may provide them with specific social and economic advantages, we anticipate that o > 0.

If the respondent identified herself as *Religious* using one of the following definitions — firm atheist, not a religious person, or a religious person (given a value of 1) — *Religious* is a dummy variable set to 1.

Housework is the wife's number of years of housework. We expect a negative coefficient because higher household responsibilities reduce labour market participation and the likelihood of engaging in innovative pursuits.

Wage is a proxy for *Income.* The wife's hourly wage outside the home is measured in the Kyrgyz currency *soms*.

Hourstotal represents the total number of hours per week that the wife spent working at her job. It is also a proxy for *Income.*

Rural is a dummy variable for a non-urban location. We expect a negative impact on income because cities' productivity and labour demand are higher.

East includes regions of Issyk-Kul, Naryn, Chuy and the Bishkek city. We anticipate $s < 0$ because these regions are typically calmer than the western regions, which are more prone to ethnic and political tensions.

Data

The dataset includes 11,913 observations from the 2019 Life in Kyrgyzstan (LiK) panel survey, a special and extensive longitudinal survey that has been carried out yearly since 2010. The LiK dataset is designed to provide insights into the living conditions and socio-economic development of individuals and households in Kyrgyzstan. It covers various topics: employment, migration, education, household structure, and well-being. Virtually all observations used in this study are for married women (3,055 observations), making this one of the few empirical studies to leverage this rich dataset for analyzing household dynamics and innovation potential.

According to the official website of the Life in Kyrgyzstan Study, the survey aims to support evidence-based policymaking and promote research on Kyrgyzstan's economic and social development. The dataset includes variables that capture individual characteristics and household-level dynamics, making it particularly suitable for analysis of patrilocality, labour allocation, and innovative activities.

According to the correlation matrix (Table 1), most variables' correlations are low, including the interaction terms, age, and square, and are likely free from multicollinearity issues in the analysis (correlation matrix can be provided **upon request**).

Table 1. Correlation matrix

	Love	**Loved**	**Decision**	**Move**	**Move * Love**	**Move * Loved**	**Years of marriage**	**Chores**	**Children under 6**	**Schooling**
1	2	3	4	5	6	7	8	9	10	11
Love	1									
Loved	-0.08	1								
Decision	0.07	-0.07	1							
Move	-0.04	0.18	-0.04	1						
Move*Love	0.05	0.15	-0.02	0.66	1					
Move*Loved	-0.02	0.27	-0.04	0.71	0.58	1				
Years of marriage	-0.06	-0.04	-0.02	-0.06	-0.05	-.005	1			
Chores	-0.1	0.03	-0.04	-0.01	-0.02	-0.004	-0.07	1		

Continuation of the table 1

1	2	3	4	5	6	7	8	9	10	11
Children under 6	0.02	0.03	-0.001	-0.01	-0.02	-0.008	-0.33	0.05	1	
Schooling	0.02	0.03	-0.07	0.01	0.04	0.008	0.12	-0.03	-0.11	1
Age	-0.01	-0.23	0.07	-0.11	-0.07	-0.09	0.8	-0.03	-0.28	0.03
Age^2	-0.01	-0.2	0.05	-0.09	-0.06	-0.07	0.8	-0.03	-0.26	0.003
Kyrgyz	0.02	0.05	-0.03	0.01	0.03	0.012	0.1	-0.02	-0.14	0.2
Religious	0.04	-0.1	0.1	0.02	0.01	0.008	-0.09	-0.04	0.18	-0.18
Housework	0.01	-0.05	0.01	-0.03	-0.02	-0.02	-0.03	-0.01	0.03	0.004
Wage	-0.01	-0.01	-0.06	-0.03	-0.03	-0.03	0.24	0.004	-0.13	0.2
Hourstotal	-0.02	-0.04	-0.003	-0.05	-0.04	-0.03	0.35	-0.02	-0.15	0.17
Rural	0.08	-0.04	0.08	-0.03	-0.01	-0.03	0.02	-0.06	0.07	-0.17
East	-0.08	0.08	-0.23	0.06	0.05	0.09	0.16	-0.05	-0.18	0.13
Affection	-0.16	0.12	-0.04	0.04	0.02	0.05	-0.13	0.001	-0.01	0.11
Age	1									
Age^2	0.99	1								
Kyrgyz	0.03	0.01	1							
Religious	–0.1	–0.1	0.03	1						
Housework	–0.05	–0.06	–0.03	0.04	1					
Wage	0.08	0.05	0.02	–0.12	–0.08	1				
Hourstotal	0.13	0.08	0.09	–0.09	–0.09	0.62	1			
Rural	–0.06	–0.06	0.13	0.22	–0.04	–0.10	–0.01	1		
East	0.12	0.11	–0.03	–0.33	–0.06	0.18	0.17	–0.14	1	
Affection	–0.04	–0.04	–0.05	–0.1	–0.002	0.01	–0.02	–0.12	0.12	1

Note — the table presents pairwise correlation coefficients for all independent variables used in the model. Values close to 0 indicate weak correlation, while values near ±1 indicate strong correlation.
Source: Kovaleva's estimates using 2019 LIK data.

In the following part, Table 2 displays the descriptive statistics. The standard deviation is so high that it exceeds the mean for most variables. However, in some instances, such as the ones presented in the last column of the output, there is still enough data variability to allow for reasonably accurate coefficient estimates even when the standard deviation is less than or equal to the mean.

Table 2. Descriptive statistics

Variable	Observations	Mean	Standard deviation	Min	Max
Love	2785	1.034	0.935	0	3
Loved	3055	0.0812	0.273	0	1
Decision	2785	0.198	0.399	0	1
Move	3055	0.0128	0.112	0	1
Move*Love	2785	0.01	0.124	0	3
Move*Loved	3055	0.007	0.081	0	1
Years of marriage	621	8.77	8.274	2	31
Chores	2736	1.978	0.609	0	3
Children under 6	3055	1.386	1.341	0	9
Schooling	2916	10.602	2.115	0	15
Age	3055	39.664	14.132	17	89
Age2	3055	1772.8	1254.4	289	7921
Kyrgyz	3055	0.684	0.465	0	1
Religious	2785	0.924	0.266	0	1
Housework	3055	0.24	1.013	0	22
Wage	3055	14.31	30.144	0	348.8
Hourstotal	3055	14.285	20.514	0	70
Rural	3047	0.719	0.45	0	1
East	3055	0.327	0.47	0	1
Affection	2756	7.933	2.09	0	10

Note — (i) schooling indicates the number of years a person has been enrolled in an educational institution.
Source: Kovaleva's estimates using 2019 LIK data.

Empirical results

The earnings of women who did not work outside the home are set to zero in the observations used for the regressions in Table 3 of women's pay on 13 independent factors. A Tobit model is employed since the dependent variable is not normally distributed (70 % of the salaries are reported to be zero). The model explained about 10 % of the total pay variation across households.

Of the eight variables that test the patrilocality hypothesis, four are consistent with it and four are not. Statistical significance is measured at the 10 % level. Key conclusions include:

1. A woman who almost certainly lives with her husband's family does not make less money than other wives, according to the statistically insignificant *Move* coefficient. Thus women in patrilocal households might still be able to innovate outside the home, which runs counter to the patrilocality concept.

2. Because *Loved* is statistically insignificant, a woman in a love marriage does not make more money than other women. This contradicts the theory of patrilocality, which implies that a woman with some control in her marriage would choose to earn more money on her own. However, innovation in household decision-making might still be present in other forms, such as flexible work arrangements.

3. The *Love* coefficient is statistically insignificant; a woman who believes that a love marriage is less taxing for the wife than an arranged marriage does not earn more than other women. Even a poor woman may favour a love marriage because she thinks it could boost her income or values things other than money. In terms of innovation, this reflects how social norms influence women's economic participation.

4. The *Kyrgyz* ethnic group does not lower wages. Therefore, even if traditional practices are incompatible with a contemporary economy, they do not always impact women's earnings. However, wages are lower when the husband is the decision maker in the house, as indicated by the negative and statistically significant *Decision* coefficient. This could mean that husbands deny their wives' work opportunities or restrict their freedom to earn or innovate.

5. *Religious* women earn lower wages in the OLS model (the coefficient is statistically significant and negative). This is consistent with the patrilocality hypothesis, which holds that cultural beliefs affect how much the wife works outside the home. Lower income for religious women may also indicate fewer opportunities for entrepreneurship or innovation.

6. Each additional year of work as a housewife (*Housework*) lowers the wife's wage. This is consistent with the patrilocality hypothesis. It also suggests that time spent on housework reduces innovation by women.

7. Each additional child or grandchild under age 6 (*Children under 6*) lowers the woman's wage. This is consistent with the patrilocality hypothesis, but with others as well. The caregiving burden limits women's engagement in outside work, which could otherwise foster innovation.

Male decision-making power, religious feeling, and long-term housework lower the wife's wages. However, co-residence, ethnicity, a nonlove marriage, and belief in a love marriage do not reduce her wages. Overall, cultural and economic factors favour the hypothesis more than marital and location factors do. Importantly, these findings underline how social structures influence women's capacity for innovative work and entrepreneurship.

Results from control variables (that is, independent variables that do not test the patrilocality hypothesis) are mostly unsurprising:

1. The wages are higher in an eastern region (*East*) because this area is farther from ethnic conflicts along the western and southern borders. Higher wages in these regions also reflect increased access to education and technology, fostering women's innovation potential.

2. As anticipated, women's incomes rise with higher education levels (*Schooling*), underscoring the beneficial effect of education on income. Education also gives women the tools they need to be innovative and entrepreneurial.

3. Work experience, which increases salaries at a rate that diminishes over time, is substituted for *Age*. The age-related coefficient is positive, which means experience boosts earnings, and the coefficient on Age^2 is negative, which indicates that this effect gets weaker over time. The adverse effects of ageing may outweigh any benefits for a woman. Alternatively, while experience is still valuable, its marginal benefits may be declining — possibly because there is a limit to the practical knowledge one can acquire. Also, older women with more experience might have greater potential to engage in household innovations or microentrepreneurship.

4. As the *Rural* coefficient is not statistically significant, salaries in rural areas are anticipated to be lower than those in urban areas. Because there are no industrial centers or urban job clusters like factories

and retail establishments in rural areas, one may anticipate lower pay there. This pattern, however, is only seen in OLS regressions, not in Tobit regressions (see Table 3). The primary distinction is that, since the majority of observed wages are zero, the Tobit model views zero wages as a typical value rather than an extreme one. According to the Tobit specification, the frequency of zero wages is comparable in rural and non-rural areas, supporting the idea that rural location has little bearing on earnings.

Table 3. Practical model: OLS and Tobit findings for the earnings and independent variables of married women

Wage	OLS		Tobit	
Love	–.22	(0.725)	–2.829	(0.147)
Loved	–.221	(0.920)	–7.005	(0.334)
Decision	–3.213**	(0.032)	–11.418**	(0.017)
Move	2.643	(0.729)	–21.562	(0.472)
Move*Love	–6.958	(0.260)	–12.03	(0.669)
Move*Loved	–10.506	(0.296)	–19.969	(0.650)
Chores	.739	(0.438)	2.244	(0.446)
Children Under 6	–1.696***	(0.000)	–5.354***	(0.001)
Schooling	2.273***	(0.000)	6.926***	(0.000)
Age	2.243***	(0.000)	11.205***	(0.000)
Age2	–.025***	(0.000)	–.126***	(0.000)
Kyrgyz	–1.386	(0.279)	–2.263	(0.572)
Religious	-4.248*	(0.076)	–8.853	(0.195)
Housework	–2.804***	(0.000)	–24.156***	(0.000)
Rural	–3.595***	(0.007)	–5.241	(0.203)
East	6.305***	(0.000)	15.311***	(0.000)
Constant	–45.077***	(0.000)	–315.769***	(0.000)
Sigma			71.546	
N	2682		2682	
Left-centered			1894	
R^2	0.1116***	(0.000)		
Pseudo R^2			0.0379***	(0.000)
Log likelihood			–5287.0887	

*Note — (i) only married females. (ii) Parentheses surround standard errors. * p<0.1; ** p<0.05; *** p<0.01.*
Source: Kovaleva's estimates using 2019 LIK data.

With a higher Adjusted R-squared, Table 4 represents a stronger but more condensed model. The percentage of people with no income has dropped from 70 % to 62 %, and the dataset is less than a fifth the size of that in Table 3. Every variable in this model is highly statistically significant at the 1 % level, with the exception of *Kyrgyz* ethnicity and *Religious*. At the 6 % level, the *Religious* variable is moderately significant. One finding defies previous conclusions: women in love marriages now earn more than predicted income, as indicated by the positive *Loved* coefficient.

Table 4. Practical model that is more robust and slimmer than Table 3: Tobit and OLS findings

Wage	OLS		Tobit	
Loved	13.177***	(0.002)	37.603***	(0.009)
Years of marriage	.877***	(0.000)	4.242***	(0.000)
Children Under 6	–3.642***	(0.000)	–18.748***	(0.000)
Schooling	2.297***	(0.000)	7.0***	(0.000)
Age	2.607***	(0.000)	11.679***	(0.000)
Age^2	–.0356***	(0.000)	–.163***	(0.000)
Kyrgyz	–6.329***	(0.004)	–8.071	(0.388)
Religious	14.857***	(0.007)	37.885*	(0.062)
Housework	–2.23***	(0.000)	–21.962***	(0.000)
East	8.799***	(0.000)	21.681***	(0.009)
Constant	–68.652***	(0.000)	–346.066***	(0.000)
Sigma			59.254	
N	576		576	
Left-centered			452	
R^2	0.2477***	(0.000)		
Pseudo R^2			0.1066***	(0.000)
Log likelihood			–807.36148	

*Note — (i) only married females. (ii) Standard errors are in parentheses. * p<0.1; ** p<0.05; *** p<0.01.*
Source: Kovaleva's estimates made by the author using 2019 LIK data.

A comparison of Table 4 to Table 3 yields several new findings.

1. A woman's earnings increase with the length of her marriage. This could be because her negotiating position strengthens over time (the positive coefficient on *Years of Marriage*). Kolpashnikova and Kan (2020) emphasize the importance of marital bargaining to determining how family duties and labour are divided. This improved bargaining power may allow women to explore innovative economic activities.

2. Interestingly, the strength of women's religious devotion is associated with their wages. All else equal, greater religious commitment may be a function of higher levels of self-discipline, which could positively impact productivity, earnings and innovation potential.

3. The OLS model's coefficients have the same signs and statistical significance as in the Tobit model (see Table 4). The only exception is that the Kyrgyz ethnicity is negative and significant in the OLS model.

This model generally supports the patrilocality hypothesis more consistently than the first one. This suggests that patrilocality matters but is not comprehensive in its effects. The low R-squared and pseudo-R-squared values buttress this conclusion.

A final prediction of the theoretical model is that housework decreases the wife's affection for her husband. Table 5 calculates the elasticity. Although a negative elasticity was predicted, it is positive, perhaps because a more loving wife is more inclined to help out around the house. The wife's willingness to perform household chores (*Ln Chores*) improves by 0.1 % for every 1 % increase in attachment. A longer marriage (*Years of marriage*) may decrease her affection, as may living with her husband's family (*Move*).

Table 5. Elasticity of affection concerning housework

Ln Affection	OLS	
Ln Chores	.105***	(0.008)
Loved	.0595	(0.296)
Decision	.0194	(0.541)
Move	–.497***	(0.003)
Years of marriage	–.006***	(0.000)
Rural	–.077***	(0.003)
Constant	2.048***	(0.000)
N	563	
R^2	0.0785***	(0.000)
*Note — (i) only married females. (ii) Parentheses surround standard errors. * p<0.1; ** p<0.05; *** p<0.01.* *Source: Kovaleva's estimates made by the author using 2019 LIK data.*		

In interpreting ***Ln Affection***, the authors evaluated the wife's level of happiness with her life via her answers to several questions in a survey. Of course, her happiness may depend on nonmarital factors as well as marital ones. A rural location may decrease her happiness.

Table 5 highlights how affection and shared responsibilities may foster a cooperative environment where women can innovate household practices.

Policy recommendations

The analysis suggests several policy recommendations to foster an environment conducive to gender equity and economic innovation. First, the government could develop educational programs that raise awareness about gender roles and the economic benefits of gender equity, based on Chen and Mace's (2023) insights into cultural constraints women face in patrilocal arrangements. Furthermore, the curriculum should be reformed to include gender studies and innovation to show the role of women in economic development. This would support the findings of Kolpashnikova and Kan (2020) on cultural expectations and their impact on labour allocation.

Second, grants and subsidies should be created for female entrepreneurs, especially in rural areas where traditional norms are more likely to prevail (Landmann, Seitz, & Steiner, 2018). Encourage microfinance and credit for women starting or growing businesses, and make sure that these financial products address the special needs arising from women's household duties.

Third, enforce laws prohibiting discrimination based on gender, specifically on issues of pay and job availability. Moreno-Colom (2017) notes that employment does not guarantee equal gender equality for women. Encourage technological enhancements that enable work from home, flexible working hours, and part-time work. This would help women to balance work and household responsibilities.

Fourth, promote and invest in labour-saving home technologies that reduce the time women and other caregivers spend on household chores so they can devote more time to earning an income. This would be a

positive effect of technological advancements in reducing gender-based labour disparities. Promote community-based projects that provide shared resources for domestic tasks, such as community laundries and childcare cooperatives.

The government could also partner with local community leaders and influencers to change cultural norms restricting women's economic participation. Kolpashnikova (2018) discusses the challenges that women face in traditional societies. Media campaigns could inspire young girls by celebrating women's achievements in the workforce and as innovators.

Periodically review gender-related policies to address the barriers to women's economic participation and innovation.

Support initiatives that enable rural women in community decisions. Encourage women's networks and associations to support and mentor women and advocate for their rights and market participation.

Finally, offer accessible and quality childcare options to enable women to work and become entrepreneurs. To help women manage work and family responsibilities, promote partnership with the private sector for workplace childcare facilities.

Based on recent studies and empirical evidence, one can conclude that these policy initiatives can eliminate socio-cultural and economic barriers preventing women from participating fully in the economy and innovating. They can also promote gender equality and economic growth in a culturally sensitive and effective way.

Limitations

This study has limitations due to data constraints and methodological issues. The cross-sectional data from a single country limits the ability to make causal inferences about other patrilocal contexts. "Innovation" and "economic participation" are hard to measure. Furthermore, the analysis assumes cultural homogeneity within Kyrgyzstan and does not analyze in detail regional differences or dynamics of change in household arrangements and gender roles.

Future research could benefit from longitudinal studies to understand causality and changes over time, and incorporate qualitative methodologies to enrich the understanding of cultural impacts on labour dynamics. The geographical scope could be expanded to include more countries with patrilocal traditions to increase the generalizability of the findings. Moreover, analyzing male and female roles within household structures might give a more comprehensive view of the interplay between gender, culture and economic participation.

Conclusion

The authors supported the current hypothesis with their previous research, which showed that household responsibilities and cultural norms limit women's economic and innovative capabilities in Kyrgyzstan (Kovaleva, Taylor, Pech, & Madumarov, 2025). Authors observed that the patrilocality hypothesis, which holds that living with the man's family makes the woman do more housework, is supported by the voluntary-marriage hypothesis, which asserts that women are likely to shoulder a greater share of domestic work in marriages they did not fully authorize.

Current empirical findings present a more nuanced picture. The patrilocality theory is refuted by the fact that women who reside with their spouse's family do not earn less money outside the home. However, the patrilocality notion is indirectly supported by the fact that women who spend more time on housekeeping earn less money outside the home. To build on these findings, future work should mitigate simultaneity bias by using lagged independent variables in the analysis to estimate causal effects more accurately. Future research should also examine how changes in cultural expectations and household structures affect economic outcomes and women's ability to engage in innovative and entrepreneurial activities, which can help develop society and the economy.

Across all models, compulsory marriage and patrilocality have a limited impact on determining a wife's wages and household responsibilities**.** However, the findings highlight the potential for household-level innovations, such as more equitable labour division and increased educational attainment, to enhance women's economic participation. As the broader literature consistently highlights, education and geographic location remain the most influential factors affecting women outside wages, shaping the division of household labour (Kovaleva, Taylor, Pech, & Madumarov, 2025). These findings show that family dynamics and socio-economic factors are intricately linked. Individual and couple-specific characteristics evolve, leading to changes in labour division.

Our last questions may be the most relevant: What difference does the type of marriage make? How does it influence a wife's labour allocation and opportunities to innovate? The initial labour division is primarily driven by expectations rooted in cultural norms. In cultures that expect women to spend most of their time on household duties, women are less likely to work in other occupations or start their own businesses. However, marriage can change over time. For example, after gaining experience in the outside world or negotiating more say in the family, the wife may move to a more active economic and innovative role.

The findings suggest two interesting paradoxes:

The productivity paradox: Although the number of hours worked decreases when a woman lives with her husband's family, her income does not always decrease. This makes it appear that wages may be more a function of productivity as well as personal traits like education and ethnicity than the household situation. In other words, the family environment may affect how much she works, but not how much she earns. This could suggest unrealized potential for innovation under the headings of household duties and economic activities.

The decision-making paradox: The husband takes control of home decisions, and his wife's working hours rise, but her wages drop dramatically, despite completing such chores as picking up her children from school and managing the household. She accepts long working hours and low wages without asking for better working conditions. Such factors are linked to intra-household power dynamics and hinder women as innovators.

Although patrilocality and marital arrangements may not directly determine women's economic outcomes, they bear on household labour dynamics. According to the findings, improvements in the home, such as collaborative decision-making, flexible work schedules, and easier access to education, may enhance women's overall well-being and engagement in the labour market.

In summary, the study partly confirmed the patrilocality hypothesis. The hypothesis predicts that living with the husband's family, or in a patrilocal household, is linked to lower incomes. But the study did not confirm his. On the other hand, lower earnings were indeed linked to childcare responsibilities (*Children under 6*), male decision-making authority (*Decision*), and home labor (*Housework*). The overall results support the broader theoretical logic of the patrilocality hypothesis: cultural and household dynamics restrict women's economic participation and innovation, even if co-residence with in-laws alone is not the direct cause.

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