

## Gender differences, risk attitude and entrepreneurship in Kyrgyzstan

Razia Abdieva\* • Burulcha Sulaimanova • Kamalbek Karymshakov

*Kyrgyz-Turkish Manas University, Kyrgyzstan*

*Received: 2 July 2018*

*Revised: 21 December 2018*

*Accepted: 12 January 2019*

---

### Abstract

This study analyses the role of risk attitude for entrepreneurship by gender differences in Kyrgyzstan. Logit analysis is applied to the cross-sectional data set drawn from the nationally representative survey for 2011. Entrepreneurship is measured by the self-employment activities and analysed by the agricultural and non-agricultural sample. Results of the study show that more risk-taking preferences are associated with higher entrepreneurship probability. However, this effect is not persistent for women in further estimations for non-agricultural entrepreneurship sample, while for men higher positive effect of risk loving behavior remains in off-farm self-employment too. These findings underline the existing difference in risk tolerance by gender in non-agricultural employment. Movement of women from farm to off-farm entrepreneurship may not necessarily require risk loving characteristics. However, further analysis of this difference should take into account potential difference of necessity and opportunity entrepreneurs by gender.

*Keywords:* risk attitude; entrepreneurship; probit analysis; woman entrepreneurship; gender difference

*JEL Classification Codes:* J16, D81, D21, L26, D90

---

### 1. Introduction

Economic development requires development of entrepreneurship activity in economy. Along with such measures as strengthening legislature for private property rights or development of financial and other infrastructure, individual behavioral characteristics and perceptions are important for self-employment propensity of individuals (Bosma et. al., 2018; Miniti, 2010).

---

\* Corresponding author. E-mail: razia.abdieva@manas.edu.kg.

Citation: Abdieva, R., Sulaimanova, B., and Karymshakov, K. (2019) Gender differences, risk attitude and entrepreneurship in Kyrgyzstan, *Economics and Business Letters*, 8(1), 17-30.

DOI: 10.17811/eb1.8.1.2019.17-30

Previous version of this paper was presented in 9th International Conference on Eurasian Economies, 2017, 5-7 October, Bishkek, Kyrgyzstan.

Among these behavioral features empirical studies indicate that risk attitude of individuals is important factor for entrepreneurship choice (Hvide and Panos, 2013; Ekelund et al., 2005; Wagner, 2003). Moreover, majority of the papers revealed gender differentials in risk aversion behavior of individuals. In particular, it is asserted that women are more risk averse than men (Bruce and Johnson, 1994; Eckel and Grossman, 2008; Al-Ajmi, 2011).

Kyrgyzstan as one of the transition economies represents interesting case for the study of women entrepreneurship. Comprehensive economic reforms towards market economy since the beginning of 1990s required emergence of the entrepreneurial group of population. On the other hand, increasing women labor force participation is important for labor productivity increase.

Current labor market statistics of Kyrgyzstan indicate the gender gap. Thus, the level of employment of women is 45.6 per cent, while of men 69.7 per cent. Share of woman workers are high in service sector as real estate transactions (89.2%), hotel and restaurants activities (64 %), education (78,6 %) and healthcare (83.3 %). In agriculture 44.5% of workers were women and 55,5 % were men in 2014(National Statistic Committee, 2015: 51-58). Along with this heads of 29.4 % of small business, 34% of medium enterprises and 30% of large business entities were women in 2014 (National Statistic Committee, 2015: 63).

Despite these stylized facts on gender misbalances in the labor market, studies analyzing these issues in Kyrgyzstan context are limited. Among them the survey by Hasanov et al. (2009) on business environment for women's entrepreneurship in Kyrgyzstan, indicated that the major reasons for women deciding to start up an SME are: a need for self-fulfillment, self-sufficiency and independence (42 per cent), to give the opportunity to manage profitable business (39 per cent) and the possibility to choose a working schedule (23 per cent). At the same time 16 per cent of the woman entrepreneurs interviewed stated that their reasons for choosing SME was a need for money; another 6 per cent attributed it the loss of previous source of income, while 4 per cent have started entrepreneurial activity due to failure to find a new job (Hasanov etc., 2009: 9). In general important obstacles for women's entrepreneurship in Kyrgyzstan can be summarized as follows: inadequate government support and administrative barriers, traditional treatment of the role of women, education, access to financial resources and gender-based discrimination (Kapalova, 2014: 21; Hasanov etc., 2009: 14).

However, these analysis are mostly based on sociological or questionnaire based approaches, while economic literature with empirical studies is scarce. Following the other empirical studies in the relevant literature on general topic of women entrepreneurship, it is of particular interest to study the risk tolerance effect on the women entrepreneurship. The aim of this paper is to analyze the effect of risk tolerance by gender on the choice of entrepreneurship in the specific case of Kyrgyzstan. To our best knowledge this is the first study investigating the relationship between risk attitude and entrepreneurship in Kyrgyzstan context.

This study draws on the nationally representative cross-sectional data, where based on subjective evaluation of respondents the risk tolerance of individuals is measured. Binary response logit models are applied for empirical estimation.

The paper is structured as follows. The next section includes literature review on risk tolerance and entrepreneurship, taking into account gender differentials. Section three discusses empirical methodology. Following three section provide with the data and summary statistics, estimation results and, finally, concludes.

## 2. Literature review

More risk lovers are more likely to choose entrepreneurship than wage employment. According to some theoretical and empirical studies (Wagner, 2003; Ekelund et al., 2005) entrepreneurship requires making risky decisions in an uncertain environment. So only those persons who are able to bear higher risks may start as an entrepreneur. From this point of view, the risk attitude

of a person is one of the crucial variables in a person's choice between entrepreneurship and a salaried job (Caliendo et al, 2006).

Guiso and Paiella (2004) find that less risk averse individuals are more likely to be self-employed. Also several other empirical studies revealed that more risk lover men more inclined to be engaged in entrepreneurship as self-employed (Hartog et al., 2002; Guiso and Paiella, 2004; Ekelund et al., 2005; Dohmen et al., 2005; Kan and Tsai, 2006; Cho, 2011). On the other hand, some studies found mixed results related the effect of risk attitude of individuals on the choice of entrepreneurship. Rosen and Willen (2002) came to conclusion that risk attitude is not a dominant factor in his/her decision to start an own business. Cramer et al. (2002) too could not be confident enough to conclude that there is causality link between risk aversion and entrepreneurial selection of individual. Also, Blanchflower and Oswald (1998) found positive correlation between the wealth status of a person and his/her risk attitude. Block et al. (2015) argue that the risk attitudes of opportunity and necessity entrepreneurs are different. Opportunity entrepreneurs are more willing to take risks than necessity entrepreneurs.

Along with this, rural-urban location differences may have reflections in entrepreneurial activities of individuals. Yu and Artz (2018) argue that individuals in rural area are more have higher probability of becoming entrepreneur compared to their peers in urban area. However, returns to entrepreneurship skills in rural part are lower than in urban places. Following these findings it is interesting to investigate if this difference in return has implication for sectoral allocation of entrepreneurship, such as agriculture and non-agriculture. Because in most of the developing countries in rural area agriculture is the main sector of employment. From the long-run economic development standpoint off-farm entrepreneurship of women is one of the economic challenges for women empowerment.

Yu and Artz (2018) investigated entrepreneurship and location choices among college-educated persons in USA. Results of double selection model showed that rural location choice is strongly associated with growing up in rural hometown. Individuals whose parents are entrepreneurs are more likely to choose entrepreneurship themselves. Also, results showed that older alumni are more likely to be entrepreneurs and men too are more likely to be entrepreneurs than women. Being married too is positively related with being entrepreneur. Individuals who have more diversified work experience too more likely to live in rural areas and start a business. At the same time estimations showed that individuals are more likely to start a business in rural areas but more likely to seek wage employment in urban areas. Estimations of earning regressions revealed that rural entrepreneurs earn more than rural workers but less those urban entrepreneurs.

There are several studies focusing risk attitude and gender relationship in Kyrgyzstan case. Çağlayan and Abdieva (2014) investigated risk tolerance of individual investors in Kyrgyzstan case. Using multinomial logit model they found that men are more risk lovers than women in Kyrgyzstan. When the age increases people become less risk lover. Having non-wage income increases taking risk and increases in the rate of investment. The findings also indicate that income has a positive effect on the risk tolerance. Abdieva et al. (2015) analyzing the determinants of the risk tolerance in Kyrgyzstan, indicated that in general individuals at older ages are more risk averse, along with this men more willing to take risk. Increasing income and education level has a positive effect on the risk taking decision of the individual. The regional distribution of risk tolerance of individuals shows that individuals living in rural areas and in south region are more likely to be in risk-averse category. Results of study by Esenaliev and Anderson (2015) on gender wage gap in Kyrgyzstan showed that the level of gender wage gap is 24-30%, and risk attitude is used as one of the possible factors for explaining this.

Although these studies explore empirical evidence on risk attitude by gender and raise its importance as potential factor for wage earnings differentials, to our best knowledge studies did

not focus on the risk attitude and entrepreneurship activities by gender in case of Kyrgyzstan. This paper aims to fill this gap.

### 3. Methodology

The decision of individual to be entrepreneur has binary response character, which calls for using binary response Logit models, which are conditional on individual and household characteristics. Formally, model is given below (Wooldridge, 2005):

$$P(y_i = 1|x_i) = G(\beta_0 + \beta_1x_1 + \dots + \beta_kx_k) = G(\beta_0 + x\beta) \quad (4)$$

$$G(z) = \frac{\exp(z)}{[1 + \exp(z)]} = \Lambda(z) \quad (5)$$

where  $G$  is the logistic function.  $y_i$  is the discrete dependent variable, taking values of zero or one, showing the probability of individual to be entrepreneur;  $x_i$  is the vector of variables at individual level, which includes individual's age, marital status and education level and household levels variables, which includes household composition, expenditure level, regional characteristics (for detailed description of variables see Table A1 in Appendix A).

Occupational choices of individuals are based on their employment status given in the questionnaire. It should be noted that in this paper entrepreneurship is measured in a broad sense and those who indicate their wage employment as the own-account worker are grouped as the entrepreneurs. However, this broad definition of entrepreneurship may give biased results, since in most of the developing countries not all own-account working activities can be considered as entrepreneurship. As Karymshakov et al. (2016) note in Kyrgyzstan members of household who own land are mostly considered as own-account workers. In this case it appears that even if individuals just work as family worker in agriculture with low productivity, they may be considered as own-account workers. Therefore, working in agriculture as own-account worker may not have characteristics of entrepreneurs. This fact raises the necessity for measurement of entrepreneurship in in-farm and off-farm sector. Following this issue we estimate the model by agriculture and non-agriculture sector.

In the dataset Life in Kyrgyzstan for 2011 used for this study, there is a special section on subjective well-being of individual, where individual is asked particular question on how they assess their risk tolerance, as person who is fully willing to take risks or a person avoiding taking risks, which is measured from 0 to 10. The answer for this question is taken as the main explanatory variable. From these answers three categories of risk tolerance are formed: risk-averse individuals (from 0 to 3), risk-neutral (from 4 to 6) and risk-lovers (from 7 to 10).

### 4. Data and Descriptive Statistics

In this study the risk attitude and gender behavior impact on entrepreneurial decision is investigated based on the second wave of "Life in Kyrgyz Republic" survey data, which was conducted by DIW Berlin in collaboration of Humboldt University of Berlin, the Center for Social and Economic Research (CASE-Kyrgyz Republic), and the American University of Central Asia (AUCA) in 2011. This survey includes wide range information both on individual and household level and representative at the national level.

The table 1 describes the main individual and household characteristics both for men and women. The total amount of observation is equal to 7 340 individuals between 15-65 ages, where 52.67 % are women. The mean age of sample is 37.51 years, and there is no significant difference in ages between genders. While marital status of women is higher than men, showing that women have more propensities to be married rather than men. The education attainment shows that both men and women more likely to have basic or secondary education, while men more likely to have technical education and women more inclined to have tertiary education.

The risk attitude indicators show that 36.13 % and 20.98 % of men and women count their self as risk lovers respectively, while 23.55 % and 37.35 % of men and women report their self as risk-averse person. Precisely, men more likely to take risk rather than women do.

Table 1. Descriptive statistics.

	Total sample		Men		Women	
	Obs.	%	Obs.	%	Obs.	%
<b>Individual characteristics:</b>						
Age (mean)	7340	37.51	3474	37.35	3866	37.64
Marital status (1=married)	5914	80.57	2666	76.74	3248	84.01
Education level:						
- Basic or secondary	4752	64.74	2258	65.00	2494	64.51
- Technical	1299	17.70	664	19.11	635	16.43
- Tertiary	1253	17.07	533	15.34	720	18.62
Risk attitude:						
- Risk lover	2066	28.15	1255	36.13	811	20.98
- Risk neutral	3010	41.01	1401	40.33	1609	41.62
- Risk averse	2262	30.82	818	23.55	1444	37.35
<b>Household characteristics:</b>						
Household size (mean)	-	5.3609	-	5.3972	-	5.3282
Children ratio (0-5 years) (mean)	-	0.1120	-	0.1113	-	0.1125
Expenditure per capita (mean)	-	38 363.1	-	37 768.4	-	38 897.5
Residence (1=rural)	45594	62.59	2229	64.16	2365	61.17
Regions:						
- North	1143	15.57	555	15.98	588	15.21
- South	3647	49.69	1717	49.42	1930	49.92
- Central	2550	34.74	1202	34.60	1348	34.87

Source: LIK 2011 data.

The household characteristics do not display gender differences, and in general the average household size consist of 5 people, the ratio of children in the household with respect to household size is around 0.11 and total expenditure per capita in household is around 38 thousand soms. More than half of individuals reside in rural areas and most of observation comes from south regions, which are highly populated.

## 5. Estimation results

The estimation results for entrepreneurial decision of the individual are given in the Table 2. Almost all estimated parameters have expected signs. The primary variable of interest, the impact of risk attitude of individual on decision to be entrepreneur shows that risk lovers more likely to be self-employed. This finding is in line with results by Guiso and Paiella (2004). There is significant gender difference on impact of risk attitude on labor supply decision. Thus, risk-lover women more likely to be entrepreneur, but this effect are not significant in further estimations by agricultural and non-agricultural samples. Women with risk averse preferences have less probability to be entrepreneur in non-agricultural sector. Interestingly, risk effect for men is more evident in non-agricultural sector. Risk lover men show higher probability to be entrepreneur in non-agricultural sector, while in agricultural sector it shows negative effect. Moreover, the risk averse preferences have less negative effect for off-farm entrepreneurship for men.

There is statistically significant impact of age on the individuals' decision to engage in entrepreneurial activities, thus with increase of age individual more likely to be entrepreneur, how-

ever after definite ages this probability decreases. Generally marital status of individual is positively correlated with decision to be entrepreneur, while there is no significance of marital status on entrepreneurs working in agricultural sector, especially if they are women. The educational level of individual shows that, with higher education individuals more likely to be working in other occupation types. While having technical or tertiary education does not present any impact on decision of individual to be self-employed in agricultural sector.

Table 2. Logit estimation results for Entrepreneurship (marginal effect estimates) – Total sample.

	Total sample		
	Total	Men	Women
<b>Individual characteristics</b>			
Age	0.04***	0.061***	0.021***
Age squared	-0.0005***	-0.0007***	-0.0002***
Marital status (1=married)	0.045***	0.132***	0.030**
Education level:			
- Technical	-0.015	-0.063***	0.003
- Tertiary	-0.078***	-0.136***	-0.026***
<b>Household characteristics</b>			
Household size	0.002	-0.002	0.003
Children ratio (0-5 years)	0.032	0.126**	-0.068**
Expenditure per capita	0.015	0.012	0.019**
Residence (1=rural)	0.049***	0.109***	-0.003
Regions:			
- North	0.010***	0.243***	0.012
- South	0.058***	0.102***	0.025**
Risk attitude:			
- Risk lover	0.055***	0.015	0.025**
- Risk averse	-0.065***	-0.073***	-0.024***
No. of Obs.	7340	3474	3866
LR chi2	740.4***	621.7***	188.9***
AIC	6772.66	3863.91	2117.84
BIC	6869.28	3950.05	2205.47
Log likelihood	-3372.33	-1917.95	-1044.91
Pseudo R2	0.0989	0.1395	0.0829

Note: \*, \*\* and \*\*\* show statistical significance at the 10, 5 and 1% level, respectively. For coefficient estimates of the models see the table in Appendix A, Table A2.

The household composition has twofold impact on entrepreneurship. While the size of household does not influence the entrepreneurship, the ratio of children (0-5 years) with respect to the total size of household size impacts the decision of individuals of men and women differently. Hence with increase of children ratio the probability of men to be self-employed is increasing, while for women is decreasing.

The per capita expenditure level of household has significant influence on individual decision to be entrepreneur in non-agricultural sector and general positive correlation with women decision to engage in self-employment both in agricultural and non-agricultural sectors. These results are consistent with findings of Blanchflower and Oswald (1998) where they found positive correlation between risk attitude and the wealth status and Çağlayan and Abdieva (2014). The residence of household in rural area is increasing the probability of individual to be self-em-

ployed in agricultural sector rather than in non-agricultural sector. Yu and Artz (2018) too revealed that individuals are more likely to start a business in rural areas. Moreover, the regional characteristics of household show that individuals from north area more likely to be working in own account in agricultural sector, while in south region individuals more likely to conduct their selves to self-employment in non-agricultural sector.

Table 2 (cont.). Logit estimation results for Entrepreneurship (marginal effect estimates) – Agricultural sector.

	Agricultural sector		
	Total	Men	Women
<b>Individual characteristics</b>			
Age	0.054***	0.067***	0.021*
Age squared	-0.0005***	-0.0006***	-0.0002
Marital status (1=married)	0.068	0.146**	0.088
Education level:			
- Technical	0.068	0.015	0.015
- Tertiary	0.068	-0.007	0.051
<b>Household characteristics</b>			
Household size	-0.001	-0.018*	0.005
Children ratio (0-5 years)	0.337***	0.324**	-0.067
Expenditure per capita	0.042	0.28	0.088**
Residence (1=rural)	0.168***	0.178*	0.059
Regions:			
- North	0.193***	0.255***	0.083
- South	-0.008	0.140***	-0.017
Risk attitude:			
- Risk lover	-0.010	-0.121***	0.050
- Risk averse	-0.083**	-0.109**	-0.025
No. of Obs.	1603	1025	578
LR chi2	291.7***	324.9***	37.1***
AIC	1958.36	1020.47	586.62
BIC	2033.68	1089.52	647.654
Log likelihood	-965.18	-496.23	-279.31
Pseudo R2	0.1313	0.2467	0.0624

Note: \*,\*\* and \*\*\* show statistical significance at the 10, 5 and 1% level, respectively. For coefficient estimates of the models see the table in Appendix A, Table A2.

## 6. Conclusion

Development of entrepreneurship activities for developing countries is the important long-term objectives, which may depend on many factors ranging from government policies to other social norms. In a developing country context, development of entrepreneurial activities may increase women labor force participation. Moreover, it may decrease their employment in non-traditional sectors of economy. In particular, difference in productivity of labor in agricultural and non-agricultural employment, raises the significance of the latter for policy making. Therefore, women entrepreneurship in non-agricultural sector may enhance women empowerment. However, along with other institutional factors, individual risk-tolerance characteristics are fundamental for carrying out entrepreneurial activities.

The study of risk tolerance and entrepreneurial activities by women in transition economies received less attention in the economic literature. Given this empirical gap, the objective of this paper was to study the impact of risk tolerance over the entrepreneurship by focusing on the

gender and non-agricultural sector of employment. This study applied binary response techniques on the large nationally representative cross-sectional data. In general, estimation results showed that individual preferences for taking more risk have positive effect over the entrepreneurship. However, further estimations by gender and non-agricultural sector revealed that women entrepreneurship in off-farm sectors is not associated with risk loving behavior. However, the effect of risk loving over the entrepreneurship remains in non-agricultural sector for men. Diverging effects of risk lover status over the entrepreneurship by gender underlines the potential difference in necessity and opportunity entrepreneurs. The non-significance of risk-loving characteristics over the women in off-farm sector may indicate that these women are necessity entrepreneurs, while men may demonstrate more opportunity entrepreneurial characteristics. However, the main limitation of this study is that it does not provide with enough evidence on the difference by risk tolerance by opportunity and necessity entrepreneurship. This can be the topic for further research.

Table 2 (cont.). Logit estimation results for Entrepreneurship (marginal effect estimates) – Non-agricultural sector.

	Non-agricultural sector		
	Total	Men	Women
<b>Individual characteristics</b>			
Age	0.028***	0.038***	0.016***
Age squared	-0.0003***	-0.0004***	-0.0001***
Marital status (1=married)	0.036***	0.095***	0.019*
Education level:			
- Technical	-0.001	-0.0312*	0.11
- Tertiary	-0.044***	-0.080***	-0.014*
<b>Household characteristics</b>			
Household size	0.006***	0.008*	0.004**
Children ratio (0-5 years)	0.014	0.0960*	-0.050*
Expenditure per capita	0.035***	0.058***	0.016**
Residence (1=rural)	-0.034***	-0.041**	-0.020***
Regions:			
- North	-0.009	0.031	-0.009
- South	0.048***	0.088***	0.015*
Risk attitude:			
- Risk lover	0.043***	0.046**	0.010
- Risk averse	-0.042***	-0.0411**	-0.021***
No. of Obs.	5737	2449	3288
LR chi2	376.90***	213.10***	155.68***
AIC	3996.96	2320.84	1450.06
BIC	4090.13	2402.09	1535.44
Log likelihood	-1984.48	-1146.42	-711.03
Pseudo R2	0.0867	0.0850	0.0987

Note: \*,\*\* and \*\*\* show statistical significance at the 10, 5 and 1% level, respectively. For coefficient estimates of the models see the table in Appendix A, Table A2.

Thus, although risk tolerance important for entrepreneurship, this effect may not be strong through all sector of employment and among men and women. Especially these results suggest that agricultural and non-agricultural measurement of entrepreneurial activities should be taken into account in order to have the true picture of entrepreneurship. For more comprehensive exploration of the relationship between risk tolerance and entrepreneurship further studies may



test the reverse causality – changes in risk preferences after being entrepreneur.

Findings of this paper to some extent underline the fact that women entrepreneurship in off-farm sector of employment in Kyrgyzstan case is limited. Therefore, development of entrepreneurial activities among women in off-farm sector requires in priority government policies oriented supporting women self-employment. One of the directions for policy could be development of entrepreneurial skills through education programs and other activities, lifting budget constraints through increase of access to financial resources and other actions to decrease gender gap in labor market. These measures should be oriented to support the movement towards opportunity entrepreneurship.

## References

- Abdieva, R., Karymshakov, K. and Sulaimanova, B. (2015) Determinants of Risk Tolerance: Empirical Evidence from Kyrgyzstan, *Annual "Life in Kyrgyzstan" Conference*, 1-2 October 2015, Bishkek
- Ahunov, M. and Yusupov, N. (2017) Risk Attitudes and Entrepreneurial Motivations: Evidence from Transition Economies, *Economic Letters*, 160, 7-11.
- Al-Ajmi, J. Y. (2011) Risk Tolerance of Individual Investors in an Emerging Market, *International Research Journal of Finance and Economics*, 17, 15-26.
- Asian Development Bank (2010) *Situation Analysis: Possibilities and Barriers for Development of Women Entrepreneurship in Villages (RUS)*, Bishkek.
- Astanova S.U. (2017) Status of Women's Entrepreneurship in Rural Areas of Kyrgyzstan, *Economics*, 1(22). Available via <https://economic-theory.com/blizhajshij-nomer/ekonomika-i-upravlenie-narodnym-khozyajstvom/279-sostoyanie-razvitiya-zhenskogo.html>.
- Atkinson, S. M., Baird, S. B. and Frye, M. B. (2003) Do female mutual fund managers manage differently?, *Journal of Financial Research*, 26(1), 1-18.
- Blanchflower, D. and Oswald A. (1998) What makes an Entrepreneur?, *Journal of Labor Economics*, 16, 26–60.
- Block, J., Sandner, P. And Spiegel, F. (2015) How do risk attitudes differ within the group of entrepreneurs? The role of motivation and procedural utility, *Journal of Small Business Management*, 53(1), 183-206.
- Bonin, H., Dohmen, T., Falk, A., Huffman, D. and Sunde, U. (2007) Cross-sectional earnings risk and occupational sorting: The role of risk attitudes, *Labour Economics*, 14, 926–937.
- Bosma, N., Sanders, M. and Stam, E. (2018) Institutions, entrepreneurship, and economic growth in Europe, *Small Business Economics*, in press.
- Brody, L. R. (1993) On understanding gender differences in the expression of emotions. In *Human Feeling: Explorations in Affect Development and Meaning* (ed. S. L. Ablon, D. Brown, E. J. Khantzian and J. E. Mack), 87-121. Hillsdale, N.J.: Analytic Press.
- Bruce, A. and Johnson, J. (1994) Male and female betting behavior: new perspectives, *Journal of Gambling Studies*, 10, 183-98.
- Çağlayan, E. and Abdieva R. (2014) How 's the Risk Tolerance of Individual Investors in Kyrgyzstan?, *Asian Economic and Financial Review*, 4(3), 404-415.
- Caliendo, M., Fossen F. and Kritikos, A. (2006) Risk Attitudes of Nascent Entrepreneurs: New Evidence from an Experimentally-Validated Survey, IZA DP No. 2168, Discussion Paper Series, Institute for the Study of Labor.
- Charness, G. and Gneezy, U. (2012) Strong Evidence for Gender Differences in Risk Taking, *Journal of Economic Behavior & Organization*, 83, 50-58
- Cho, I. S. (2011) Do Gender Differences in Risk Preferences Explain Gender Differences in Labor Supply, Earnings or Occupational Choice? Working Paper No. 11022, December, Iowa State University, Department of Economics.

- Cramer, J., Hartog, J., Jonker, N. and Van Praag C. (2002) Low Risk Aversion encourages the choice for entrepreneurship: an empirical test of a truism, *Journal of Economic Behavior and Organization*, 48, 29–36.
- Croson, R. and Gneezy, U. (2009) Gender Differences in Preferences, *Journal of Economic Literature*, 47, 448-474
- Dohmen, T., Falk, A., Huffman, D. Sunde, U., Schupp, J. and Wagner W. (2005) Individual Risk Attitudes: New Evidence from a Large, Representative, Experimentally-Validated Survey, IZA Discussion Paper, 1730.
- Dohmen, T. and Falk, A. (2005) Performance Pay and Sorting – Productivity, Preferences and Gender, IZA Working Paper.
- Eckel, C. C. and Grossman, P. J. (2008) Forecasting Risk Attitudes: An Experimental Study Using Actual and Forecast Gamble Choices, *Journal of Economic Behavior and Organization*, 68, 1-17
- Ekelund, J., Johansson, E., Jarvelin, M. R., and Lichtermann, D. (2005) Self-Employment and Risk Aversion - Evidence from Psychological Test Data, *Labour Economics*, 12(5), 649–659.
- Charness, G. and Gneezy, U. (2012) Strong Evidence for Gender Differences in Risk Taking, *Journal of Economic Behavior & Organization*, 83, 50-58.
- Guiso, L., and Paiella, M. (2004) The Role of Risk Aversion in Predicting Individual Behavior, CEPR Discussion Paper, 4591.
- Hans K. H. and Georgios A. P. (2013) Risk Tolerance and Entrepreneurship, IZA Discussion Paper No. 7206 February.
- Hartog, J., Ferrer-i-Carbonell, A., and Jonker, N. (2002) Linking Measured Risk Aversion to Individual Characteristics, *Kyklos*, 55, 3-26.
- Hasanov, R., Biybosunova, S. and Hasanova, S. (2009) Assessing the Business Environment for Women’s Entrepreneurship Development in the Kyrgyz Republic, ILO, Subregional Office for Eastern Europe and Central Asia, Moscow.
- Johnson, J. E. and Powell, P. L., (1994) Decision making, risk and gender: are managers different?, *British Journal of Management*, 5(2), 123-138.
- Kan, K. and Tsai, W. (2006) Entrepreneurship and risk aversion, *Small Business Economics*, 26, 465-474.
- Karymshakov, K., Abdieva, R., Sulaimanova, B. and Sultakeev, K. (2016) Remittances impact on youth labour supply: evidence from Kyrgyzstan, 2016-05 No. PEP.
- Minniti, M. (2010). Female entrepreneurship and economic activity, *European Journal of Development Research*, 22(3), 294-312.
- National Statistical Committee of Kyrgyz Republic, (2015) Women and Men in Kyrgyz Republic, 2010-2014 years (in Russian). Available via <http://stat.kg/media/publicationarchive/534f0c98-fb76-4922-b8c1-6b8b8f44ba27.pdf>.
- Najimudinova, S. (2015) Kırgızistan’da Kadın Girişimciliği: Durum Analizi ve Perspektifleri, *Sosyoekonomi*, 23(24), 7-22.
- Niederle, M. and Vesterlund, L. (2007) Do women shy away from competition? Do men compete too much?, *Quarterly Journal of Economics*, 122(3), 1067-1101.
- Rosen, H. and Willen, P. (2002) Risk, Return and Self-employment, Discussion Paper, University of Princeton.
- Soll, J. B. and Klayman, J. (2004) Overconfidence in interval estimates, *Journal of Experimental Psychology: Learning, Memory and Cognition*, 30(2), 299-314.
- Statistics Committee of Kyrgyz Republic, (2017) “Entrepreneurship in Kyrgyz Republic in 2012-2016. Available via <http://www.stat.kg/media/publicationarchive/b8b8c9d3-a7ad-48ac-8d2e-f85d85eb9e9d.pdf>.

- Wagner, J. (2003) The Impact of Personal Characteristics and the Regional Milieu on the Transition from Unemployment to Self-Employment: Empirical Evidence for Germany, *Jahrbuch für National Ökonomie und Statistik*, 223(2), 204–221.
- Wooldridge, J. M. (2005) *Introductory econometrics: a modern approach*, Cincinnati: South-Western College Pub.
- World Bank (2012) Sarosh Sattar, Opportunities for Men and Women: Emerging Europe and Central Asia Women in Entrepreneurship, Chapter three Women Entrepreneurship. Available via <http://siteresources.worldbank.org/ECAEXT/Resources/258598-1322580725430/chReferences>.
- Yu L., and M. Artz (2018) Does rural entrepreneurship pay?, *Small Business Economies*, in press.

## Appendix A – Additional tables

Table A1. Variables definition.

<b>Dependent variable</b>	
<b>Entrepreneurship</b>	1 = individual is self-employed 0 = individual is not self-employed
<b>Explanatory variables:</b>	
<b>Individual characteristics:</b>	
Age	Age (years).
Marital status (1=married)	1= married; 0 = single
<b>Education level:</b>	
- Basic or secondary	1= individual has basic or secondary; 0 = otherwise.
- Technical	1= individual has technical education; 0 = otherwise.
- Tertiary	1= individual has tertiary education; 0 = otherwise.
<b>Risk attitude:</b>	
- Risk lover	1= individual has risk-lover attitude; 0 = otherwise.
- Risk neutral	1= individual has risk-neutral attitude; 0 = otherwise.
- Risk averse	1= individual has risk-averse attitude; 0 = otherwise.
<b>Household characteristics:</b>	
Household size	The total number of household members.
Children ratio (0-5 years)	The ratio of children in household, aged between 0-5 years, with respect to the total size of household.
Expenditure per capita	The per capita expenditure of the household (in logarithm).
Residence (1=rural)	1= the household resides in rural area, 0 = urban area.
<b>Regions:</b>	
- North	1= the household resides in Issyk-Kul, Naryn or Talas oblast, 0 =otherwise.
- South	1= the household resides in Jalal-Abad, Batken or Osh oblast, 0 =otherwise.
- Central	1= the household resides in Chui oblast or Bishkek city, 0 =otherwise.

Table A2. Logit estimation results for Entrepreneurship (coefficient estimates) – Total sample.

	<b>Total sample</b>		
	<b>Total</b>	<b>Men</b>	<b>Women</b>
<b>Individual characteristics</b>			
Age	0.3006*** (0.0202)	0.2900*** (0.0256)	0.3483*** (0.0423)
Age squared	-0.0035*** (0.0002)	-0.0034*** (0.0003)	-0.0042*** (0.0005)
Marital status (1=married)	0.3415*** (0.1251)	0.6773*** (0.1508)	0.5915** (0.2911)
<b>Education level:</b>			
- Technical	-0.1080 (0.0809)	-0.3095*** (0.1046)	0.0558 (0.1546)
- Tertiary	-0.6232*** (0.0956)	-0.7199*** (0.1220)	-0.4950*** (0.1790)
<b>Household characteristics</b>			
Household size	0.0127 (0.0184)	-0.0119 (0.0236)	0.0491 (0.0370)
Children ratio (0-5 years)	0.2255 (0.2354)	0.5974** (0.3025)	-1.1282** (0.5171)
Expenditure per capita	0.1025 (0.0692)	0.0579 (0.0893)	0.3158** (0.1325)

<i>Residence (1=rural)</i>	0.3496*** (0.0732)	0.5357*** (0.0935)	-0.0446 (0.1367)
<i>Regions:</i>			
- North	0.6099*** (0.1003)	1.0488*** (0.1299)	0.1932 (0.2051)
- South	0.4028*** (0.0851)	0.4843*** (0.1066)	0.4137** (0.1648)
<i>Risk attitude:</i>			
- Risk lover	0.3639*** (0.0718)	0.0725 (0.0917)	0.3780*** (0.1437)
- Risk averse	-0.4850*** (0.0787)	-0.3616*** (0.1040)	-0.4116*** (0.1451)
<i>Constant</i>	-9.05*** (0.8929)	-8.03*** (1.1425)	-13.05*** (1.7696)
<i>No. of Obs.</i>	7340	3474	3866
<i>LR chi2</i>	740.4***	621.7***	188.9***
<i>Log likelihood</i>	-3372.33	-1917.95	-1044.91
<i>Pseudo R2</i>	0.0989	0.1395	0.0829

Note: \*, \*\* and \*\*\* show statistical significance at the 10, 5 and 1% level, respectively. For margin estimates of the models see the Table 2.

Table A2 (cont). Logit estimation results for Entrepreneurship (coefficient estimates) – Agricultural sector.

	Agricultural sector		
	Total	Men	Women
<b>Individual characteristics</b>			
<i>Age</i>	0.2176*** (0.0371)	0.3173*** (0.0525)	0.1387* (0.0740)
<i>Age squared</i>	-0.002*** (0.0004)	-0.0031*** (0.0006)	-0.0014 (0.0009)
<i>Marital status (1=married)</i>	0.2759 (0.2269)	0.6457** (0.2712)	0.6894 (0.6128)
<i>Education level:</i>			
- Technical	0.2733 (0.1731)	0.0715 (0.2475)	0.0978 (0.3702)
- Tertiary	0.2724 (0.2449)	-0.0328 (0.3401)	0.3082 (0.5063)
<b>Household characteristics</b>			
<i>Household size</i>	-0.0066 (0.0342)	-0.0841* (0.0472)	0.0341 (0.0712)
<i>Children ratio (0-5 years)</i>	1.3477*** (0.4623)	1.5249** (0.6555)	-0.4413 (0.9640)
<i>Expenditure per capita</i>	0.1684 (0.1317)	0.1346 (0.1866)	0.5791** (0.2603)
<i>Residence (1=rural)</i>	0.7038** (0.2766)	0.7611* (0.3923)	0.4379 (0.5167)
<i>Regions:</i>			
- North	0.7862*** (0.1983)	1.3633*** (0.2641)	0.4951 (0.4380)
- South	-0.0316 (0.1738)	0.6575*** (0.2281)	-0.1067 (0.3912)
<i>Risk attitude:</i>			
- Risk lover	-0.0415 (0.1293)	-0.5595*** (0.1842)	0.3143 (0.2534)
- Risk averse	-0.3340** (0.1420)	-0.4878** (0.2156)	-0.1667 (0.2683)

<i>Constant</i>	-7.82*** (1.7044)	-8.93*** (2.4115)	-11.43*** (3.4220)
<i>No. of Obs.</i>	1603	1025	578
<i>LR chi2</i>	291.7***	324.9***	37.1***
<i>Log likelihood</i>	-965.18	-496.23	-279.31
<i>Pseudo R2</i>	0.1313	0.2467	0.0624

Note: \*, \*\* and \*\*\* show statistical significance at the 10, 5 and 1% level, respectively. For margin estimates of the models see the Table 2.

Table A2 (cont). Logit estimation results for Entrepreneurship (coefficient estimates) – Non-agricultural sector

	Agricultural sector		
	Total	Men	Women
<b>Individual characteristics</b>			
<i>Age</i>	0.3062*** (0.0280)	0.2558*** (0.0349)	0.3928*** (0.0541)
<i>Age squared</i>	-0.0037*** (0.0003)	-0.0032*** (0.0004)	-0.0047*** (0.0007)
<i>Marital status (1=married)</i>	0.4419*** (0.1640)	0.7259*** (0.1993)	0.5240 (0.3380)
<i>Education level:</i>			
- <i>Technical</i>	-0.0148 (0.1056)	-0.2208 (0.1360)	0.2392 (0.1811)
- <i>Tertiary</i>	-0.5506*** (0.1163)	-0.613*** (0.1479)	-0.3594* (0.2013)
<b>Household characteristics</b>			
<i>Household size</i>	0.0652*** (0.0251)	0.0520* (0.0316)	0.0910** (0.0457)
<i>Children ratio (0-5 years)</i>	0.1578 (0.3187)	0.6512* (0.3888)	-1.1551* (0.6399)
<i>Expenditure per capita</i>	0.3833*** (0.0928)	0.3900*** (0.1177)	0.3841** (0.1627)
<i>Residence (1=rural)</i>	-0.3739*** (0.0902)	-0.2794** (0.1128)	-0.4761*** (0.1618)
<i>Regions:</i>			
- <i>North</i>	-0.1097 (0.1555)	0.2008 (0.1974)	-0.2494 (0.2735)
- <i>South</i>	0.5239*** (0.1085)	0.5953*** (0.1371)	0.3444* (0.1912)
<i>Risk attitude:</i>			
- <i>Risk lover</i>	0.4384*** (0.0972)	0.3011** (0.1212)	0.2265 (0.1815)
- <i>Risk averse</i>	-0.5010*** (0.1082)	-0.2929** (0.1424)	-0.5203*** (0.1786)
<i>Constant</i>	-12.26*** (1.2061)	-11.02*** (1.5114)	-14.68*** (2.1805)
<i>No. of Obs.</i>	5737	2449	3288
<i>LR chi2</i>	376.90***	213.10***	155.68***
<i>Log likelihood</i>	-1984.48	-1146.42	-711.03
<i>Pseudo R2</i>	0.0867	0.0850	0.0987

Note: \*, \*\* and \*\*\* show statistical significance at the 10, 5 and 1% level, respectively. For margin estimates of the models see the Table 2.