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Economic Crisis and Female Entrepreneurship: Evidence from Countries in Eastern Europe and Central Asia

by

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Abstract

Building on the theory of necessity entrepreneurship, we test whether female entrepreneurship was a part of the household coping mechanism facing the recent global crisis across 30 transition countries centered in Eastern Europe and Central Asia. The identification strategy relies on the self-reported crisis victimization indicators at the household level. Main findings indicate that female members from crisis-affected households are more willing to become entrepreneurs and have initiated firms at a significantly higher rate since 2007. The estimated outcomes are particularly critical for male headed households with propensity score matching and doubly robust tests supporting the main findings. We also find that prior entrepreneurial activity at the household level, acts as a catalyst for such female necessity entrepreneurship. Overall, the findings suggest that crisis perhaps worked as a contextual factor contributing to the creation of necessary entrepreneurship among women.

JEL Classification: L26, D13, J16

Keywords: Female Entrepreneurship; Economic Crisis; Eastern Europe and Central Asia

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Outline

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1. Introduction

The recent global economic crisis with its peak in 2008 resulted in a decline in global gross domestic product (GDP). It led to unstable financial markets and a lag in the private sector demand (The World Bank, 2010). Its consequences especially for the labor market have been tragic. In many countries workers lost their jobs, wage earnings declined and work hours shortened (LiTS, 2011). In a recent study, Klapper and Love (2011) using panel data for 93 countries show that most countries experienced a sharp drop in new firm registration during the recent global financial crisis. Women are often the hardest victims of an economic shock. Pines, Lerner and Schwartz (2010), examining the impact of the global crisis on female entrepreneurship, find a lower participation rate for women in entrepreneurship in 43 countries. While the cross-country evidences provide useful insights into female entrepreneurial activities, the aggregate findings do not reveal much information on the causal relationship between economic crisis and the propensity of female entrepreneurship at the individual or household level[1].

Existing literature suggests that women hit by crisis, face a lower demand for their services and shortage in credit for business (Pines et al, 2010). These factors are likely to dampen the propensity of entrepreneurship for women facing a crisis. However, existing theories on entrepreneurship contend that adverse labor market conditions may force individuals to become necessity entrepreneurs, starting a small business, when alternative livelihood choices are not readily available (Acs, et al, 2005; Allen et al, 2007). Furthermore, Allen et al, (2007) found that necessity entrepreneurship is more prevalent among women, reemphasizing the contention that women engage in self-employment at a higher rate when livelihood choices are limited. This is supported by Arenius and Minniti (2005), who opine that contextual factors along with socio-demographic and perceptual factors influence the complex decision of starting a new business for women.

In this paper, we examine if women respond to the recent global crisis by starting business as a household coping strategy. In particular, using the individual level data from the

[1] The use of rigorous impact evaluation in this field has received limited attention (Mckenzie, 2003; 2004; Fallon and Lucas, 2002; Manning, 2000) perhaps due to the unavailability of reliable datasets (Acs et al, 2011; Bruhn and Love, 2012).

second round of Life in Transition Survey (2010), we evaluate the impact of the economic crisis on female entrepreneurship across 30 transition countries of Eastern Europe and Central Asia (EECA). We account for the participation rate as well as perception of women towards entrepreneurship. The main motivation of this study comes from the literature on necessity entrepreneurship and the role of contextual factors in entrepreneurship, which we discuss below. Moreover, the transition countries of Eastern Europe and Central Asia were among the hardest hit by the global economic crisis where the crucial transmission channels of the crisis have been reductions in wage earnings and job losses (LiTS report, 2011). This justifies our selection of geographic areas for this study.

Differential economic opportunities and outcomes reflected for instance in lower female entrepreneurship have obvious welfare implications and need to be understood better if the gender parity as part of the Millennium Development Goals is to be met. There is a growing interest in studying the determinants of entrepreneurship especially for women. A variety of factors influence the complex decision of starting a new business for both genders, including socio-demographic, contextual and perceptual factors (Arenius and Minniti, 2005; Kourilsky and Walstad, 1998). Education (Cooper, 1985; Linan, 2004; Rees and Shah, 1986; Robinson and Sexton, 1994; Luber et al. 2000), socialization experience (Hackett and Betz, 1981), exposure to media and expectancies all tend to play a significant role in the setting up of a business for women, more so than they would affect men (Bussey and Bandura, 1999; Ljungren and Kolvereid, 1996; Brown et al., 2006). Personal and family considerations are often more important than economic conditions for women in setting up business (Anna et al, 2000; Orser and Hogarth-Scott, 2005). Contextual factors also play an important role. Verheul et al. (2012) using the theory of planned behavior show that a lower preference for women to become self-employed largely explains their relatively low involvement in self-employment (Minniti et al., 2005; Reynolds et al., 2002).

In this study, we use individual level data from the second round of the Life in Transition Survey (2010). We test the significance of the recent economic crisis as a contextual factor in determining female entrepreneurship. This study considers existing female entrepreneurs, prospective female entrepreneurs and nascent female entrepreneurs separately. This allows us to examine the impact of the crisis at different stages of

entrepreneurship. Our baseline identification strategy builds on the direct effect of crisis at the individual level. We use a dummy variable which takes the value of one if respondents were reported to be affected by crisis. In addition, we use a set of victimization indicators as dummy variables identifying various aspects of crisis affecting their livelihood status negatively. It includes direct effects of crisis such as losing jobs, experiencing wage cuts, receiving lower volume of remittances and working for fewer hours, among others. We use standard OLS fixed effect model as our baseline empirical strategy.

Empirical findings indicate that the entrepreneurial propensity of women is higher among households that are the hardest hit by crisis. While the outcomes are significant statistically, it fails to yield robust outcomes across the victimization indicators. We perform a variety of robustness checks. To address the existence of sample selection bias, we employ propensity score matching. We also perform empirical analysis across various subsamples comprising of individuals from countries that experienced crisis at a high level, at a low level; also countries that has high entrepreneurship and low entrepreneurship rate. Additionally, we test for the same relationship between female headed and male headed households. Finally, to check for omitted variable bias, we use a test to identify the relative strength of observables against unobservable in our empirical models following Altonji, Elder, Conley and Taber (2005). The findings from these tests do not alter the main findings. The empirical outcomes show a strong correlation between the propensity of entrepreneurship for women and the direct victimization of crisis, often suggesting a causal relationship. Entrepreneurship has been a part of active household coping strategies for women during and after the crisis. An additional test on this relationship controlling for existing entrepreneurial activity within the household undermines our main findings. We find that women are more like to attempt to setup an enterprise of their own in the awake of a crisis, if someone else in the household already engaged in entrepreneurial activity. However, while this weakens our main hypothesis, it does not negate it; the tendency for the Schumpetarian hypothesis to be prevalent among female members in households without prior entrepreneurial activity can be thought of as the lower bound for such creative destruction. Overall, this study provides empirical evidence supporting that the recent global crisis perhaps worked as contextual factor and contributed to the growth of female entrepreneurs during and after the crisis in Eastern Europe and Central Asia.

The rest of the paper is organized as follows. In section 2, we highlight the key features of female entrepreneurship in transition countries. Section 3 provides a brief description of the LiTS (2010) data and descriptive evidence using the perception of respondents' on the recent economic crisis and entrepreneurship. Section 4 discusses the main findings of the baseline econometric model. In section 5, we provide empirical outcomes of robustness check tests. This is followed by a concluding section summarizing the main findings and prospects of future research.

2. Female Entrepreneurship in Transition Countries Traced over time

There is worldwide evidence that women are less likely to engage in entrepreneurial activities than men (Minniti et al., 2005; Reynolds et al., 2002). Transition countries are no exception to this. In a recent study, Nikolova et al. (2012) using LiTS (2010) data found that women are less likely to attempt to set up a venture however no less likely to succeed than men once they try. The authors posit that the lower participation of women in entrepreneurship could be due to various factors. Paul and Sattar (2009), using the first round of Life in Transition Survey (2006) data for 27 transition countries, found similar evidence of an overall gender gap of 6.5 percentage points against women in self-employment.

In retrospect, the beginning of the transition era was characterized by the demise of the centrally planned economic system followed by a process of economic, social and political transformation. One of the major changes was the development of private business ownership in most of the transition countries in central Asia and Eastern Europe. This was particularly important for transition countries in the short run, in terms of an expected increase in the number of jobs and wealth that small private firms offer for individuals, and also in the long run through potential welfare gains for the economy and society as a whole. However, job growth has been limited and labor force participation rates, particularly for women in entrepreneurial activities, have stagnated and even declined in some of these countries.[2] Evidence from national studies also confirm lower levels of womens' entrepreneurial activity in transition countries in Bulgaria (Stoyanowska, 2001), Hungary (Nagy, 1999) and Poland (Lisowska, 2002).

2 See World Bank 2005, *Enhancing Job Opportunities: Eastern Europe and the former Soviet Union*, World Bank.

To get a more recent picture, we reflect upon the Global Gender Gap Index 2008 (World Economic Forum) that ranks 130 countries including 25 countries from the transition region comprising of the Eastern European and the Central Asian countries. The global gender gap index is composed of gender gap in four areas: economic participation, education attainment, health and political empowerment. In the global ranking of 130 countries, transition countries are evenly spread out, with Latvia (globally ranked 10^{th}) being the highest compared to Turkey (globally ranked 123^{rd}) being the lowest among the group of 25 transition countries. This indicates that the transition countries as a region are no different compared to the rest of the world when it comes to gender gap in general.

In Appendix A, we show gender gap in entrepreneurship across 26 transition countries. The horizontal bar diagram depicts female entrepreneurs as a percentage of male entrepreneurs using data from the Business Environment and Enterprise Performance Survey (BEEPS) (2008). The evidence is similar to the World Economic Forum ranking we discussed above. The share of female entrepreneurs to male entrepreneurs ranges from as high as .43 (in Latvia) to as low as .14 (in Armenia). Although no clear sub-regional gender gap story emerges from this, most of the new EU member states fall in the gender gap range of .30 - .40; countries form the Balkan region are in the middle, with a gender gap of .20 to .30; the majority of the Commonwealth of Independent States (CIS) fall within the gender gap range of .10 - .20.

3. Descriptive Evidence on Crisis and Entrepreneurship

We use data from the *Life in Transition Survey 2010* (LiTS 2010) which comprises of a sample of 39,000 respondents from 34 transition countries and 5 western European countries. The LiTS 2010 survey was conducted jointly by the European Bank for Reconstruction and Development (EBRD) and the World Bank. For our purpose, we employ only 16,807 observations; as our sample comprises only of female respondents who fall within the working age (See Appendix B). We also exclude respondents from the Western European nations that are included in the latest round of the LiTS survey (LiTs 2010), as our goal is to investigate how the crisis affected entrepreneurial efforts among women in the Eastern European and Central Asian Economies (the so called Transition Economies).

The summary statistics (reported in Appendix C), show that a significant proportion (68%) of the respondents had some form of a secondary education, and another 21% of the respondents acquired some form of education higher than the secondary level. The statistics also reveal that 56 per cent of the sample comprise of female headed households, with an average household size of 3.4, where on average 55 per cent of the household comprised of female members.

Using the LiTS (2010) data we graphically present the *perceived* effect of the financial crisis for the sample of 30 countries we study in Appendix D. We find a heterogeneous effect of the financial crisis across the sub-sample of countries surveyed in LiTS, similar to findings reported in Nikolova et al. (2012). The reported adverse effect of the economic crisis among female respondents was highest in Serbia, where 77% of the respondents were reported as being affected by the crisis; while only 17% of the Uzbek respondents made a similar claim, showing the wide disparity of the *perceived* effect of the crisis. While most of these countries are likely to have experienced the crisis to an almost similar extent; the perception of the experience is subjective, and sometimes reflects the socio-cultural factors that defines perceptions (EBRD, 2011; Nikolova et al., 2012).

Appendix E indicates that the effect of the crisis across male headed and female headed households was almost homogenous. The table indicates that about a half of the respondents from both cohorts identified themselves as being affected by the financial crisis. This is in contrast to findings reported by Pines et al. (2010) who, using GEM (General Entrepreneurship Monitor) 2007 data find that "women (entrepreneurs) are more impacted by the crisis than men". Our data shows that about a third of the sample (among both male and female headed households) reported having experienced wage reductions during and in the aftermath of the crisis and more significantly 12% of the households reported that the head of the household lost his/her job due to the financial crisis. The table also indicates that about 15.5% of the households and 12.5% of the households experienced delayed/suspended wages and reduced remittance inflows respectively.

Appendix F divulges the self-reported perspective of male and female headed households towards self-employment. Again, the results reported in Appendix F indicate there is no evident distinction in the attitude towards self-employment among male and female headed households across the sub-sample of countries surveyed in LiTS. While only 7 per cent of

the male headed households and 6 per cent of the female headed households were at the time of the survey self-employed, about 40 per cent of the sample from both cohorts shared their willingness to be self-employed in the future. Nikolova et al. (2012) highlight access to capital as the biggest barrier for those willing to start their own enterprise; and especially during the financial crisis the severity of this barrier increased adversely.

On the other hand, Figure 3.1 below, maps the perceptive response of the proportion of respondents who wanted to become self-employed for each of the surveyed countries, against the proportion of households that were affected by the financial crisis in each of those respective countries. The graph depicts an inverse relationship with a correlation of -.44 between the proportion of affected households and the proportion of respondents who wanted to be self-employed. This implies that being affected by the financial crises subdued the desire to be self-employed, most likely as a result of the economic climate in the worst affected countries such as Serbia, Hungary and Bulgaria. On the other hand, we see a better response in the desire for self-employment in countries such as Belarus, Kyrgyzstan and Uzbekistan where the effect of the crisis was perceived to be lower.

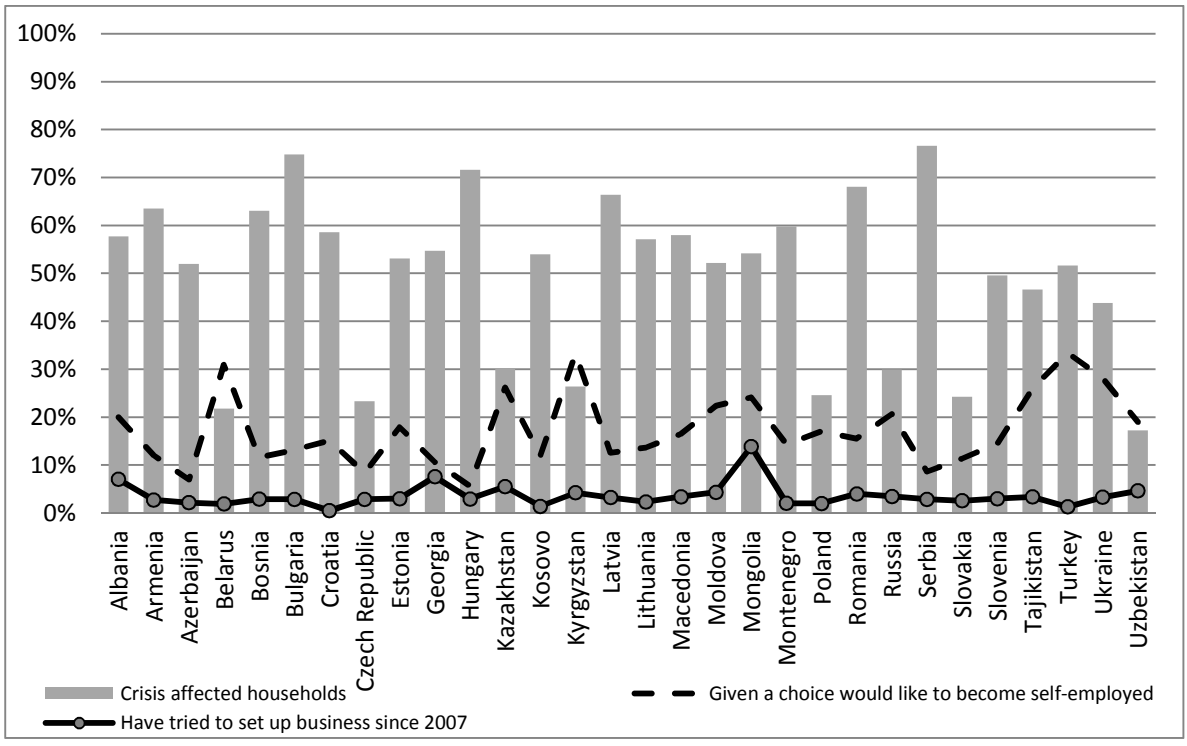

Figure 3.1: Crisis victimization and self-employment response

Source: Authors' own calculations, based on LiTS (2010)

Once we compare the level of self-employment prevalent in countries in 2006 to the levels of self-employment prevalent in the same countries in 2011 (as depicted in Appendix G), it is evident that to a certain degree, that the impact of the financial crisis in fact increased self-employment in the worst affected countries. However, while this did not apply universally across the sub-sample of 30 countries, the evidence is more apparent in certain countries than the rest. For example, Albania recorded the largest increase in the proportion of self-employed from 9 per cent in 2006 to 15 per cent in 2010, at a time when 58 per cent of the Albanian households reported being affected by the financial crisis. In contrast, Uzbekistan which reported the lowest number of crisis affected households of 17 per cent also ironically saw the largest drop in the proportion of self-employed across the same four year time period, from 27 per cent to 10 per cent.

As pointed out earlier, not all countries conformed to this positive relationship between the proportion of crisis affected households and the proportion of self-employed. In Kyrgyzstan and Russia for example, while only 26 per cent and 30 per cent of the households respectively were affected by the financial crisis, the proportion of self-employed increased from 9 per cent to 13 per cent in Kyrgyztan and more dramatically from 1 per cent to 6 per cent in Russia. Similarly, while two-third of the Latvian households and three-fourths of the Belarusian households reported as being affected by the financial crisis, the proportion of self-employed in fact halved in Latvia and dropped by a third in Belarus.

Appendix H summarizes the matrix of growth incidence in female entrepreneurship to the proportion of crisis affected households with a threshold of 40 per cent. The table does not report 3 countries (Bosnia, Moldova and Turkey) within the sub-sample for whom there is no clear indication of which matrix they fall into due to the low association between the two variables. These results from the table show a lack of clear evidence on the effect of exposure by the financial crisis on female entrepreneurship at the aggregate level, and therefore warrant further investigation at the micro level for better understanding of the transmission mechanisms and the socio-cultural factors that shape the decision for self-employment.

4. Baseline Empirical Model and Findings

As our baseline econometric strategy, we use the following binary dependent variable model to examine the determinants of the propensity to self-employment for women in 34 transition countries:

$$y = x'\beta + \varepsilon$$

We employ a set of dependent variables that distinguish between prospective female entrepreneurs and nascent female entrepreneurs. This allows us to examine the impact of the crisis at different stages of entrepreneurship. In the above equation, 'y' represents our dependent binary variables – the first variable, 'willingness to be self-employed' takes the value of one if the individual was willing to be self-employed, and zero otherwise, and the second variable 'attempted self-employment since 2007' takes the value of one if the individual had attempted to be self-employed since 2007, and zero otherwise. x represents a vector of covariates and β is the corresponding coefficient vector. Random factors as well as unobservable factors are captured by the error term ε. x also includes a vector of independent variables that capture the channels of crisis victimization for the individual's household. These include whether the crisis affected the household, whether any member of the household experienced wage reductions, whether the head of the household experienced a job loss, whether a household member experienced delayed or suspended wages, whether the household experienced a reduced flow of remittance, and finally whether a member of the household experienced reduced working hours.

For the baseline model we use a probit analysis, where our dependent and independent variables are as outlined above. Columns (1)-(6) of Table 4.1 reports the marginal effects of each of the 'x' variables on the willingness for women to be self-employed and their attempts at self-employment since 2007. The marginal effects from the probit analysis show that women from crisis affected households were not significantly different in their willingness to be self-employed in comparison to those women from households who were not affected by the crisis. However, the results show that women's reluctance to be self-employed increased if a household member experienced delayed or suspended wages. These results fall short of providing conclusive evidence on, if and how the crisis affected female entrepreneurship in these transitional economies, other than hinting that women who were affected by the crisis in general had a lower preference to be self-employed.

Table 4.1: Probit analysis of willingness to be self-employed and having tried to setup a business since 2007

	Willingness to be self-employed						Tried to setup business since 2007					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Crisis affected households	0.002						0.230***					
	(0.000)						(0.014)					
Wages reduced		-0.060**						0.067				
		(-0.015)						(0.004)				
Head of household lost job			0.005						0.236***			
			(0.011)						(0.017)			
Wages delayed or suspended				0.005						0.063		
				(0.001)						(0.004)		
Reduced flow of remittances					0.062						0.048	
					(0.016)						(0.003)	
Working hours reduced						-0.030						0.039
						(-0.007)						(0.003)
Observations	16,807	16,807	16,807	16,807	16,807	16,807	16,807	16,807	16,807	16,807	16,807	16,807
Pseudo-R2	0.055	0.056	0.056	0.056	0.056	0.056	0.078	0.072	0.075	0.072	0.072	0.072

Note: Only regression coefficients of the main crisis victimization index are shown in the table; *** p<0.01, ** p<0.05, * p<0.1 (Robust standard errors are used in the estimation). Marginal fixed effects reported in parantheses. The regressions include country-specific fixed effects, control for rural and urban areas, control for household specific characteristics such as household size, number of children and adult members, number of female and male members in a household, gender of the head of household and an index of household asset and individual specific characteristic such as age, squared-age, educational attainments, an indicator of risk prone behavior at the individual level.

The results reported in columns (7)-(12) of Table 4.1 capture the association between crisis victimization and whether the individuals have been actively trying to setup a business since 2007. The results indicate that women were about 1 to 2 per cent more likely to have attempted to be self-employed if they were affected by the financial crisis or specifically if the head of the household had lost his/her job due to the financial crisis. These results are statistically significant at the 1 per cent level. Given that the average rate of female entrepreneurship across these 30

countries was only 6 per cent, a one or two per cent increase in the probability of setting up an enterprise can translate to significant rates of change in the national female entrepreneurship rate.

The contrast in the signs for the key explanatory variables of interest across columns (1)-(6) and (7)-(12) indicate that while women in general disliked being self-employed, they in fact attempted to be self-employed (since 2007), possibly as a measure to ease household finances during the hard times. These results indicate the presence of *necessity* entrepreneurship rather than *opportunity* entrepreneurship among respondents across the Transition economies. Necessity entrepreneurship is the starting-up of business as a measure of last resort due to the lack of formal employment – it is a form of forced entrepreneurship (Allen et al, 2007; Nikolova et al. 2012). The latter – opportunity entrepreneurship is a genuine willingness to be an entrepreneur, and reflects a dislike for formal employment. Similar to findings in our study, Nikolova et al. (2012) who used the same dataset, report that necessity entrepreneurship is more likely to be prevalent among countries with lower GDP per capita (as those in the Eastern Europe and Central Asian bloc studied in this paper). Our results also conform to findings by Allen et al (2007) who found that female entrepreneurs are more likely to be necessity entrepreneurs rather than opportunity entrepreneurs and as a result are less likely to start-up their own business compared to men. We consider some additional tests below to evaluate the evidence thus far.

5. Robustness Checks

In this section we analyse the outcomes of a number of robustness tests to validate the findings from our baseline estimation.

Table 5.1: Probit analysis of victimization indicators on self-employment

	Like to become self-employed						Tried to set up business since 2007					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Crisis affected households	0.011 (0.003)	0.047	-0.021 (-0.005)	0.066	-0.009 (-0.002)	0.054	0.174*** (0.010)	0.089	0.222*** (0.019)	0.077	0.173*** (0.013)	0.085
Wages reduced	-0.090** (-0.020)	0.048	-0.035 (-0.009)	0.066	-0.101** (-0.025)	0.054	0.037 (0.023)	0.086	0.090 (0.008)	0.070	0.105 (0.008)	0.083
Head of household lost job	0.007 (0.002)	0.048	-0.028 (-0.007)	0.066	-0.041 (-0.010)	0.053	0.107 (0.007)	0.086	0.305*** (0.031)	0.074	0.270*** (0.024)	0.086
Wages delayed or suspended	0.043 (0.010)	0.048	0.019 (0.005)	0.066	-0.047 (-0.011)	0.053	0.038 (0.002)	0.086	0.080 (0.007)	0.069	0.081 (0.006)	0.082
Reduced flow of remittances	0.082 (0.019)	0.048	0.075 (0.020)	0.066	0.119* (0.031)	0.054	0.017 (0.001)	0.086	0.077 (0.007)	0.069	0.016 (0.001)	0.081
Working hours reduced	0.035 (0.008)	0.048	-0.066 (-0.016)	0.066	-0.107 (-0.025)	0.054	0.077 (0.005)	0.086	0.029 (0.002)	0.069	0.062 (0.005)	0.082
Observations	10,151	10,151	7,161	7,161	5,449	5,449	10,151	10,151	7,161	7,161	5,449	5,449

Note: Columns (1) and (7) report the marginal effects of the probit estimation for high crisis countries, whilst columns (2) and (8) report the pseudo R^2 for the same. Columns (3) and (9) report the marginal effects of the probit estimation for high self-employment countries, whilst columns (4) and (10) report the pseudo R^2 for the same. Columns (5) and (11) report the marginal effects of the probit estimation for high crisis, high self-employment countries; whilst columns (6) and (12) report the pseudo R^2 for the same. Only regression coefficients of the main crisis victimization index are shown in the table; *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors are used in the estimation. The regressions include country-specific fixed effects, control for rural and urban areas, control for household specific characteristics such as household size, number of children and adult members, number of female and male members in a household, gender of the head of household and an index of household asset and individual specific characteristic such as age, squared-age, educational attainments, an indicator of risk prone behavior at the individual level.

5.1. HIGH CRISIS COUNTRIES

Since a diverse groups of countries and individuals are accounted for in the pooled baseline regression (despite country, regional and individual controls), the results may not be so profound. Thus, as an additional measure of analysing the transmission mechanism of the financial crisis towards female entrepreneurship we restricted our sample to high-crisis countries. For this purpose, our sample was restricted to countries that reported at least 50 per cent (half) of the households as being affected by the crisis; what we refer to henceforth as high crisis countries. This includes 20 of the 30 sub-sample of countries (Refer Appendix I).

The estimated outcomes for high crisis countries are reported in columns (1)-(2) and(7)-(8) of Table 5.1. The results are not significantly different from those reported in Table 4.1, where women from all 30 countries were included in the estimation. The size of the coefficient for a family member experiencing a reduction in wages is approximately twice as those reported in Table 4.1, and the head of the household's job loss no longer seems to significantly affect the probability that the respondents would have attempted to setup a business. In general however, the results reported in Table 5.1 are not very different from the results reported in Table 4.1, and this asserts the findings from our baseline estimation.

5.2. HIGH SELF-EMPLOYMENT COUNTRIES

As a second robustness estimation measure, we restricted the sample to countries that reported at least 6 per cent of the households as being self-employed[3]. Only 12 out of the 30 countries (refer Appendix I) report self-employment rates of greater than 6 per cent in the LiTS 2010 round of the survey. We again find a strong positive correlation between crisis victimization and attempts at self-employment but find no evidence of the effect of crisis victimization on the desire to be self-employed. The results reported in columns (3)-(4) and (9)-(10) of Table 5.1 show that none of the covariates seem to affect the desire to be self-employed in countries with a relatively high level of self-employment. A possible explanation for these findings is that, in countries with relatively high levels of self-

3 We decided on a threshold level of 6 per cent, as the average rate of self-employment across the 30 countries being studied in this paper is 6 per cent

employment, other factors seem to be more important in determining the willingness to be self-employed, and the crisis is not a significant determinant. A second plausible explanation is that, women in such countries are strictly more necessity entrepreneurs rather than opportunity entrepreneurs.

Marginal effects from the table also indicate that women were about 2 per cent more likely to have attempted to initiate some form of a self-employment initiative since 2007 if they were affected by the financial crisis and more significantly 3 per cent more likely to have attempted the same, if the head of the household experienced a job loss during the crisis. While the signs and significance levels are in agreement with our baseline findings, the size of the coefficient is about 2-3 times larger than those reported in the baseline model. This again reaffirms our argument that women from high self-employment countries are more necessity based entrepreneurs than women from low self-employment countries.

5.3. HIGH CRISIS AND HIGH SELF-EMPLOYMENT COUNTRIES

We further restrict the sample to countries that were both severely affected by the crisis and also had relatively high levels of self-employment as an additional robustness check. For this purpose we only employ countries which reported at least 50 per cent of the households as being affected by the crisis and at the same time reported that at least 6 per cent of the respondents as being self-employed. The restrictions reduce the sample to only 5 out of the 30 countries (refer Appendix I). The results from this analysis are reported in columns (5)-(6) and (11)-(12) of Table 5.1. The results seem to conform to our baseline findings except for the effect of a drop in remittance inflows. Marginal effects from the table indicate that women were about 3 per cent willing to be self-employed if the remittance inflows had dropped. The coefficient is however only significant at the 10 per cent level.

5.4. PROPENSITY SCORE MATCHING (PSM) AND DOUBLE-ROBUST ESTIMATION

To address the possibility of selection bias, we employ propensity score matching with a nearest neighbor matching strategy. The covariates on which the scores were matched

include the number of children in the household, the household size, asset holdings (captured by an index), age, education, country and the sector of the economy (i.e. rural, urban). The treated group was defined as those who were affected by the financial crisis based on the victimization indicators discussed above, and the control group comprised of those respondents who did not identify as being affected for each of the indicators.

Table 5.2: Comparison of estimated effects of crisis victimization indicators on female entrepreneurship: Double-Robust Probit estimation of victimization indicators on self-employment

	Baseline Probit (Marginal Effects)	Propensity Score Matching	Double-Robust Probit Estimates
Willing to be self-employed			
Crisis affected households	0.000	-0.003	-0.002
Wages reduced	-0.015**	-0.024**	-0.022*
Head of household lost job	0.011	0.004	0.005
Wages delayed or suspended	0.001	-0.004	-0.004
Reduced flow of remittances	0.016	0.012	0.011
Tried to setup a business since 2007			
Crisis affected households	0.014***	0.015***	0.012***
Wages reduced	0.004	0.006	0.006
Head of household lost job	0.017***	0.015**	0.012*
Wages delayed or suspended	0.004	0.004	0.004
Reduced flow of remittances	0.003	0.006	0.004

Note: *** p<0.01, ** p<0.05, * p<0.1. Nearest neighbor matching employed for PSM analysis. Robust standard errors are used in the estimation. Baseline probit marginal effects estimates are reproduced from Table 4.1.

Our results from the nearest neighbor matching strategy (reported in Appendix J) conform to those using the probit analysis, with the difference in coefficients among the treatment

and control groups being between 1 and 2 percentage point(s) for the significant estimates[4]. We then employed the calculated propensity scores as a right hand side variable in estimating the double-robust probit model (reported in Table 5.2). We use this table as a sensitivity analysis to assess the specification of the baseline probit and propensity score matching (PSM) models.

If the models are correctly specified, then ideally the double-robust estimates would produce similar results. As evident from Table 5.2, estimates of the willingness to be self-employed seem to be more accurately specified under the propensity score matching. However, estimates of certain victimization indicators on the probability of setting up an enterprise seem to favor both PSM and probit. Overall, while estimates from both models are closely related in terms of size and sign of the coefficient to the double-robust estimates; the support is mixed. PSM seems to be a better model to estimate the willingness to be self-employed whilst probit seems a better fit to estimate the effect of the crisis on attempting to setup a business.

5.5. DO WOMEN FROM MALE-HEADED HOUSEHOLDS RESPOND DIFFERENTLY?

A necessity based entrepreneurship approach would characterize that female members of male-headed households which are hard-hit by crisis are more likely to become self-employed compared to those from female-headed households. This could be thought as an alternative coping strategy for women to provide additional support to their families when the main earner is the direct victim of crisis. However, evidence reported in Table 5.3 provides a mixed response. Whilst the effect of crisis seem to be generally homogenous across the groups, women from male headed households and households where other women (such as their mother, sister) were heading the household; were *less* likely to attempt to set up a business than if they were heading the household themselves.

4 We had also estimated the effects using Calipher and Kernel matching, and the results seem to be robust to alternate matching specifications.

Table 5.3: Probit outcomes based on samples defined by gender of household head and livelihood sources

	Like to become self-employed				Tried to set up business since 2007			
	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
Crisis affected households	0.043	0.03	0.032	0.035	0.217***	0.211***	0.170***	0.256***
Wages reduced	-0.012	-0.042	-0.015	-0.114	0.102	0.068	0.065	0.113
Head of household lost job	0.026	0.005	-0.017	0.049	0.138	0.158**	0.103	0.233*
Wages delayed or suspended	0.094**	0.054	0.056	0.063	-0.065	0.029	-0.003	0.164
Reduced flow of remittances	0.065	0.042	-0.006	0.112	0.102	0.094	-0.036	0.159*
Working hours reduced	0.061	0.038	0.041	0.024	-0.154	-0.043	0.004	-0.168
Observations	7,340	10217	7662	2543	7,340	10217	7662	2543

Note: Only regression coefficients of the main crisis victimization index are shown in the table; *** p<0.01, ** p<0.05, * p<0.1 (Robust standard errors are used in the estimation).Model specifications: (1) respondents from male headed household; (2) respondents are not household head; model (3) respondents are not household head and self-employment is NOT a source of household income; and model (4) respondents are not household head and self-employment is a source of household income. The regressions include country-specific fixed effects, control for rural and urban areas, control for household specific characteristics such as household size, number of children and adult members, number of female and male members in a household, gender of the head of household and an index of household asset and individual specific characteristic such as age, squared-age, educational attainments, an indicator of risk prone behavior at the individual level.

5.6. CAN EXISTING SOURCES OF LIVELIHOOD BE A POSSIBLE CHANNEL OF CAUSATION?

Researchers in this line of literature have also explored the impact of family entrepreneurial history on both male and female entrepreneurship. For both men and women, self-employment depends on whether their father or other family members was self-employed, but for women this relationship is less strong (Hout and Rosen, 2000). However, using LiTS (2008) data we find strong correlation between propensity for entrepreneurship for women and having self-employment as existing sources of livelihood in the same household. This could undermine the causal relationship between crisis and female entrepreneurship unless the effect of self-employed family members affects entrepreneurship for women only through crisis. To address this concern, we consider two sub-samples: (1) if respondent is not a household head and belongs to a household with self-employed member and (2) if respondent is not a household head and belongs to a household with no self-employed member. We find that women with self-employed household members are more likely to set up business facing crisis (see Table 5.3 above). While this undermines the causal argument that we put forward, a lower but statistically significant coefficient for women from crisis affected households without self-employed members supports the main argument of this paper. The coefficient for the sample with no self-employed member can be thought as a lower bound of the existing relationship.

Overall, one can think of existing self-employed household members as a catalyst which propels the likelihood of female entrepreneurship from a household facing crisis.

5.7. TO WHAT EXTENT DO UNOBSERVABLES AFFECT THE BASELINE OUTCOMES?

The estimated outcomes from the baseline regressions and robustness tests do not confirm whether the coefficient might be affected by the selection on unobservables. As our final robustness check, we follow the strategy developed by Altonji, Elder, Conley and Taber (2005) using selection on observables to estimate the potential bias from unobservables. Based on this method, we calculate the ratio R= $\frac{\widehat{\beta_{Full}}}{\widehat{\beta_{Restricted}} - \widehat{\beta_{Full}}}$, which indicates how much stronger the selection on unobservables, relative to selection on observables, needs to be to explain away the estimated effect of the full probit model.

The ratio is calculated using the estimated coefficients from the full probit models that we ran (in Table 4.1) and a restricted version of the probit model (with only geographic and individual controls). For the first dependent variable, the average of the six ratios is close to 14 whereas for the second dependent variable, the average of the six ratios is close to 18 (Appendix K). Thus, on average the selection of unobservable has to be at least 14 times stronger than the selection of observables to explain away the estimated probit results. Thus, it is less likely that the estimated outcomes will be affected by the selection on unobservable.

6. Conclusion

The female participation rate in economic opportunities and outcomes, especially in entrepreneurship shows a grim picture despite the global initiative undertaken almost a decade ago under the Millennium Development Gender Goals (GEM, 2008). Contributing to a growing body of literature that suggests a variety of factors explaining the lower participation of women in entrepreneurship, this paper examines empirically whether the recent global economic crisis serves as a contextual factor providing an impetus to the female participation rate. Our hypothesis transgresses from the Schumpetarian (1939) process of creative destruction, which is also supported by the necessity entrepreneurship theory that inadequate labor market conditions may force individuals to become necessity

entrepreneurs. Using LiTS (2010) data surveyed in 30 transition countries from the Eastern Europe and the Central Asia, we found a positive correlation between the growth of female entrepreneurs and direct exposure to crisis. Satisfactory outcomes on robustness checks suggest a causal relationship and also support the fact that women are generally necessity-based entrepreneurs.

While theories suggest that necessity entrepreneurship is likely to produce less innovation and thereby play a limited role in transcending economic growth than opportunity based entrepreneurship, the former may still play a major role in times of crisis as long as it creates employment. This way, our findings are in line with other studies such as Allen et al. (2007) and Nikolova et al. (2012). Moreover, Nikolova et al. (2012) point out, even though female entrepreneurs are less likely to start with their own enterprise, once they start they are no less likely to succeed than their male counterparts. This conclusion along with our empirical findings retorts the need for policy frameworks that encourage female entrepreneurship and could supplement the necessity based entrepreneurship. This calls for affirmative actions by the governments especially in transition economies to initiate policy directives that aim to encourage female entrepreneurship. As a multiplier effect, such initiatives are likely to benefit not only the families of the female entrepreneurs but also the country as a whole.

Certain caveats deserve a mention. While our results are robust to alternate specifications, our study might not have controlled for an exhaustive set of control variables determining female entrepreneurship. Also, there could be measurement errors in terms of perception-based victimization indicators that could suffer from recall bias. There could also be subjective bias respondents' attitude towards risks related to the economic crisis. Nevertheless, we hope that our findings can be complemented by studies that are able to explore the household dynamics (at the micro level) and the various socio-cultural factors (both at the micro and macro level) that affect the propensity to entrepreneurship for women at a greater depth. This would improve our understanding of how the various transmission channels affect female entrepreneurial decisions. Also, cross-country studies can provide new insights into regional and structural disparities affecting both types of entrepreneurship: necessity versus opportunity based.

References

Acs Z., Bosma N., and Sternberg, R. (2011), 'Entrepreneurship in World Cities', in Minniti (ed) The Dynamics of Entrepreneurship: Evidence from Global Entrepreneurship Monitor Data. Oxford University Press, Oxford.

Allen, I.E., Elan N., Langowitz N., and Dean, M. (2007), Global Entrepreneurship Monitor Report on Women and Entrepreneurship. Babson College, MA

Altonji, J.G., Elder, T.E., and Taber, C.R. (2005), 'Selection on Observed and Unobserved Variables: Assessing the Effectiveness of Catholic Schools', *Journal of Political Economy*, 11, pp. 151-184.

Anna, A., Chandler, G., Jansen, E., and Mero, N. (2000), 'Women business owners in traditional and non-traditional industries'. *Journal of Business Venturing*, 15(2), pp. 279-303

Arenius, P., and Minniti, M. (2005), 'Perceptual Variables and Nascent Entrepreneurship'. *Small Business Economics*, 24, pp. 233-247.

Beugelsdijk, S., and Noorderhaven, N. (2005), 'Personality Characteristics of Self-Employed; An Empirical Study', *Small Business Economics*, 24(2), pp. 159-167.

Bruhn, M., and Love, I. (2011), 'Gender differences in the impact of banking services: evidence from Mexico', *Small Business Economics*, 37(4), pp. 493-51.

Bussey, K., and Bandura, A. (1999), 'Social cognitive theory of gender development and differentiation', *Psychological Review*, 106(4), pp. 676-713.

Cliff, J. E. (1998), 'Does one size fit all? Exploring the relationship between attitudes towards growth, gender, and business size', *Journal of Business Venturing*, 13(6), pp. 523-542.

Cooper, A. C. (1985), 'The Role of Incubator Organizations in the Founding of Growth Oriented Firms'. *Journal of Business Venturing*, 1, pp. 75-86.

EBRD (2011), Life in Transition: After the crisis. European Bank for Reconstruction and Development. European Bank for Reconstruction and Development (EBRD), London.

Fallon, P. R., and Lucas, R. E. B. (2002), 'The Impact of Financial Crises on Labor Markets, Household Incomes, and Poverty: A Review of Evidence', *World Bank Research Observer*, 17, pp. 21-45.

Hackett, G., and Betz, N. E. (1981), 'A self-efficacy approach to the career development of women', *Journal of Vocational Behavior*, 18, pp. 326-336.

Hout, M., and Rosen, H. (2000), 'Self-employment, family background, and race'. *Journal of Human Resources*, 35(4), pp. 670-692

Klapper, L., and Love, I. (2011), 'The impact of the financial crisis on new firm registration'. *Economics Letters*, 113, pp. 1-4.

Kourilsky, M. L., and Walstad, W. B. (1998), 'Entrepreneurship and female youth: Knowledge, attitudes, gender differences, and educational practices', Journal of Business Venturing, 13, pp. 77-88.

Lee, D. Y., and Tsang, E. W. K. (2001), 'The effects of entrepreneurial personality, background and network activities on venture growth', *Journal of Management Studies*, 38(4), pp. 583-602.

Linan, F. (2004), 'Intention-based models of entrepreneurship education', *Piccolla Impresa / Small Business*, 3, pp. 11-35.

Lisowska, E. (2002), 'Women's entrepreneurship: trends, motivations and barriers' in Ruminska-Zimny E (eds) Women Entrepreneurs in Eastern Europe and CIS countries. GENE, New York and Geneva.

Ljunggren, E., and Kolvereid, L. (1996) New Business Formation: Does Gender Make a Difference?, *Women in Management Review*, 11, pp. 3-12.

Luber, S., Lohmann, H., Muller, W., and Barbieri, P. (2000), 'Male Self-Employment in Four European Countries: The Relevance of Education and Experience across Industries', *International Journal of Sociology*, 30, pp. 5-44.

Manning, A. (2000), 'Pretty Vacant: Recruitment in Low-Wage Labour Markets', *Oxford Bulletin of Economics and Statistics*, 62, pp. 747-770.

McKenzie, D. J. (2003), 'How do Households Cope with Aggregate Shocks? Evidence from the Mexican Peso Crisis', *World Development*, 31, pp. 1179-1199.

McKenzie, D. J. (2004), 'Aggregate Shocks and Urban Labor Market Responses: Evidence from Argentina's Financial Crisis', *Economic Development and Cultural Change*, 52, pp. 719-758.

Minniti, M., Arenius, P., and Langowitz, N. (2005), 2004 Global Entrepreneurship Monitor Topic Report: Women and Entrepreneurship. Bosbon College, MA.

Nagy, B. (1999), Businessmen and businesswomen: male and female entrepreneurs in the early 1990s, mimeo, Budapest University of Economic Sciences, Hungary.

Nikolova, E., Ricka, F., and Simroth, D. (2012), 'Entrepreneurship in the transition region: an analysis based on the Life in Transition Survey'. *Working Paper No. 141*, European Bank for Reconstruction and Development (EBRD), London.

Orser, B., and Hogarth-Scott, S. (2002), 'Opting for Growth: Gender Dimensions of Choosing Enterprise Development', *Canadian Journal of Administrative Sciences*, 19, pp. 284-300.

Paul, S., and Sattar, S. (2008), 'What accounts for the lower participation of women in entrepreneurship? Evidence from Transition Countries'. The World Bank, Washington D.C

Pines, A. M., and Lerner, M., and Schwartz, D. (2010), 'Gender differences in entrepreneurship: Equality, diversity and inclusion in times of global crisis', *Equality Diversity and Inclusion an International Journal*, 29, pp.186-198.

Rees, H., and Shah, A. (1996), 'An empirical analysis of self-employment in the U.K.', *Journal of Applied Econometrics*, 1, pp. 95-108.

Reynolds, P. D., Camp, S. M., Bygrave, W. D., Autio, E., and Hay, M. (2002) 'Global Entrepreneurship Monitor 2001 Executive Report', Babson College, MA.

Robinson, P. B., and Sexton, E. A. (1994), "The effect of education and experience on self-employment success", *Journal of Business Venturing*, 9, pp. 141-156.

Rosenbaum, P. R., Rubin, D. B. (1983), 'The central role of the propensity score in observational studies for causal effects', *Biometrika*, 70, pp. 41-55.

Rosenthal, P., Guest, D., and Peccei, R. (1996), 'Gender differences in managers' causal explanations for their work performance: a study in two organizations'. *Journal of Occupational and Organizational Psychology*, 69, pp. 145-151.

Schiller, B. S., and Crewson, P. E. (1997), 'Entrepreneurial Origins: A Longitudinal Inquiry'. *Economic Inquiry*, 35(3), pp. 523-531.

Schumpeter, J. (1939), Business Cycles. McGraw-Hill, New York

Stoyanowska, A. (2001), 'Jobs, Gender and Small Enterprises in Bulgaria. *Working papers No 20.* Series on Women's Entrepreneurship Development and Gender in Enterprises.

The World Bank (2010), Global Economic Prospects 2010. The World Bank, Washington D.C.

Verheul, I., Thurik, R., Grilo, I., and van der Zwan, P. (2012), 'Explaining preferences and actual involvement in self-employment: Gender and the entrepreneurial personality. Journal of Economic Psychology, 33(2), pp. 325-241.

Appendices

Appendix A: List of countries and respective sample sizes.

	Country	Sample size		Country	Sample size
1	Albania	525	16	Lithuania	476
2	Armenia	548	17	Macedonia	502
3	Azerbaijan	602	18	Moldova	510
4	Belarus	579	19	Mongolia	506
5	Bosnia	520	20	Montenegro	497
6	Bulgaria	457	21	Poland	651
7	Croatia	418	22	Romania	451
8	Czech Republic	527	23	Russia	895
9	Estonia	469	24	Serbia	662
10	Georgia	528	25	Slovakia	590
11	Hungary	409	26	Slovenia	468
12	Kazakhstan	619	27	Tajikistan	564
13	Kosovo	578	28	Turkey	620
14	Kyrgyzstan	542	29	Ukraine	847
15	Latvia	405	30	Uzbekistan	842

Appendix B: Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
Respondent's age group					
18-24	16807	0.14	0.35	0	1
25-34	16807	0.24	0.43	0	1
35-44	16807	0.22	0.42	0	1
45-54	16807	0.21	0.41	0	1
55-64	16807	0.18	0.38	0	1
Respondent's education group					
Primary	16807	0.11	0.31	0	1
Secondary	16807	0.68	0.47	0	1
Higher	16807	0.21	0.41	0	1
Preference for risk and uncertainty	16807	0.26	0.44	0	1
Number of male household members	16807	1.45	1.06	0	7
Number of female household members	16807	1.86	0.97	1	8
Number of adult household members	16807	2.56	1.25	1	10
Number of children	16807	0.80	1.05	0	7
Household size	16807	3.36	1.67	1	10
Female head of the household	16807	0.56	0.50	0	1
Household head's age group					
18-24	16807	0.07	0.25	0	1
25-34	16807	0.18	0.38	0	1
35-44	16807	0.22	0.41	0	1
45-54	16807	0.26	0.44	0	1
55-64	16807	0.22	0.42	0	1
65 and up	16807	0.06	0.23	0	1
Asset index	16807	-0.03	1.67	-2.60	3.45
Urban	16807	0.48	0.50	0	1
Rural	16807	0.40	0.49	0	1

Appendix C: Perspective of female respondents towards self-employment

	Male household head	Female household head
Self-employed	7%	6%
Given a choice would like to become self-employed	22%	21%
Would like to become self-employed but not self-employed currently	18%	18%
Have tried to set up business since 2007	4%	3%

Appendix D: Crisis Victimization and Growth in Female Entrepreneurship.

	Positive growth in female entrepreneurship	Negative growth in female entrepreneurship
More than 40% of female respondents agree crisis affected households	Albania Armenia Estonia Hungary Mongolia Romania Serbia Slovenia Tajikistan Ukraine	Azerbaijan Bulgaria Croatia Georgia Kosovo Latvia Lithuania Macedonia Montenegro
Less than 40% of female respondents agree crisis affected households	Czech Republic Kyrgyzstan Poland Russia Slovakia	Belarus Kazakhstan Uzbekistan