



GRAPE Working Paper # 6

Pushed into necessity? Labor market inequality and entrepreneurship of disadvantaged group

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FAME | GRAPE 2017



Foundation of Admirers and Mavens of Economics
Group for Research in Applied Economics

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Abstract

Theoretical literature on entrepreneurship hints that labor market inequality may constitute a relevant push factor for necessity self-employment, as opposed to aspirational self-employment. Drawing on empirical confirmation, this insight is used in many policy recommendations. We provide a new approach to test and quantify the link between labor market inequality and self-employment. We exploit rich and diverse international data on patterns of self-employment from the Global Entrepreneurship Monitor. We focus on measures of labor market inequality for women, utilizing estimates of adjusted gender wage and gender employment gap, comparable for a large selection of countries and years. Our results show that greater gender disparities in access to and in compensation for wage employment are associated with necessity self-employment, but the effect is small. We find no link for the aspirational self-employment.

Keywords:

female entrepreneurship, gender wage gap, gender employment gap, GEM

JEL Classification

J16, L26, D12

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Acknowledgements

We are grateful for long and clarifying discussions on the topic to Tomasz Mickiewicz, Saul Estrin, Irene van Staveren, Yona Rubinstein, Fredrik Heyman, Martin Olsson, Joacim Tag, Marcin Bielecki and Lucas van der Velde. Peter Szewczyk provided wonderful assistance. Participants of seminars at IFN, Ljubljana University, Ostfold College, GRAPE, WSE as well as participants of WCCE 2016 and IAFFE 2016 provided wonderful comments. Remaining errors are ours. Authors gratefully acknowledge the funding support from INNOGEND project co-funded from Norway Grants in the Polish-Norwegian Research Programme operated by the National Centre for Research and Development..

Published by:
ISSN:

FAME | GRAPE
2084-624X
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1 Introduction

Economic theory provides at least two possible answers to the question why people decide to establish their own firm. The first one is an intrinsic motivation to create something new (e.g. Hellmann 2007, Estrin et al. 2013). The second one stems from the fact that entry into self-employment – unlike entry into wage employment – is often unconstrained, thus constituting a viable alternative to unemployment (e.g. Earle and Sakova 2000, Hughes 2003, Llisterri et al. 2006, Thurik et al. 2008, Naudé 2011). There is empirical evidence that for some groups factors such as discrimination foster entry into self-employment (see Hughes 2003, Llisterri et al. 2006, for the case of women and youth, respectively).¹ Indeed, Evans and Leighton (1989) highlight that disadvantaged workers are more likely to enter self-employment. Focusing particularly on women and relying on qualitative evidence, Hughes (2003) argues that erosion of safe jobs has pushed women into self-employment in Canada.

Although the link between discrimination and a decision to enter into self-employment is appealing, its quantification poses methodological challenges. First, in most cases it is impossible to identify if a given worker has experienced discrimination, thus making it rather challenging to relate any labor market status choices to previous employment experience. Some attempts have been made by Taniguchi (2002), who analyzed white, Hispanic and African-American young women in the US using a longitudinal survey. Assuming that some women are more discriminated against than others due to ethnicity, Taniguchi (2002) argues that facing discrimination is conducive to establishing an own firm. Gender imbalance in start-ups and nascent entrepreneurship has long been a matter of analysis and is well documented (e.g. Mueller 2004, Estrin and Mickiewicz 2011, Kenney and Patton 2015).

Second, measures of discrimination are rarely available – typically one relies on the wage gaps between that cannot be attributed to differences in individual characteristics. Indeed, to obtain these indicators one needs micro-level data with a wide variety of controls. A comprehensive set of variables is needed, especially with parametric methods, because it is the ‘unexplained’ part of the wage models that is *attributed* to discrimination. The gender wage gap literature, for example, typically provides estimates for one or a few selected countries/years due to the data intensity of such computations. Thus, relating discrimination to self-employment in comparative context is also rare.

Third, even if one assumes all members of a vulnerable group are equal in a sense that they face the same labor market barriers, the very nature of discrimination remains a methodological challenge. Economic theory suggests, among others, a so-called taste-based motivation, whereby employers refuse to offer employment or equal wages because their clients regard some groups of workers as inferior. If that is the case, engaging in self-employment changes nothing in the preferences of the clients, with discrimination prevailing as a barrier to labor market activity of a vulnerable group.² The second dominant explanation for why discrimination is observed is

¹An related although rather separated strand of research concerns the self-employment motivations of immigrant population (see Moore 1983, Waldinger et al. 1990, Fairlie and Meyer 1996, Clark and Drinkwater 1998, 2000, Light 2004, Kerr and Mandorff 2015).

²Admittedly, for women establishing their own firms may be additionally challenging due to family roles, in the

the so-called statistical discrimination, whereby employers discount in wages the fact that some workers may be less productive per nominal hour – e.g. women due to care giving activities. Statistical discrimination could only be a motivation to set up own business if one had some form of private information that could not be signaled effectively to potential employers (e.g. a woman knew she would have high productivity per nominal hour and could not credibly commit). It is only the final possible explanation for discrimination – taste for discrimination against a type of workers – that has a straight forward implication that establishing a firm is likely to increase earned income.

Our paper is an attempt to at least partially overcome these methodological limitations. We employ a large collection of the estimates of the gender employment and gender wage gap for a large number of countries. These estimates come from two comparative studies: Ñopo et al. (2012) and Goraus and Tyrowicz (2013). We match these estimates with the rich and comprehensive data from Global Entrepreneurship Monitor (GEM), which provides a wide variety of indicators of propensity to undertake self-employment as well as the motivations behind being self-employed. GEM data are used extensively for the studies of self-employment, also in the context of women (see Mueller 2004, Minniti and Nardone 2007, Minniti and Naudé 2010, Estrin and Mickiewicz 2011, for example). Combining these two rich sources of data made it possible to analyze the case of 26 different countries, including advanced market economies, catching up and developing countries. We put into empirical test the conjecture that the extent of gender inequality in the labor market constitutes a pushing factor for necessity self-employment among women. By the same token, one should expect little or no role of gender gaps in the labor market for the aspirational self-employment.

We contribute to the current literature in two ways. First, we relate explicit, empirical indicators of gender inequality to the decisions concerning self-employment across genders in a large number of countries. Thus, we are able to provide comprehensive evidence concerning the relationship between labor market gaps and the necessity and aspirational self-employment for women, relative to men. We find that, indeed, higher scope of unexplained employment and wage inequality is associated with higher necessity self-employment among women. Although the effect is statistically significant and robust, it does not seem, however, to be economically large. Exploiting the fact that richness of the data permits separation into declared motivations for becoming self-employed, we also contribute to the debate on the drivers of aspirational self-employment. We find that labor market inequality between men and women has no explanatory power in the aspirational self-employment. Both findings are robust to including alternative indicators of gender inequality.

The paper is organized as follows. We first review the available, scarce evidence relating labor market conditions for women with self-employment. The literature has been growing for topics such as both formal and informal institutions, but somewhat smaller number of studies analyzed the gendered aspects thereof. In section 3 we move to describing the data employed in our study, this section covers also our empirical strategy. We present results in section 4 and

case of wage employment institutional solutions have been installed in majority of countries, including maternity leave, part-time employment, etc. (see Gherardi 2015, and the references there in for a recent overview).

conclude with policy implications of our study.

2 Literature review

There are two main strands of the literature directly related to our study: push/pull factors to entrepreneurship and female entrepreneurship. Labor economics literature has not reached a consensus on the role of labor market barriers (e.g. low wages or lack of jobs) in determining the decision to start one's own business. Early research on this topic highlight that starting new business as unemployed lowers opportunity costs (Blau 1987, Evans and Jovanovic 1989, Blanchflower and Meyer 1994), so an economic recession may be consider as a push factor. On the other hand, starting a new business requires physical capital, while unemployment leads to decrease in wealth (Johansson 2000, Hurst and Lusardi 2004). As Audretsch et al. (2002) emphasize that a recession is associated with fewer entrepreneurial opportunities, thus it should deter rather than encourage entrepreneurial entry.

In addition to the theoretical disagreements, the empirical results are also mixed. Typically, the identification is based on testing the correlation between labor market conditions (e.g. unemployment rate or GDP growth) and start-up intensity. In the case of early time-series analyses, studies find positive correlation between unemployment level and self-employment propensity (see Hamilton 1986, Schuetze 2000, Parker and Robson 2004). However, Robson (1998a) claims that most of the variation of self-employment rate can be explained by the regional fixed effects, so these results cannot be conclusive. In a panel data setup (e.g. Blanchflower 2000, Parker and Robson 2004) and individual level data studies (e.g. Taylor 1996, Henley 2004, Millán et al. 2012) the relationship between self-employment rate and unemployment rate tend to be negative. Similarly mixed results are obtained for GDP and self-employment. Robson (1998b) finds positive correlation between these two measures, but Pietrobelli et al. (2004), Robson (2010) show negative correlation between start-up rate and growth of domestic product. Offering some middle ground, Acs et al. (1994) present evidence for some U-shaped pattern in the relationship between self-employment rate and level of economic development, but these findings lack theoretical underpinnings.

Some foundations have been provided by the literature focusing on access to finance for newly established firms. Credit constraints have been shown to matter substantially, especially for women (Estrin and Mickiewicz 2011). This also suggests that the local development of the financial services and networks facilitating credibility or collateral play an important role. Indeed, the literature relating wealth – especially real estate in the form of housing – to entrepreneurial activity provides strong evidence in favor of such link (Robson 1998a, Blanchflower and Oswald 1998, Henley 2005, Disney and Gathergood 2009). The drawback of this literature from conceptual perspective, however, is that it moves the decision to establish own firm to household level (owner of the asset) rather than personal level. Consequently, this literature cannot account for motivations such as family risk pooling/sharing strategies, bargaining between family workers, comparative advantages of household members, etc. Naturally, gender aspect is bound to be missing as well.

The relevance of gender dimension – the second strand of the related literature – has been made paramount by a series of empirical studies. First, it is known that women are establishing different types of firms - with different structures and in different industry sectors than men (Coleman 2000, Orser et al. 2006, Allen et al. 2007). More extensive participation of women in self-employment makes markets more diverse with larger variety of products and services. The entrepreneurial sector has then higher quality and is better prepared to consumers' needs (Verheul et al. 2006, Minniti and Naudé 2010). Moreover, participation of women in the self-employment may enhance the women's power and welfare position by e.g. increasing returns from education (Fafchamps and Quisumbing 2005). Female self-employment opportunities are also considered as an important topic in a life-work balance discussion. Last but not least, female entrepreneurship plays important role in the reduction of the poverty (Anderson and Eswaran 2009).

Also, female entrepreneurship seems to exhibit specificity in the context of both formal and informal institutions. This is particularly important dimension, as it is claimed that contextualization (in terms of e.g. institutional environment) is crucial from the perspective of modern entrepreneurship research (Zahra et al. 2014). Estrin and Mickiewicz (2011) show that women react differently to institutional factors such as size of the state or informal financial sector in an economy. Kobeissi (2010) finds correlations between female entrepreneurship and gender specific measures of education attainment, gender empowerment, etc.

This gender specificity as suggested by various empirical studies need not be a purely gender phenomenon. It is widely acknowledged that the position of women in the labor market remains unequal, relative to men (even if the methodology to accurately measure the scope of this inequality continues to evolve). Results from previous studies suggest that there might exist a correlation between labor market constraints and level of entrepreneurial activity, though the sign is not clear, especially in the context of women. If inequality in employment and wage opportunities was an outcome of statistical discrimination, one should expect no relationship between the measures of gender gaps in the labor market and the intensity of entrepreneurship among women. Also, if lower earnings and barriers to employment for women is driven by consumers taste, entrepreneurship offers no better outcomes, thus reducing any incentives to engage in self-employment – be it necessity or opportunity. Thus, if there were to be links between gender gaps in the labor market and female self-employment, they would have to stem from employers' tastes or an interplay between labor market and business environment institutional setting. Thus, analyzing these links is of particular policy relevance.

While our study offers a novel perspective, it does relate to the literature. Perhaps the closest to our intentions in this paper has been the study by Kobeissi (2010). In a wide variety of control indicators, she includes ratio of wages between men and women (UN HDR), utilizing cross-country aggregates from GEM data. Her study finds a positive correlation between women's self-employment and raw wage gaps in a cross-section, but these results clearly cannot substantiate a causal hypothesis that gender specific labor market barriers push women out of employees pool and into self-employment. We utilize measures of employment and wage inequality between

men and women *adjusted* for individual characteristics and separate explicitly necessity self-employment and opportunity self-employment, as suggested by theory. We also compare the role of institutional characteristics to objective measures of labor market gender inequality.

3 Method and data

This section discusses the empirical strategy employed in our study as well as the data available. The main objective of the study is to test whether gender inequality in the labor market is a push factor for necessity self-employment among women. Thus, first we derive a simple model with gender to analyze the functional form in the relationship between the labor market inequality and self-employment. We then move to discussing the data sources and the econometric approach.

3.1 Theoretical framework

We propose a simple theoretical framework relating inequality in the labor market with the propensity to become self-employed. The framework is based on Fonseca et al. (2001) choice of occupation model. Consider an individual free to chose between self-employment (and creating jobs for others) and wage-employment (associated with job search). Let the expected payoff from being a worker be U and expected payoff from being an entrepreneur be αV . In this setup α is an entrepreneurial factor, e.g. a maximum number of new jobs that individual can create. As is standard, V is the expected value to entrepreneur from vacant job. Assume factor α to be exogenous. The higher α is, the better entrepreneurial skills person has. K is a start-up costs.

Extending Fonseca et al. (2001) framework, assume that individuals may have a gender. Women are disadvantaged in wages (gwg). Assume that V , U , K and distribution of α is the same for women and men, while m and w - costs of being self-employed are gender-specific. The following compatibility constraints for becoming self-employed hold in this setup:

$$\begin{aligned} \text{M:} & \quad (\alpha - m)V - K > U, \\ \text{W:} & \quad (\alpha - w)V - K > U(1 - gwg). \end{aligned}$$

The reservation entrepreneurial ability, which governs choice of entrepreneurship, is therefore different for men and women.

$$\begin{aligned} \text{M:} & \quad S_m = \frac{U + K}{V} + m \\ \text{W:} & \quad S_w = \frac{U + K - gwg * U}{V} + w \end{aligned}$$

With a fairly unconstraining assumption that α has distribution close to Pareto with index parameter κ close to 1, the population of self-employed men (1) and women (2) is a complementary

fraction.

$$\text{M: } e_m = 1 - F(S_m) = \left(\frac{1}{S_m}\right)^\kappa \Rightarrow \frac{1}{e_m} = \frac{U + K}{V} + m \quad (1)$$

$$\text{W: } e_w = 1 - F(S_w) = \left(\frac{1}{S_w}\right)^\kappa \Rightarrow \frac{1}{e_w} = \frac{U + K}{V} + m - \frac{gwg * U}{V} + (w - m) \quad (2)$$

This yields a gap in

$$\frac{1}{e_w} - \frac{1}{e_m} = -\frac{gwg * U}{V} + (w - m) \quad (3)$$

This gap should be negative unless men are sufficiently disadvantaged in costs of self-employment, i.e. m is sufficiently smaller than w . Similar reasoning holds for the employment gap:

$$W : (\alpha - \delta_w)V - K > U * (1 - geg). \quad (4)$$

This yields analogous derivation of gap in self-employment rates as in the case of gender wage gap. Note also that $(w - m)$ is likely to be a country specific effect, so specifications with country fixed effects are likely to be unbiased estimates of equation (3).

For the more intuitive conclusions, we will estimate our model using simpler form of the final equation with only female self-employment propensity on the left-hand side and male propensity as an explanatory variable (5).

$$\frac{1}{e_w} = -\frac{gwg * U}{V} + (w - m) + \frac{1}{e_m} \quad (5)$$

3.2 Data

Data on self-employment come from the Global Entrepreneurship Monitor. GEM is a survey conducted every year in over 100 countries among representative samples of at least 2000 individuals. Responders are asked mainly about their entrepreneurial activities, plans and aspirations. We use all data available online, i.e. waves of the survey from 2001 to 2010. This data has been used extensively in entrepreneurship research and thus does not require additional presentation (Kelley et al. 2012, Lepoutre et al. 2013, Minniti 2013, Bosma 2013).

The indicators of labor market gender inequalities come from two main sources. First, Ñopo et al. (2012) provide a set of estimates for gender wage gaps for 64 countries around the world. These estimates employ Ñopo (2008) decomposition based on exact matching. Thus, the estimates account for differences in characteristics of the labor market participants, at least to the extent to which data permit identification of similarities in characteristics among men and women. The estimates for 64 countries come from a relatively recent period, but are only available for one year (the most recent data available in the World Bank repository). This data is complemented by the estimates from various years provided by Goraus and Tyrowicz (2013). While this source of data focuses on European economies (transitioning and advanced), it has the advantage of often providing more than estimate per country. The other advantage of using this source is that Goraus and Tyrowicz (2013) also provide estimates of the gender employment gap. Both these studies employ Ñopo (2008) decomposition and roughly equivalent

set of control variables.

Although the country coverage of GEM is increasing with every wave, originally few countries were represented. Also the micro-datasets collected by Ñopo et al. (2012) and Goraus and Tyrowicz (2013) are often available for only selected years for many countries. With exact matching of years between the data on gender labor market gaps and GEM we obtain data for 21 countries with GWG indicator, and 25 countries with GEG indicator. This is the largest comparative data set in the literature, but far from satisfactory. To address this problem we implement the following procedure. First, if data concerning labor market gaps is not available for the exact year of GEM wave for a given country, but is available in the period prior or after the wave, we replace missing matches with those inexact ones. Research finds that gender wage gaps are exceptionally stable over time, especially in short horizons (O'Reilly et al. 2015) so this inexact matching of years for a given country is not likely to yield a substantial bias. To define the period for matching we take five year horizons either prior to or after the availability in either of the two types of data sources.

Second, as means of comparison, we also utilize indicators of gender equality from Indices of Social Development operated by Institute for Social Studies at Erasmus University. These indicators are composite and usually utilize raw measures, i.e. without adjusting for differences in characteristics between men and women. ISD has a wide coverage of countries in five-year intervals, we are thus able to match a larger number of GEM country-year data points. This has three main advantages. First, we may analyze the relation between gender equality and necessity self-employment among women for a broad selection of countries. Second, we may explicitly test the external validity of the findings for specifications with our preferred measures of gender gaps in the labor market. Third, ISD indicators capture the aspects of formal and informal institutions which were emphasized by the literature (Zahra et al. 2014) and which are not captured by adjusted gender employment and wage gaps.

Summarizing, data coverage of GEM combined with the availability of estimates from Ñopo et al. (2012) and Goraus and Tyrowicz (2013) yields 25 exact country matches. With the inexact matches, we are able to increase the sample to comprise 26 countries for both GWG and GEG indicators. Finally, with ISD data we can work with as many as 80 countries available in GEM. The combined data coverage is summarized in Table A1.

3.3 Empirical strategy

Our empirical strategy relies on the theoretical model described in section 3.1. We follow a micro-level approach. Our main interest lies in necessity self-employment. We use self-reported motivation to start a new business as available in GEM to identify self-employment out of necessity. We employ a multilevel mixed effects model, in a spirit similar to Estrin and Mickiewicz (2011), Estrin et al. (2013). We estimate the propensity to engage in necessity self-employment among women. We include the traditional controls at individual level (age, education, indicators concerning access to capital and knowledge about business, etc.). As country level controls, we use propensity to engage in necessity self-employment by men and the

available variety of gender equality controls. We keep the former to account for the plausible conjecture that labor markets which segment and/or discriminate workers are likely to have higher rates of necessity self-employment in general.

Clearly specifications which focus on necessity self-employment cannot be considered a robust confirmation for the hypothesis that gender inequality in the labor market pushes women out of wage-employment and into starting their own businesses. It is likely that generally malfunctioning labor markets will encourage self-employment, while higher self-employment has been demonstrated to exhibit ‘spillovers’ in a sense that it triggers further increase in self-employment. Thus, in addition to necessity self-employment, we also need specifications with aspirational self-employment. For these explained variables, in order to have the hypothesis be confirmed, we need that no relationship is found for the indicators of gender gaps in the labor market.

When it comes to separating self-employment *per se* from entrepreneurship the literature so far suggests two approaches with reference to GEM data. First GEM asks individuals who report intention to start up a new business what is the main reason to do so. In addition to necessity (as used in our main explained variable), responders may also report that the main motivation is a business opportunity they consider viable. This is the first approach to define aspirational self-employment in GEM data. Second approach relies on answers reported by those who already operate a business. These responders provide answers to a question on what is their expected future employment level. Following Estrin et al. (2013) we use the employment growth aspiration (EGA). Due to the nature of the question, it has value only for current entrepreneurs and because some of the respondents refuse to reveal its planned employment, this measure will be available for much smaller sample than the previous ones.

3.4 Descriptive statistics

Given the complexity of the data we analyze, we treat descriptive statistics with special attention. We replicate the split between the exact match with GEG and GWG data and the widest possible coverage with the ISD indicators of gender equality. In total, although the samples differ substantially in country composition, the differences in key variables are not as substantial, see Table A2. For countries in which gender wage gaps estimates are exactly matched, the estimates of gender employment gaps are much higher. This, however, is about the biggest discrepancy between the averages and it is not statistically significant (due to a large dispersion of GEG estimates). Recall that GEG and GWG measures are adjusted for individual characteristics, thus raising our confidence in this data.

As far as self-employment indicators are concerned, we find that the countries available in our sample are characterized by on average lower entrepreneurship than the largest sample matching the ISD coverage. This is to be expected, because the comparable estimates of the adjusted gender employment and wage gaps are usually available for more advanced countries and these are in general characterized by somewhat lower levels of self-employment. Although there is some discrepancy between ISD coverage of 80 countries and the 20+ countries for which

GEG and/or GWG are available, there is no discernible differences in the indicators of necessity and aspirational self-employment in these two groups. The three samples are also similar in other observable and relevant characteristics, such as age, education and access to networks of entrepreneurs.

4 Results

We present the results from individual data from GEM. We employ multilevel regressions to adequately account for the variation in measures of gender inequality across countries and years. We estimate linear probability model, with the explained variable taking the value of 1 if an individual reports having undertaken self-employment due to necessity. The variable takes the value of 0 if one continues to be wage employed. Thus, following our theoretical setup, we distinguish self-employed out of necessity to those who continue to participate in (possibly unequal) labor market.³ Since barriers in the labor market may affect also other groups, not only women, we control in all the specifications for the country-year ratio between men self-employed out of necessity and men who continue to be wage employed. We estimate six specifications of the model, to account for the role of our key variables: GWG, GEG and expert measures of gender equality from ISD. This approach is replicated for the equations for aspirational self-employment, only the explained variable is adapted.

The results for necessity self-employment on the individual level data are reported in Table A3. By and large, they provide evidence to substantiate the main hypothesis of this study: probability to become self-employment increases with the labor market barriers. This effect is significant in smaller selection of countries (exact match) and in larger selection (inexact match). However, our estimates lose significance when we utilize the gender wage gap and thus reduce the number of countries to 21 and the number of country-year waves to 53. The estimated coefficient has a positive sign, but is no longer significant. The results for objective measures of gender gaps in the labor market are corroborated by a negative estimate for the expert measures of gender inequality from ISD.⁴

The results from Table A3 are indicative that harmful labor market conditions constitute a push factor to start own enterprise out of necessity. Although robust and statistically significant, these effects are rather small economically. An increase of 1 percentage point in GEG for example is associated with a necessity self-employment higher by 0.4-0.6 percentage points, i.e. less than 10% of the incidence. Although GEG estimates are fairly dispersed across countries in our sample, they tend to be rather stable across time. Thus, should higher incidence of necessity self-employment be a concern for economic policy, it seems that the gender inequality itself has a higher priority.

As posited by our theoretical framework, necessity self-employment among women is strongly correlated with its incidence among men. This suggests that labor markets with higher barriers

³Such approach is also in line with conceptualization proposed by Ramoglou (2013).

⁴For ISD indicators higher value of the indicator implies more equality, hence the change in the estimated sign between columns (1)-(4) and column (5). In the interest of comparability, countries and years in column (5) are the same as in the case of GEG/GWG inexact matching.

for women, generally tend to be more segmented, pushing also other groups towards self-employment. Our study confirms, though, that this effect is stronger for women. Also, while our theoretical model predicts the coefficient on necessity self-employment among men to be close to unity, this is rejected by the data. As confirmed by earlier studies, better education and networking with other entrepreneurs is conducive to necessity self-employment relative to those who remain in the pool of the employees. This indicates that there continue to be selection effects, even in pushed self-employment.

For our hypothesis to be corroborated by the data, we need for the necessity self-employment to be correlated to the barriers – as proven – and for the aspirational self-employment to be unrelated. To this end we run a set of estimations similar to Table A3, but rather than necessity self-employment, we estimate a linear probability model with mixed effects for the aspirational entrepreneurship. We define the explanatory variable to take the value of 1 if an individual reports aspirations to mainly drive his or her decision and 0 if a person remains wage employed. Alternatively, relying on earlier studies, we also use the expected growth in employment (EGA) as measure of entrepreneurial aspirations. While failure to reject the null hypothesis will not confirm lack of relationship, should we find significant estimators on measures of barriers, we would surely know our main hypothesis was rejected by the data. As evidenced in Table 2, it is not the case. Indeed, correlations between measures of gender inequality (labor market adjusted gaps and expert indicators) and incidence of aspirational self-employment are all insignificant. These results confirm that the patterns identified for necessity self-employment are not driven by country specificity in self-employment *per se*. Entrepreneurial aspirations seem not to be dependent on gender gaps in employment and wages. In parallel to earlier literature, our study too confirms that institutions may matter for incidence of aspirational self-employment. The estimates of ISD expert measures of gender quality prove statistically significant and positive, which accentuates the relevance of factors such as voice, empowerment, access to finance, etc.

The results obtained for both necessity self-employment and opportunity self-employment are confirmed in several robustness checks on subsamples with shorter time periods (Table A3 and A4) and subsamples covering separately EU14 countries and new member states (Table A5 and A6).

Our results at individual level are consistent with earlier studies of female entrepreneurship, (e.g. Estrin and Mickiewicz 2011, Estrin et al. 2013) – the individual characteristics have the expected signs and plausible magnitudes. Our specific focus in this paper has been on the labor market inequality – a notion absent from earlier studies – which can be conveniently estimated for women due to availability of comparable estimates of adjusted gender employment and wage gaps. We show that the way institutions in these countries affect labor market position of women is associated with their choices to engage in necessity self-employment. Estrin and Mickiewicz (2011) prove a similar point for access to capital and aspirational self-employment.

Table 1: Necessity self-employment for women

Necessity SE for women = 1	(1)	(2)	(3)	(4)	(5)
GEG exact match	0.0060*** (0.0018)				
GWG exact match		0.0021 (0.0030)			
GEG inexact match			0.0064*** (0.0014)		
GWG inexact match				0.0046* (0.0025)	
ISD gender equality					-0.0205*** (0.0055)
Necessity SE - men (average)	0.6242*** (0.0375)	0.6315*** (0.0597)	0.6237*** (0.0363)	0.9931*** (0.0488)	0.6346*** (0.0365)
Age	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
Tertiary education	0.0004 (0.0003)	0.0000 (0.0006)	0.0004 (0.0003)	0.0003 (0.0004)	0.0003 (0.0003)
Knows entrepreneur	0.0071*** (0.0003)	0.0079*** (0.0007)	0.0072*** (0.0003)	0.0072*** (0.0004)	0.0071*** (0.0003)
Knows business angel	0.0118*** (0.0010)	0.0103*** (0.0020)	0.0116*** (0.0010)	0.0111*** (0.0011)	0.0118*** (0.0010)
Constant	0.0010 (0.0008)	0.0049*** (0.0017)	0.0011 (0.0008)	-0.0021 (0.0013)	0.0185*** (0.0044)
Relevance of year-country groups (σ_u)	-5.7017*** (0.0904)	-5.6271*** (0.1721)	-5.7227*** (0.0911)	-4.8667*** (0.0615)	-5.7308*** (0.0942)
Relevance of individual level (σ_e)	-2.4537*** (0.0012)	-2.3585*** (0.0022)	-2.4433*** (0.0012)	-2.3918*** (0.0012)	-2.4537*** (0.0012)
Country-year groups	185	53	191	175	185
Observations	339,702	101,616	344,308	326,663	339,702

Notes: multilevel mixed effects model with individuals representing level one and country-year groups representing level two. The explained variable is binary, taking the value of 1 if a person declares self-employment out of necessity and 0 if continues to be wage employed. Individuals engaged into self-employment for other reasons excluded from computation. The share of necessity self-employment among men computed as average for each country-year. ISD measures of gender equality take the value between 0 and 1, higher values imply more equality.

The values of σ_u display a test statistic for a null hypothesis that country-year level effects are jointly insignificant. The values of σ_e display a test statistic for a null hypothesis that individual level effects are jointly insignificant. Standard errors clustered at country level in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

5 Conclusions

Some literature suggests – e.g. García and Welter (2013) – that typical business behavior and entrepreneurship should not be considered gender neutral. Our study supports this claim, showing a specific angle of business start-ups among women in a broad group of countries. We analyze empirically a theoretically-motivated link between gender labor market inequality and the incidence of necessity self-employment among women.

Our paper proposes a way to partially overcome the methodological difficulties concerning the problem of gender equality in the labor market and self-employment. We combine a wide selection of adjusted gender employment and wage gaps estimators with individual-level data from the Global Entrepreneurship Monitor. We estimate the determinants of necessity and aspirational self-employment in a multi-level framework. While we cannot argue that women who start their own businesses have been previously discriminated against, we show that higher scope of adjusted gender gaps in employment and wages tends to be associated with higher incidence of necessity self-employment, but not aspirational self-employment. These results are robust to inclusion of controls and country selection. However, these effects are economically small if not negligible. Hence, policy relevance of the link between labor market inequality and necessity self-employment appears to be relatively low.

Our findings are relevant from a policy dimension for two main reasons. First, although one should be cautious of causal interpretations, such a link is indicative that indicators of labor market gender gaps may be understated, if at least some women are pushed out to necessity self-employment. Thus, in the analyzed countries, the scope of inequality seems to be even larger than captured by the available estimation techniques. Second, it also suggest that it is not customers' taste but rather employers' taste that stands behind labor market gaps.

References

- Acs, Z., Audretsch, D. and Evans, D.: 1994, Why does the self-employment rate vary across countries and over time?, *Discussion Paper 871*, Center for Economic Policy Research.
- Allen, E., Langowitz, N. and Minniti, M.: 2007, The 2006 Global Entrepreneurship Monitor Special Topic Report: Women in Entrepreneurship, *Technical report*, Center for Women Leadership, Babson College, Babson Park, MA.
- Anderson, S. and Eswaran, M.: 2009, What determines female autonomy? Evidence from Bangladesh, *Journal of Development Economics* **90**(2), 179–191.
- Audretsch, D. B., Carree, M. A., Van Stel, A. J. and Thurik, A. R.: 2002, Impeded industrial restructuring: the growth penalty, *Kyklos* **55**(1), 81–98.
- Blanchflower, D. G.: 2000, Self-employment in OECD countries, *Labour Economics* **7**(5), 471–505.
- Blanchflower, D. G. and Meyer, B. D.: 1994, A longitudinal analysis of the young self-employed in Australia and the United States, *Small Business Economics* **6**(1), 1–19.
- Blanchflower, D. G. and Oswald, A. J.: 1998, What makes an entrepreneur?, *Journal of Labor Economics* **16**(1), 26–60.
- Blau, D. M.: 1987, A time-series analysis of self-employment in the United States, *Journal of Political Economy* **95**(3), 445–467.
- Bosma, N.: 2013, The Global Entrepreneurship Monitor (GEM) and Its Impact on Entrepreneurship Research, *Foundations and Trends in Entrepreneurship* **9**(2), 143–248.
- Clark, K. and Drinkwater, S.: 1998, Ethnicity and Self-Employment in Britain, *Oxford Bulletin of Economics and Statistics* **60**(3), 383–407.
- Clark, K. and Drinkwater, S.: 2000, Pushed out or pulled in? Self-employment among ethnic minorities in England and Wales, *Labour Economics* **7**(5), 603–628.
- Coleman, S.: 2000, Access to capital and terms of credit: A comparison of men- and women-owned small businesses, *Journal of Small Business Management* **38**(3), 37.
- Disney, R. and Gathergood, J.: 2009, Housing wealth, liquidity constraints and self-employment, *Labour Economics* **16**(1), 79–88.
- Earle, J. S. and Sakova, Z.: 2000, Business start-ups or disguised unemployment? Evidence on the character of self-employment from transition economies, *Labour Economics* **7**(5), 575–601.
- Estrin, S., Korosteleva, J. and Mickiewicz, T.: 2013, Which institutions encourage entrepreneurial growth aspirations?, *Journal of Business Venturing* **28**(4), 564–580.

- Estrin, S. and Mickiewicz, T.: 2011, Institutions and female entrepreneurship, *Small Business Economics* **37**(4), 397–415.
- Evans, D. S. and Jovanovic, B.: 1989, An estimated model of entrepreneurial choice under liquidity constraints, *Journal of Political Economy* **97**(4), 808–827.
- Evans, D. S. and Leighton, L. S.: 1989, Some empirical aspects of entrepreneurship, *American Economic Review* **79**(3), 519–535.
- Fafchamps, M. and Quisumbing, A.: 2005, Assets at marriage in rural Ethiopia, *Journal of Development Economics* **77**(1), 1–25.
- Fairlie, R. W. and Meyer, B. D.: 1996, Ethnic and Racial Self-Employment Differences and Possible Explanations, *The Journal of Human Resources* **31**(4), 757–793.
- Fonseca, R., Lopez-Garcia, P. and Pissarides, C. A.: 2001, Entrepreneurship, start-up costs and employment, *European Economic Review* **45**(4), 692–705.
- García, M. C. D. and Welter, F.: 2013, Gender identities and practices: Interpreting women entrepreneurs’ narratives, *International Small Business Journal* **31**(4), 384–404.
- Gherardi, S.: 2015, Authoring the female entrepreneur while talking the discourse of work-family life balance, *International Small Business Journal* **33**(6), 649–666.
- Goraus, K. and Tyrowicz, J.: 2013, The Goodwill Effect? Female Access to the Labor Market Over Transition: A Multicountry Analysis, *WNE UW Working Papers Series 19/2013 (104)*, Faculty of Economics, University of Warsaw.
- Hamilton, R. T.: 1986, The influence of unemployment on the level and rate of company formation in Scotland, 1950–1984, *Environment and Planning A* **18**(10), 1401–1404.
- Hellmann, T.: 2007, The role of patents for bridging the science to market gap, *Journal of Economic Behavior & Organization* **63**(4), 624–647.
- Henley, A.: 2004, Self-employment status: The role of state dependence and initial circumstances, *Small Business Economics* **22**(1), 67–82.
- Henley, A.: 2005, Job creation by the self-employed: The roles of entrepreneurial and financial capital, *Small Business Economics* **25**(2), 175–196.
- Hughes, K. D.: 2003, Pushed or pulled? Women’s entry into self-employment and small business ownership, *Gender, Work & Organization* **10**(4), 433–454.
- Hurst, E. and Lusardi, A.: 2004, Liquidity constraints, household wealth, and entrepreneurship, *Journal of Political Economy* **112**(2), 319–347.
- Johansson, E.: 2000, Self-employment and liquidity constraints: Evidence from Finland, *The Scandinavian Journal of Economics* **102**(1), 123–134.

- Kelley, D. J., Singer, S. and Herrington, M.: 2012, Global Entrepreneurship Monitor 2011, *Global report*, Center for Women Leadership, Babson College, Babson Park, MA.
- Kenney, M. and Patton, D.: 2015, Gender, ethnicity and entrepreneurship in initial public offerings: illustrations from an open database, *Research Policy* **44**(9), 1773–1784.
- Kerr, W. R. and Mandorff, M.: 2015, Social networks, ethnicity, and entrepreneurship, *Working Paper No. 21597*, National Bureau of Economic Research.
- Kobeissi, N.: 2010, Gender factors and female entrepreneurship: International evidence and policy implications, *Journal of International Entrepreneurship* **8**(1), 1–35.
- Lepoutre, J., Justo, R., Terjesen, S. and Bosma, N.: 2013, Designing a global standardized methodology for measuring social entrepreneurship activity: the Global Entrepreneurship Monitor social entrepreneurship study, *Small Business Economics* **40**(3), 693–714.
- Light, I.: 2004, The Ethnic Economy, in N. Smelser and R. Swedberg (eds), *Handbook of Economic Sociology*, 2nd edn, Russell Sage Foundation, chapter 28.
- Llisterri, J. J., Kantis, H., Angelelli, P. and Tejerina, L.: 2006, Is Youth Entrepreneurship a Necessity or an Opportunity?: A first exploration of household and new enterprise surveys in Latin America, *Sustainable Development Department Technical Papers Series MSM-131*, Inter-American Development Bank.
- Millán, J. M., Congregado, E. and Román, C.: 2012, Determinants of self-employment survival in Europe, *Small Business Economics* **38**(2), 231–258.
- Minniti, M.: 2013, *The Dynamics of Entrepreneurship: Evidence from Global Entrepreneurship Monitor Data*, Oxford University Press.
- Minniti, M. and Nardone, C.: 2007, Being in someone else’s shoes: the role of gender in nascent entrepreneurship, *Small Business Economics* **28**(2-3), 223–238.
- Minniti, M. and Naudé, W.: 2010, What do we know about the patterns and determinants of female entrepreneurship across countries?, *European Journal of Development Research* **22**(3), 277–293.
- Moore, R. L.: 1983, Employer Discrimination: Evidence From Self-Employed Workers, *The Review of Economics and Statistics* **65**(3), 496–501.
- Mueller, S. L.: 2004, Gender gaps in potential for entrepreneurship across countries and cultures, *Journal of Developmental Entrepreneurship* **9**(3), 199.
- Naudé, W.: 2011, *Entrepreneurship and Economic Development*, Palgrave Macmillan UK, London, chapter Entrepreneurship and Economic Development: An Introduction, pp. 3–17.
- Ñopo, H.: 2008, Matching as a tool to decompose wage gaps, *The Review of Economics and Statistics* **90**(2), 290–299.

- Ñopo, H., Daza, N. and Ramos, J.: 2012, Gender earning gaps around the world: a study of 64 countries, *International Journal of Manpower* **33**(5), 464–513.
- O’Reilly, J., Smith, M., Deakin, S. and Burchell, B.: 2015, Equal Pay as a Moving Target: International perspectives on forty-years of addressing the gender pay gap, *Cambridge Journal of Economics* **39**(2), 299–317.
- Orser, B. J., Riding, A. L. and Manley, K.: 2006, Women entrepreneurs and financial capital, *Entrepreneurship Theory and Practice* **30**(5), 643–665.
- Parker, S. C. and Robson, M. T.: 2004, Explaining international variations in self-employment: evidence from a panel of OECD countries, *Southern Economic Journal* **71**(2), 287–301.
- Pietrobelli, C., Rabellotti, R. and Aquilina, M.: 2004, An empirical study of the determinants of self-employment in developing countries, *Journal of International Development* **16**(6), 803–820.
- Ramoglou, S.: 2013, Who is a “non-entrepreneur”? Taking the “others” of entrepreneurship seriously, *International Small Business Journal* **31**(4), 432–453.
- Robson, M.: 2010, *Entrepreneurship and Culture*, Springer Berlin Heidelberg, Berlin, Heidelberg, chapter Explaining Cross-National Variations in Entrepreneurship: The Role of Social Protection and Political Culture, pp. 245–267.
- Robson, M. T.: 1998a, Self-employment in the UK regions, *Applied Economics* **30**(3), 313–322.
- Robson, M. T.: 1998b, The rise in self-employment amongst UK males, *Small Business Economics* **10**(3), 199–212.
- Schuetze, H. J.: 2000, Taxes, economic conditions and recent trends in male self-employment: a Canada–US comparison, *Labour Economics* **7**(5), 507–544.
- Taniguchi, H.: 2002, Determinants of women’s entry into self-employment, *Social Science Quarterly* **83**(3), 875–893.
- Taylor, M. P.: 1996, Earnings, independence or unemployment: why become self-employed?, *Oxford Bulletin of Economics and Statistics* **58**(2), 253–266.
- Thurik, A. R., Carree, M. A., Van Stel, A. and Audretsch, D. B.: 2008, Does self-employment reduce unemployment?, *Journal of Business Venturing* **23**(6), 673–686.
- Verheul, I., Stel, A. V. and Thurik, R.: 2006, Explaining female and male entrepreneurship at the country level, *Entrepreneurship and regional development* **18**(2), 151–183.
- Waldinger, R., Aldrich, H. and Ward, R. (eds): 1990, *Ethnic Entrepreneurs. Immigrant business in Industrial Societies*, Vol. 1 of *Sage Series on Race and Ethnic Relations*, Sage Publications.
- Zahra, S. A., Wright, M. and Abdelgawad, S. G.: 2014, Contextualization and the advancement of entrepreneurship research, *International Small Business Journal* .

6 Appendices

Table 2: Opportunity self-employment and entrepreneurial growth aspirations

	(1)	(2)	(3)	(4)	(5)	(6)
	Opportunity SE for women =1			EGA		
GEG inexact match	0.0020 (0.0038)			0.0300 (0.0192)		
GWG inexact match		0.0048 (0.0043)			-0.0209 (0.0136)	
ISD gender equality			0.0287* (0.0147)			0.0483 (0.0544)
<i>y</i> variable - men (average)	0.4803*** (0.0375)	0.6387*** (0.0382)	0.7281*** (0.0211)	0.8191*** (0.0380)	0.7669*** (0.0316)	0.9036*** (0.0194)
Age	-0.0004*** (0.0000)	-0.0004*** (0.0000)	-0.0005*** (0.0000)	-0.0055*** (0.0003)	-0.0055*** (0.0003)	-0.0057*** (0.0002)
Tertiary education	0.0125*** (0.0007)	0.0122*** (0.0007)	0.0165*** (0.0007)	0.0267*** (0.0071)	0.0240*** (0.0072)	0.0350*** (0.0061)
Knows entrepreneur	0.0396*** (0.0007)	0.0401*** (0.0007)	0.0488*** (0.0006)	0.0549*** (0.0070)	0.0578*** (0.0071)	0.0703*** (0.0058)
Knows business angel	0.0556*** (0.0021)	0.0554*** (0.0021)	0.0663*** (0.0017)	0.0577*** (0.0160)	0.0521*** (0.0161)	0.0698*** (0.0115)
Constant	0.0066** (0.0027)	-0.0014 (0.0029)	-0.0268** (0.0117)	0.1950*** (0.0180)	0.2229*** (0.0167)	0.1424*** (0.0432)
Relevance of year-country groups (σ_u)	-4.5157*** (0.0649)	-4.3310*** (0.0643)	-3.9540*** (0.0414)	-4.3996*** (0.5582)	-5.3296* (2.7686)	-3.6102*** (0.1551)
Relevance of individual level (σ_e)	-1.7253*** (0.0012)	-1.7114*** (0.0012)	-1.5600*** (0.0010)	-0.6166*** (0.0044)	-0.6085*** (0.0045)	-0.5065*** (0.0033)
Country-year groups	191	175	394	189	173	391
Observations	344,308	326,663	535,615	25,373	24,737	46,737

Notes: multilevel mixed effects model with individuals representing level one and country-year groups representing level two. *Opportunity self-employment* is binary, taking the value of 1 if a person declares self-employment driven by business opportunity and 0 if continues to be wage employed. In opportunity self-employment specification individuals engaged into self-employment for other reasons excluded from computation. The share of opportunity self-employment among men computed as average for each country-year. *EGA* is measured as reported planned increase in employment in five year horizon. ISD measures of gender equality take the value between 0 and 1, higher values imply more equality. Standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table A1: Country coverage

	GEG exact match	GWG exact match	GEG inexact match	GWG inexact match
Czech Republic	1		1	1
Austria	2		2	2
Bosnia and Herzegovina			2	2
Poland	3	3	3	3
Serbia	1	1	3	3
Portugal	4	1	4	4
Romania	4		4	
Latvia	6	1	6	6
Switzerland	6		6	
Greece	8	4	8	8
Sweden	8	1	8	8
Croatia	7	7	9	9
Germany	9	4	9	9
Hungary	9	2	9	9
Iceland	9	1	9	8
Ireland	9	5	9	9
Slovenia	9	1	9	8
Belgium	10	2	10	10
Denmark	10	1	10	6
Finland	10	3	10	10
France	10	2	10	10
Italy	10	4	10	10
Netherlands	10	2	10	9
Norway	10	1	10	9
Spain	10	5	10	10
United Kingdom	10	2	10	10

Notes: Table shows how many country-year groups we were able to match with labor market indicators.

Table A2: Descriptive statistics for women in the sample

Coverage by	ISD	GEG exact	GWG exact
SE	5.8% (23.3%)	3.4% (18.2%)	3.7% (19%)
Necessity SE	1.6% (12.6%)	0.6% (7.6%)	0.8% (8.8%)
Opportunity SE	3.9% (19.3%)	2.6% (16%)	2.7% (16.2%)
EGA	23.5% (63.6%)	13.7% (54.8%)	12.1% (48.8%)
Age	43.5 (15.5)	45 (15.3)	44 (15.6)
Tertiary education	33.3% (47.1%)	34.4% (47.5%)	35.8% (48%)
Knows entrepreneur	32.6% (46.9%)	30% (45.8%)	30.5% (46.1%)
Knows business angel	2.5% (15.5%)	1.7% (13.1%)	2% (13.1%)
GEG exact match	23% (16.7%)	23% (16.7%)	32.6% (15.7%)
GWG exact match	20.2% (17.8%)	20.2% (17.8%)	20.2% (17.8%)
GEG inexact match	24% (20.1%)	23% (16.7%)	32.6% (15.7%)
GWG inexact match	24.4% (20.7%)	24.3% (20.7%)	20.3% (17.8%)
ISD	0.76 (.07)	0.79 (.05)	0.79 (.06)
Countries	80	25	21
Country-year groups	394	185	53
Individual observations	1 317 983	845 255	807 112

Notes: We report means, along with standard deviations in parentheses, for example ‘GEG exact match’ signifies an average of GEG from the countries where exact match between GEM data and available estimates of employment gap. Country coverage reported in Table A1.

Table A3: Necessity self-employment for women - robustness check - time dimension

	2001-2005			2006-2010		
	(1)	(2)	(3)	(4)	(5)	(5)
Necessity SE for women = 1						
GEG exact match	0.0048** (0.0023)				0.0096*** (0.0031)	
GWG exact match		-0.0026 (0.0028)			0.0050 (0.0114)	
GEG inexact match			0.0048** (0.0023)		0.0074*** (0.0017)	
GWG inexact match				-0.0008 (0.0017)	0.0119** (0.0059)	
ISD gender equality						-0.0185*** (0.0055)
Necessity SE - men (average)	0.5908*** (0.0520)	0.6103*** (0.0666)	0.5908*** (0.0520)	0.6096*** (0.0527)	0.6472*** (0.1191)	1.1426*** (0.0747)
Age	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
Tertiary education	0.0004 (0.0004)	-0.0013 (0.0011)	0.0004 (0.0004)	0.0003 (0.0004)	0.0007 (0.0008)	0.0001 (0.0006)
Knows entrepreneur	0.0076*** (0.0004)	0.0101*** (0.0010)	0.0076*** (0.0004)	0.0077*** (0.0004)	0.0066*** (0.0009)	0.0064*** (0.0006)
Knows business angel	0.0112*** (0.0014)	0.0097*** (0.0034)	0.0112*** (0.0014)	0.0120*** (0.0014)	0.0106*** (0.0024)	0.0101*** (0.0017)
Constant	0.0010 (0.0011)	0.0043** (0.0020)	0.0010 (0.0011)	0.0025** (0.0011)	0.0042 (0.0035)	-0.0050* (0.0027)
Relevance of year-country groups (σ_u)	-5.6100*** (0.1070)	-5.8016*** (0.2219)	-5.6100*** (0.1070)	-5.6168*** (0.1114)	-5.3642*** (0.2384)	-4.6154*** (0.0929)
Relevance of individual level (σ_e)	-2.4840*** (0.0016)	-2.4355*** (0.0035)	-2.4840*** (0.0016)	-2.4808*** (0.0016)	-2.3148*** (0.0028)	-2.2932*** (0.0019)
Country-year groups	108	31	108	104	22	71
Observations	191,373	39,703	191,373	187,007	61,913	139,656
					152,935	148,329

Notes: multilevel mixed effects model with individuals representing level one and country-year groups representing level two. The explained variable is binary, taking the value of 1 if a person declares self-employment out of necessity and 0 if continues to be wage employed. Individuals engaged into self-employment for other reasons excluded from computation. The share of necessity self-employment among men computed as average for each country-year. ISD measures of gender equality take the value between 0 and 1, higher values imply more equality.

The values of σ_u display a test statistic for a null hypothesis that country-year level effects are jointly insignificant. The values of σ_e display a test statistic for a null hypothesis that individual level effects are jointly insignificant. Standard errors clustered at country level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A4: Opportunity self-employment and entrepreneurial growth aspirations - robustness check - time dimension

	2001-2005			2006-2010		
	(1) Opportunity SE for women =1	(2) Opportunity SE for women =1	(3) Opportunity SE for women =1	(4) EGA	(5) EGA	(6) EGA
GEG inexact match	-0.0014 (0.0057)	-0.0001 (0.0040)	-0.0435 (0.0370)	0.0006 (0.0375)	-0.0532** (0.0265)	0.0541 (0.0430)
GWG inexact match	0.4500*** (0.0447)	0.4534*** (0.0453)	0.4443*** (0.0446)	0.5025*** (0.0634)	0.4745*** (0.0622)	0.6239*** (0.0619)
ISD gender equality	-0.0004*** (0.0000)	-0.0003*** (0.0000)	-0.0004*** (0.0000)	-0.0043*** (0.0004)	-0.0042*** (0.0004)	-0.0082*** (0.0005)
y variable - men (average)	0.0146*** (0.0009)	0.0145*** (0.0009)	0.0147*** (0.0009)	0.0269*** (0.0096)	0.0263*** (0.0097)	0.0248** (0.0111)
Tertiary education	0.0392*** (0.0009)	0.0391*** (0.0009)	0.0392*** (0.0009)	0.0555*** (0.0092)	0.0561*** (0.0094)	0.0625*** (0.0111)
Knows entrepreneur	0.0630*** (0.0029)	0.0623*** (0.0029)	0.0630*** (0.0029)	0.0423** (0.0215)	0.0263 (0.0222)	0.0790*** (0.0243)
Knows business angel	0.0058* (0.0033)	0.0050 (0.0032)	0.0395 (0.0292)	0.1793*** (0.0272)	0.2024*** (0.0255)	0.3268*** (0.0322)
Constant	-4.6239*** (0.0863)	-4.6356*** (0.0882)	-4.6339*** (0.0869)	-3.0861*** (0.1943)	-3.1722*** (0.2225)	-3.1118*** (0.2862)
Relevance of year-country groups (σ_u)	-1.7387*** (0.0016)	-1.7456*** (0.0016)	-1.7387*** (0.0016)	-0.6380*** (0.0059)	-0.6359*** (0.0060)	-0.5883*** (0.0069)
Relevance of individual level (σ_e)	108	104	108	108	104	81
Country-year groups	191,373	187,007	191,373	14,684	14,164	10,689
Observations	152,935	139,656	148,329	108	108	10,573

Notes: multilevel mixed effects model with individuals representing level one and country-year groups representing level two. *Opportunity self-employment* is binary, taking the value of 1 if a person declares self-employment driven by business opportunity and 0 if continues to be wage employed. In opportunity self-employment specification individuals engaged into self-employment for other reasons excluded from computation. The share of opportunity self-employment among men computed as average for each country-year. *EGA* is measured as reported planned increase in employment in five year horizon. ISD measures of gender equality take the value between 0 and 1, higher values imply more equality. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A5: Necessity self-employment for women - robustness checks - EU countries before 2000 and other countries

	EU countries (members before 2000)					Other countries				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Necessity SE for women = 1										
GEG exact match	0.0048** (0.0020)					0.0206** (0.0080)				
GWG exact match		-0.0013 (0.0032)					-0.0146 (0.0093)			
GEG inexact match			0.0048** (0.0020)					0.0078*** (0.0021)		
GWG inexact match				0.0005 (0.0015)					0.0175** (0.0085)	
ISD gender equality					-0.0276*** (0.0066)					-0.0185*** (0.0055)
Necessity SE - men (average)	0.6276*** (0.0497)	0.5800*** (0.0728)	0.6148*** (0.0486)	0.6395*** (0.0505)	0.6437*** (0.0462)	0.5967*** (0.0638)	0.6477*** (0.1146)	0.6355*** (0.0596)	1.1801*** (0.0901)	0.6853*** (0.0510)
Age	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0003*** (0.0001)	-0.0001*** (0.0000)	-0.0001*** (0.0000)	-0.0001*** (0.0000)
Tertiary education	0.0005 (0.0003)	0.0002 (0.0006)	0.0005 (0.0003)	0.0004 (0.0003)	0.0004 (0.0003)	-0.0000 (0.0010)	-0.0011 (0.0036)	-0.0002 (0.0010)	-0.0011 (0.0015)	0.0002 (0.0005)
Knows entrepreneur	0.0071*** (0.0004)	0.0077*** (0.0007)	0.0071*** (0.0004)	0.0072*** (0.0004)	0.0071*** (0.0004)	0.0073*** (0.0009)	0.0105*** (0.0032)	0.0075*** (0.0009)	0.0073*** (0.0014)	0.0065*** (0.0005)
Knows business angel	0.0103*** (0.0011)	0.0078*** (0.0020)	0.0102*** (0.0011)	0.0104*** (0.0011)	0.0103*** (0.0011)	0.0173*** (0.0024)	0.0331*** (0.0087)	0.0163*** (0.0024)	0.0136*** (0.0034)	0.0124*** (0.0015)
Constant	0.0013 (0.0009)	0.0044** (0.0018)	0.0014 (0.0009)	0.0025** (0.0010)	0.0242*** (0.0053)	-0.0005 (0.0020)	0.0141** (0.0058)	0.0016 (0.0018)	-0.0077* (0.0043)	0.0175*** (0.0046)
Relevance of year-country groups (σ_u)	-5.6998*** (0.1057)	-5.5827*** (0.1793)	-5.7031*** (0.1053)	-5.6530*** (0.1059)	-5.7858*** (0.1135)	-5.8582*** (0.2239)	-22.7829*** (8.2558)	-5.9191*** (0.2453)	-4.5014*** (0.1131)	-5.9701*** (0.2013)
Relevance of individual level (σ_e)	-2.4803*** (0.0013)	-2.3971*** (0.0023)	-2.4780*** (0.0013)	-2.4718*** (0.0013)	-2.4802*** (0.0013)	-2.3248*** (0.0031)	-2.0373*** (0.0080)	-2.2879*** (0.0031)	-2.0419*** (0.0035)	-2.4172*** (0.0018)
Country-year groups	127	43	129	124	127	58	10	62	51	77
Observations	288,969	93,896	290,780	285,067	288,969	50,733	7,720	53,528	41,596	148,329

Notes: multilevel mixed effects model with individuals representing level one and country-year groups representing level two. The explained variable is binary, taking the value of 1 if a person declares self-employment out of necessity and 0 if continues to be wage employed. Individuals engaged into self-employment for other reasons excluded from computation. The share of necessity self-employment among men computed as average for each country-year. ISD measures of gender equality take the value between 0 and 1, higher values imply more equality.

The values of σ_u display a test statistic for a null hypothesis that country-year level effects are jointly insignificant. The values of σ_e display a test statistic for a null hypothesis that individual level effects are jointly insignificant. Standard errors clustered at country level in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A6: Opportunity self-employment and entrepreneurial growth aspirations - robustness check - EU14 vs. New Member States

	EU14			New Member States		
	(1) Opportunity SE for women =1	(2) Opportunity SE for women =1	(3) Opportunity SE for women =1	(4) Opportunity SE for women =1	(5) EGA	(6) EGA
GEG inexact match	0.0048 (0.0058)	-0.0248* (0.0138)	-0.0738*** (0.0272)	0.0631 (0.0632)	-0.1194* (0.0714)	0.0107 (0.0304)
GWG inexact match	0.4877*** (0.0592)	0.8165*** (0.0731)	0.4939*** (0.0570)	0.4816*** (0.1122)	0.6018*** (0.0987)	0.5583*** (0.0493)
ISD gender equality	-0.0005*** (0.0001)	-0.0006*** (0.0001)	-0.0004*** (0.0001)	-0.0043*** (0.0007)	-0.0040*** (0.0007)	-0.0059*** (0.0003)
y variable - men (average)	0.0199*** (0.0019)	0.0200*** (0.0024)	0.0200*** (0.0019)	0.0140 (0.0183)	0.0112*** (0.0215)	0.0295*** (0.0079)
Tertiary education	0.0399*** (0.0018)	0.0428*** (0.0022)	0.0406*** (0.0019)	0.0536*** (0.0173)	0.0711*** (0.0189)	0.0591*** (0.0078)
Knows entrepreneur	0.0628*** (0.0046)	0.0617*** (0.0055)	0.0681*** (0.0048)	0.0836** (0.0340)	0.0461 (0.0348)	0.0566*** (0.0184)
Knows business angel	0.0039 (0.0055)	-0.0050 (0.0069)	0.0614*** (0.0213)	0.1883*** (0.0477)	0.2120*** (0.0547)	0.3442 (0.099)
Constant	-4.4709*** (0.1205)	-4.1021*** (0.1199)	-4.5211*** (0.1281)	-2.4700*** (0.1848)	-2.6866*** (0.2712)	-3.3400*** (0.2001)
Relevance of year-country	-1.6431*** (0.0031)	-1.5519*** (0.0035)	-1.6364*** (0.0031)	-0.6053*** (0.0106)	-0.5518*** (0.0110)	-0.6192*** (0.0049)
Relevance of individual	62 53,528	51 41,596	58 50,733	62 4,540	51 4,210	122 20,527
Country-year groups						
Observations						

Notes: multilevel mixed effects model with individuals representing level one and country-year groups representing level two. *Opportunity self-employment* is binary, taking the value of 1 if a person declares self-employment driven by business opportunity and 0 if continues to be wage employed. In opportunity self-employment specification individuals engaged into self-employment for other reasons excluded from computation. The share of opportunity self-employment among men computed as average for each country-year. *EGA* is measured as reported planned increase in employment in five year horizon. ISD measures of gender equality take the value between 0 and 1, higher values imply more equality. Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1