The Dynamics of Self-Employment and Unemployment During the Great Recession

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Abstract. Understanding the links between self-employment and unemployment is crucial for designing public policy. The literature on the topic usually focuses either on the (positive) effect of unemployment on self-employment (the 'refugee' effect) or on the (negative) effect of self-employment on unemployment (the 'entrepreneurial' effect). Few studies address the intertemporal dynamics of these effects. Thurik et al. (2008) use a data set of 23 OECD countries between 1974 and 2002, and show that these two effects co-exist. In the present paper, we extend the analysis through to 2014 to understand if the relationship held during the Great Recession. The empirical results are consistent with the previous study in that both effects are identified, and that, in normal (non-crisis) times, the 'entrepreneurial' effect is stronger than the 'refugee' effect. Our findings also suggest that the 'entrepreneurial' effect also held during the recent crisis and even became somewhat stronger.

Keywords: self-employment; unemployment; entrepreneurship.

JEL codes: J23; J64; L26; L53; M13; O11

1. Introduction

The recent economic crisis, starting in 2008, brought renewed attention to the role of self-employment as a source of economic growth and a tool to fight unemployment. Yet, a policy grounded in a misconception of the effects of self-employment is bound to be counterproductive (Dvoulety and Lukes, 2016).

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This misconception can have various sources that can be traced back to shortcomings in the literature. First, the direction of the causal effect between self-employment and unemployment is not obvious: literature discriminates between a 'refugee' effect (unemployment positively affecting self-employment) and an 'entrepreneurial' effect (self-employment negatively affecting unemployment). Second, the intensity of these two effects is not necessarily identical. Third, these effects are often identified to be neither instantaneous, nor contemporaneous, meaning that there are lagged effects with different levels of delay. Fourth, to our best knowledge, there is no analysis of these effects using data covering the recent crisis period. Therefore, the correct assessment of these effects, particularly during a crisis period, is crucial to define policy.

Using data between 1974 and 2002, Thurik et al. (2008) address the first three shortcomings. They use a two-equation VAR model to identify both the 'refugee' and the 'entrepreneurial' effect in a specification using lagged endogenous variables. They find that the latter effect is stronger than the former, and it manifests itself with a longer lag. Accordingly, they conclude that increases in unemployment affect positively self-employment in the short-term, while increasing self-employment affects negatively unemployment in the long term. The use of different time-lags to understand the relation was fundamental to reach that conclusion.

The present paper addresses the fourth shortcoming, while revisiting the analysis on the first three shortcomings using the setup of Thurik et al. (2008). Understanding if the relationship holds during an economic crisis is particularly important, since employment policy is often determined during times of crisis. The definition and calibration of all aspects of employment policy should take into account both the short-term and the long-term effects. The size, duration, and configuration of unemployment benefits, for example, can only be correctly calibrated if all effects, direct and indirect, are understood.

We use the methodology followed by Thurik et al. (2008) and extend the analysis up to 2014 to include the period of the Great Recession — a period of high unemployment in most Western economies. On one hand, severe economic downturns with high unemployment should bring a wave of entrepreneurship (Koellinger and Thurik, 2012). On the other hand, during economic downturns there are less profitable opportunities for entrepreneurs, suggesting a negative pull effect. Can this negative pull effect be so high that it counteracts the positive push effect from higher unemployment? Or does the relationship we see in the previous (non-crisis) years also hold during severe economic downturns? Moreover, is entrepreneurship a force that can bring down unemployment also during economic downturns? These are the questions we try to answer in this paper.

The rest of the paper is organized as follows. In the next section, we review the theoretical background on the dual relationship between self-employment and unemployment, recovering some of the most recent work. In the following

section, we expose briefly the methodology adopted in Thurik et al. (2008), and describe the extensions brought by the present paper. Then we present the updated estimates, with special emphasis on the crisis period. In the last section, we present the conclusions of the study and their policy implications.

2. Literature Review

The relationship between self-employment and unemployment, or more generally, entrepreneurship and the business cycle, has received considerable attention in the last years from policy makers and academics around the world (Apergis and Payne, 2016; Casares and Khan, 2016; Cichocki, 2012; Cueto et al., 2015; Fritsch et al., 2015; Giotopoulos et al., 2017; Parker et al., 2012; Saridakis et al., 2016; Shapiro, 2014; Shapiro and Mandelman, 2016; Svaleryd, 2015).

Knight (1921) considered that individuals are able to decide between three states: (i) unemployment, (ii) self-employment and (iii) employment. According to the theory of income choice, a neo-classical microeconomic framework for studying self-employment decisions, individuals are utility-maximizer agents that choose between becoming employees or entrepreneurs (self-employed). This can be considered as the starting point to study this relationship, since it argues that increasing unemployment leads to increasing start-up activity due to the decrease of the opportunity cost of starting a firm (Grilo and Irigoyen, 2006). As a counterargument, it is possible to consider that unemployment leads to depreciation of human capital and talent which exacerbates the negative situation of the unemployed (Halicioglu and Yolac, 2015), and to suggest that high unemployment may be associated with a low degree of entrepreneurial activity (Baptista and Thurik, 2007).

The literature on the causal link from unemployment to self-employment assumes two counteracting hypotheses related to "pull-push" dynamics. On one hand, the "recession-push" theory supports that individuals are pushed towards business ownership as unemployment decreases the opportunities of gaining paid-employment, and the expected gains from job search (Thurik et al., 2008). On the other hand, there is the prosperity-pull theory stating that lower levels of unemployment lead "to an increase of entrepreneurship because the risks are lower in an environment in which the entrepreneur can easily fall back on a paid job in case the business fails" (Brünjes and Diez, 2013, p. 251). The prosperity-pull effect suggests the existence of a negative causal effect between unemployment and entrepreneurship, i.e., pro-cyclical behavior when considering self-employment in relation to the business cycle. The majority of time-series studies support the recession-push effect, while in contrast, most cross-section studies support the prosperity-pull hypothesis (Storey, 1991; Congregado et al., 2014).

The credit restrictions during the Great Recession impacted significantly entrepreneurship and the overall economy (Angulo-Guerrero et al., 2017). Therefore, studying this period could help to understand the relationship between self-employment and unemployment (Scholman et al., 2015). According to Biehl et al. (2014) and Henley (2017), the European economic recession of 2008 was characterized simultaneously by very high levels of unemployment and by an increase in the self-employment rate. The objective of this paper is to analyze this period in more detail.

The literature on the reverse, 'entrepreneurial' effect from self-employment to unemployment, or more generally, from entrepreneurship to economic performance is smaller, but various studies suggest that entrepreneurship may positively affect economic performance of countries and regions, as a result of knowledge spillovers and increased competition (Carree and Thurik, 2003; Fritsch and Mueller, 2004; Van Stel et al., 2005; Erken et al., 2016). Again, the current paper will investigate if this effect also holds during crisis periods.

3. Models and Data

Thurik et al. (2008) present a two-equation panel VAR model to assess the dynamic relationship between self-employment and unemployment. The model considers changes over periods of four years, while allowing the dependent variable to be influenced with different time lags.[2] Moreover, time dummies are included to correct for time-specific effects over the business cycle. Although tested for different settings, Thurik et al. (2008) most representative model — hereafter referred to as the original model — considers a two period lag[3] and is defined by:

Model I

$$(U_{i,t} - U_{i,t-4}) = \alpha + \sum_{j=1}^{2} \beta_j (E_{i,t-j4} - E_{i,t-(j+1)4}) + \sum_{j=1}^{2} \gamma_j (U_{i,t-j4} - U_{i,t-(j+1)4})$$
$$+ \sum_{t=1}^{T} \delta_t d_t + \epsilon_{1it} \tag{1}$$

$$(E_{i,t} - E_{i,t-4}) = \kappa + \sum_{j=1}^{2} \lambda_j (U_{i,t-j4} - U_{i,t-(j+1)4}) + \sum_{j=1}^{2} \mu_j (E_{i,t-j4} - E_{i,t-(j+1)4})$$
$$+ \sum_{t=1}^{T} \nu_t d_t + \epsilon_{2it}, \tag{2}$$

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2. The number of time lags is not known a priori. To find the most adequate lag structure, the authors apply a one-by-one lag addition and analyze the results of the likelihood ratio test.
3. Equivalent to an eight year lag due to the four year time span for each period.

where U is the unemployment rate defined as the number of unemployed as a percentage of the labour force, E is the self-employment rate defined as the number of non-agricultural self-employed/business owners (of both incorporated and unincorporated businesses) as a percentage of the labour force, d are time dummies, i is a country-index, t is the year and ε are the correlated error terms. It is expected that an increase in self-employment leads to a reduction in unemployment (negative β s) and that an increase in unemployment leads to an increase in self-employment (positive λ s). The original model uses a panel data set of 23 OECD countries from 1974 to 2002, with no overlapping periods, corresponding to seven time periods (changes over a period of four years).[4] By including two lags, the sample is reduced to 115 observations (23x5). We present two extensions to the original model — Model Ia and Model Ib. In the first one, we increase the time dimension of the panel data set up to 2014, corresponding to three additional time periods, and a sample of 184 observations (23x8). In the second one, the set of time dummies is replaced by a crisis dummy (that takes the value 1 for the last two time periods observed, i.e. 2006-2010 and 2010-2014, and 0 otherwise), representing the period of the Great Recession. This model serves as a preparation for Model II, discussed below. The source of data used by Thurik et al. (2008) is Compendia 2002.1 of EIM in Zoetermeer, The Netherlands and our work is based on its updated version Compendia 2012.1. The Compendia data set uses data from the OECD Labour Force Statistics and other (country-specific) sources to make the self-employment data as comparable as possible across countries and over time. The number of self-employed is scaled on total labor force and exclude those in agriculture. For more details on the Compendia database we refer to Van Stel (2005). To include 2013 and 2014 data, we consulted the OECD database and applied relative annual changes for these two years on the 2012 levels from Compendia, so that 2013 and 2014 self-employment and unemployment rates are consistent with earlier years, according to Compendia methodology (Van Stel, 2005).[5]

Besides the sample extension, the novelty of our work is the use of a moderation model to appraise the potential effect of the Great Recession. Using the same crisis dummy mentioned above, we are interested in evaluating the interaction terms between the crisis dummy and the lag changes in self-employment and unemployment. If the interaction coefficients are significant, we can infer that the dynamic interrelationship between changes in self-employment and unemployment is influenced by the Great Recession. This approach is defined according to Model II:

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4. The 23 countries are the (old) EU-15 as well as Iceland, Norway, Switzerland, USA, Japan, Canada, Australia and New Zealand.
5. Updated versions of COMPENDIA are available on www.thurik.com.

Model II

$$(U_{i,t} - U_{i,t-4}) = \alpha + \sum_{j=1}^{2} \beta_j (E_{i,t-j4} - E_{i,t-(j+1)4}) + \sum_{j=1}^{2} \gamma_j (U_{i,t-j4} - U_{i,t-(j+1)4})$$
$$+ \sum_{j=1}^{2} \beta_{j+2} d_{crisis} (E_{i,t-j4} - E_{i,t-(j+1)4})$$
$$+ \sum_{j=1}^{2} \gamma_{j+2} d_{crisis} (U_{i,t-j4} - U_{i,t-(j+1)4}) + \phi d_{crisis}$$
$$+ \epsilon_{3it} \tag{3}$$

$$(E_{i,t} - E_{i,t-4}) = \kappa + \sum_{j=1}^{2} \lambda_j (U_{i,t-j4} - U_{i,t-(j+1)4}) + \sum_{j=1}^{2} \mu_j (E_{i,t-j4} - E_{i,t-(j+1)4})$$
$$+ \sum_{j=1}^{2} \lambda_{j+2} d_{crisis} (U_{i,t-j4} - U_{i,t-(j+1)4})$$
$$+ \sum_{j=1}^{2} \mu_{j+2} d_{crisis} (E_{i,t-j4} - E_{i,t-(j+1)4}) + \rho d_{crisis}$$
$$+ \epsilon_{4it} \tag{4}$$

The sample used to test model II is the same as in model I - 23 OECD countries, eight time periods and 184 observations. Finally, we also include a similar model (model IIb), but in which the crisis dummy only takes value 1 for the last period (2010-2014), instead of the last two periods as in Model IIa. This is because the earlier period (2006-2010) is broader than the period of the Great Recession, which started only late 2008.

4. Results and Discussion

In Table 1, we report the results obtained by Thurik et al. (2008) and compare it with four additional model specifications: one in which we add the data for 2002-2014 (Model Ia); one in which we also include a dummy for the crisis period and exclude the time dummies (Model Ib); one where we have a coefficient for the interaction of the different time lags of unemployment and self-employment with a dummy that takes value 1 for the two time periods of the Great Recession (2006-2010 and 2010-2014; Model IIa); and one similar to IIa, but where the time dummy for the Great Recession only applies for the period 2010-2014 (Model IIb).[6]

Table 1 – Estimation results

		Original		Model Ia		Model Ib		Model IIa		Model IIb	
N		115		184		184		184		184	
Time period		1974-2002		1974-2014		1974-2014		1974-2014		1974-2014	

Eq(1) and Eq(3): dependent variable $U_t - U_{t-4}$

		Original		Model Ia		Model Ib		Model IIa		Model IIb	
Constant	α	0.007		0.007		0.000		-0.001		0.003	
$E_{t-4} - E_{t-8}$	β_1	0.091		-0.261		0.482	*	0.584	*	0.860	***
$E_{t-8} - E_{t-12}$	β_2	-1.130	***	-0.664	**	-1.195	***	-1.161	***	-1.670	***
$U_{t-4} - U_{t-8}$	γ_1	-0.246	***	-0.210	**	-0.274	***	-0.233	***	-0.341	***
$U_{t-8} - U_{t-12}$	γ_2	-0.027		-0.021		-0.090		-0.083		-0.137	*
dcrisis	ϕ					0.012	***	0.012	***	-0.012	*
dcrisis*$(E_{t-4} - E_{t-8})$	β_3							-0.993		-3.155	**
dcrisis*$(E_{t-8} - E_{t-12})$	β_4							0.026		2.811	***
dcrisis*$(U_{t-4} - U_{t-8})$	γ_3							-0.267		-0.007	
dcrisis*$(U_{t-8} - U_{t-12})$	γ_4							-0.110		0.393	
Time dummies		Yes		Yes		No		No		No	
R-squared		0.403		0.350		0.221		0.234		0.251	

Eq(2) and Eq(4): dependent variable $E_t - E_{t-4}$

		Original		Model Ia		Model Ib		Model IIa		Model IIb	
Constant	$\varkappa$	-0.002		-0.002		0.000		0.000		-0.001	
$U_{t-4} - U_{t-8}$	λ_1	0.067	**	0.053	**	0.061	***	0.038		0.069	***
$U_{t-8} - U_{t-12}$	λ_2	0.090	***	0.045	*	0.025		0.019		0.029	
$E_{t-4} - E_{t-8}$	μ_1	0.329	***	0.555	***	0.386	***	0.381	***	0.306	***
$E_{t-8} - E_{t-12}$	μ_2	0.167	*	0.020		0.137	*	0.062		0.171	**
dcrisis	ϱ					-0.002	*	-0.002	*	0.002	
dcrisis*$(U_{t-4} - U_{t-8})$	λ_3							0.104	**	0.068	
dcrisis*$(U_{t-8} - U_{t-12})$	λ_4							0.068		0.076	
dcrisis*$(E_{t-4} - E_{t-8})$	μ_3							0.315		0.831	**
dcrisis*$(E_{t-8} - E_{t-12})$	μ_4							0.235		-0.002	
Time dummies		Yes		Yes		No		No		No	
R-squared		0.385		0.392		0.242		0.279		0.280	

Notes: The results are from a weighted vector autoregression (VAR) with population as weighting variable. In Models Ib and IIa, the crisis dummy reflects period 2006-2014 whereas in Model IIb, it reflects period 2010-2014.
* Significant at 10%. ** Significant at 5%. *** Significant at 1%.

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6.   The dependent variables were subjected to stationarity tests and we found no evidence of unit roots. Because our data set is a panel data set, we used an Augmented Dickey Fuller - Fisher Chi-square (ADF-Fisher Chi-square) test for the four-year change on unemployment and self-employment. We tested for nine specifications for each variable, i.e. no constant and no trend, constant and no trend, and constant and trend at level, first difference and second difference. For all unit roots tests, the null hypothesis of a unit root was rejected at a 5% significance level.

In Model Ia, where we add additional years to the original data sample, the negative effect of entrepreneurial activity on unemployment remains significant for the eight year lag, at 5% significance level, but with a smaller coefficient (in absolute terms), i.e. -0.664, reflecting a weaker negative relationship between self-employment and unemployment. However, when we control for the period of the crisis (last two lags; Model Ib), then the effect becomes similar to the one in the original model (-1.195). The positive value for the crisis dummy coefficient (0.012) reflects the increasing unemployment levels during the Great Recession.

As for the positive effect of unemployment on self-employment (the 'refugee'effect), both the first and second lag effects become smaller but remain significant (although the second lag is only significant at 10% level). Just as in Thurik et al. (2008), we conclude that the effect of unemployment on self-employment is faster (but not stronger) than the reverse, 'entrepreneurial' effect. When explicitly controlling for the crisis period (rather than including a full set of time dummies), the coefficient increases to 0.061, in line with Thurik et al. (2008). However, the second lag is no longer significant at traditional confidence levels (Model Ib). All in all, from the period extension, we conclude that the effects suggested by Thurik et al. (2008) remain valid, with small variations regarding effect size and duration.

One of the factors we need to consider is the possible impact of the Great Recession in these effects. We address this hypothesis through the moderation approach introduced in the last section. The idiosyncrasies of the period of the Great Recession are, thus, analyzed with Models IIa and IIb, on the right hand side of the table.

In Model IIa, we inquire if the effects present in Model Ia are distinct during the crisis, by adding a variable measuring the interaction between the lags of unemployment and self-employment and the time dummy for the crisis period (having value one for periods 2006-2010 and 2010-2014). As we can see from Table 1, the coefficient of the second lag effect of self-employment on unemployment is again significant and with a similar size to the effect in the original model by Thurik et al. (2008) (-1.161 versus -1.130). However, just as in Model Ib, we note that the negative effect on unemployment is preceded by an initial smaller positive effect (0.584). This pattern is in line with Fritsch and Mueller (2004), where new entrepreneurial activity initially leads to crowding out of competitors, but later on, via positive supply side effects and improved competitiveness, leads to positive employment effects.

The coefficient of the interaction terms between the crisis dummy and the lagged variables is not significant, indicating that there is no evidence of an additional 'entrepreneurial' effect during the Great Recession in Model IIa. On the other hand, we observe that the positive effect of unemployment on self-employment is reinforced during the period of the crisis. Indeed, the interaction term is positive (0.104) and significant at 5% level. Moreover, when creating the interaction between the first lag of unemployment and the crisis dummy, the

coefficient for the remaining years becomes smaller (0.038 versus 0.067 in the original model and 0.061 in Model Ib) and loses significance. The results from this specification suggest that there was no additional long-term effect of self-employment on unemployment during the crisis, but the short-term effect of unemployment on self-employment was reinforced by the Great Recession.

As stated earlier, in Model IIa it is assumed that the Great Recession covered two time periods: 2006-2010 and 2010-2014. Since in reality, the Great Recession started in late 2008, most of the progress between 2006-2010 was not affected by the Great Recession. To test the robustness of the conclusions, we also ran a regression, Model IIb, in which the crisis dummy is defined to cover only the period 2010-2014.

As we can see from the last column of Table 1, this shift in the way we categorize the period between 2006-2010 brings some interesting insights. As in Model IIa, the first lag effect of self-employment on unemployment remains positive, but this time significant at a 1% level. This initial unemployment-increasing effect of self-employment likely reflects crowding out effects (Fritsch and Mueller, 2004). The second lag is negative and is bigger in magnitude than the first lag effect (-1.670 versus 0.860) so that, in normal (non-crisis) periods, the net long-run effect of self-employment on unemployment is negative.

Yet, perhaps even more interesting are the additional effects during the period of the crisis. Now the time lag pattern is reversed. The first lag of the interaction effect becomes negative and the second lag becomes positive when we consider the period of the crisis. Hence, whereas in previous models, the negative effect of self-employment on unemployment only came after two time lags, during the crisis the effect seems to come with only one lag. As we only find this pattern in a significant way in Model IIb (but not in Model IIa), we need to be careful in making too much of this result. What seems to be clear though is that the 'entrepreneurial' effect remains valid during the crisis, and that its magnitude is even somewhat bigger during crisis periods (as the net additional long-run effect of self-employment on unemployment (-3.155+2.811=-0.344) is negative.[7]

Finally, the positive short-term effects of unemployment on self-employment return to positive and significant values when considering the Model IIb specification (coefficient becomes 0.069 versus 0.067 in the original model and 0.061 in Model Ib), but, in contrast to Model IIa, there is no evidence of an additional effect during the period of the crisis: although positive, the interaction coefficient associated with the crisis dummy is not significant for the usual confidence levels. Our results are thus not entirely robust for changing the definition of the crisis dummy period.

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7. Note that, although not significant, the net long-run additional effect of self-employment on unemployment is also negative in Model IIa (-0.993+0.026).

5. Conclusions

The recent economic crisis caused a sharp drop in employment in most OECD economies that is yet to be fully recovered. In this high-unemployment environment, policy makers need to make decisions on employment policy that have both short and long term effects on the labor market. Additionally, with strained public budgets, governments have to make decisions on which unemployment policies to invest in. Should governments soften the impact of unemployment on households' income by providing long-lasting unemployment benefits, or redirect that social spending towards the promotion of entrepreneurship to counteract the effects of unemployment? While unemployment benefits are an immediate remedy for the social problems caused by unemployment, it might decrease the entrepreneurial impetus of those receiving them. Taking this decision requires, first of all, an understanding on whether there is a clear relationship between unemployment and entrepreneurial activity. As mentioned in the introduction, that relationship can be clouded by contradictory effects between the two variables. Understanding the balance between the "entrepreneurial effect" and the "refugee effect" is then crucial to calibrate employment policy.

It is especially challenging to understand whether that relationship holds all the time. Given that employment policy is particularly relevant during downturns and the public budget is also particularly strained in those periods, ensuring that the strength of the previously found relationships hold during crisis periods is extremely important to guide public policy.

In this paper, we found that, by and large, the findings from Thurik et al. (2008) also hold after extending the period of the analysis with twelve years, including the period of the Great Recession. By using a moderation analysis, we also found indications that the 'entrepreneurial effect' was reinforced during the recent economic downturn. Self-employment was a somewhat stronger determinant of unemployment during the recent crisis. Perhaps there is a selection effect at play where 'lower-quality' (less skillful) entrepreneurs are discouraged to start a new business in adverse economic circumstances and only 'higher-quality' entrepreneurs (Giotopoulos et al., 2017) dare to set up a business during a crisis period.

A limitation of our analysis is that not enough time has passed to fully understand the long-term implications of the entrepreneurial activity that emerged as a result of the increasing unemployment levels during the Great Recession. This will be an important follow-up research as soon as more years of data become available. It is also important to understand how these impacts vary with specific macroeconomic factors of countries, especially GDP per capita and the magnitude of the downturn. Understanding these differences might further contribute towards the design of unemployment policies. Finally, the number of countries for which data is available also restricted the analysis in terms of scope

and type of economies analyzed. When longer data series become available for emerging economies, it will be possible to establish whether the relationships found for OECD economies also hold in those countries. This will be relevant for the general understanding of the links between unemployment and self-employment.

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