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Measuring performance differentials across entrepreneurship types

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Abstract

It is increasingly being recognized that different types of entrepreneurs exist with different performance levels and different contributions to the economy. Two common classifications of entrepreneurship types are based on professional status and start-up motive, where independent own-account workers are assumed to perform better than dependent self-employed and opportunity entrepreneurs are assumed to perform better than necessity entrepreneurs. However, these supposed performance differentials are seldomly tested or quantified. Using recent data drawn from the European Working Conditions Survey for the EU-28, we explore self-employment earnings (as an indicator of performance) across these different entrepreneurship types. Our results from OLS and multilevel linear regressions show that dependent self-employed workers are indeed observed to have significantly lower earnings than independent own-account workers, but the difference is only 10%, suggesting that the precarious nature of the dependent self-employed may be overstated in certain policy circles. Regarding start-up motive, our paper highlights the importance of distinguishing the group of entrepreneurs who simultaneously have both opportunity and necessity motives to start a business.

JEL codes: D31, J24, L25, L26, O52.

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1. Introduction

There is a near consensus among academics and policymakers on the importance of entrepreneurship as a driving force of economic development (Fritsch 2013). Thus, entrepreneurs substantially contribute to job creation, generate and disseminate innovative ideas, increase competition and enhance economic efficiency and productivity (Acs 2006; Audretsch and Thurik 2004). However, it is also increasingly being recognised that not all entrepreneurs are the same and some *types* of entrepreneurs contribute substantially more to the economy than other types (Baumol 1990; Urbano et al. 2020). In this regard, many theoretical arguments are provided in the literature as to which types are more productive and which types are less productive (Wennekers and Van Stel 2017). For instance, as innovation spurs firms' and workers' productivity levels, it is clear that innovative entrepreneurs contribute more to the economy than non-innovating entrepreneurs. Similarly, entrepreneurs running a fast-growing business contribute more than entrepreneurs without an ambition to grow (Henrekson and Johansson 2010). However, even though in the above examples the link between entrepreneurship types and their relative contributions to the economy is quite clear, this is not always the case for other categorizations of entrepreneurship types where performance differentials across different types of entrepreneurs are often simply assumed to exist but are seldomly quantified.

The purpose of this paper is to identify entrepreneurship types along two commonly used dimensions —professional status and start-up motive— and to test, rather than assume, whether certain types indeed perform better than others. Moreover, we aim to measure the size of the performance differentials between different groups. Concretely, regarding professional status we distinguish between self-employed with employees, independent

own-account workers, and dependent self-employed workers (Carrasco 1999; Burchell et al. 1999), while regarding start-up motive we distinguish between opportunity-driven, necessity-driven, and hybrid opportunity-necessity entrepreneurs (Reynolds et al. 2002; Block and Wagner 2010; Kautonen and Palmroos 2010).¹ Hence, our research question is: *Are there structural performance differences between entrepreneurship types, and if so, which types perform better than others?* We investigate this question by using recent data drawn from the *European Working Conditions Survey* for the EU-28, and by exploring self-employment earnings (as an indicator of performance) across these different entrepreneurship types. In our regression models explaining performance, we include a whole range of control variables so that the role of entrepreneurship types is isolated as accurately as possible.

The remainder of the paper is structured as follows. In Section 2 we provide a literature review and derive hypotheses regarding the relative performance of the different types of self-employment. The database and the variables that we employ from it are discussed in Section 3. Section 4 describes our methods of analysis while Section 5 describes the empirical results. Finally, Section 6 concludes.

2. Literature Review and Hypotheses

As mentioned earlier, in this paper we identify entrepreneurship types along the dimensions of professional status and start-up motive, and empirically test for performance differences between different types. In the present section we will therefore first discuss extant literature on the entrepreneurship types that we focus on in this paper, while identifying gaps in the literature that the current paper aims to fill (Section 2.1). We

¹ The definitions of these entrepreneurship types will be discussed in the next section.

then derive hypotheses as to which types are expected to have higher or lower entrepreneurial performance (Section 2.2).

2.1 Identifying entrepreneurship types based on professional status and start-up motive

The first dimension along which we identify entrepreneurship types is professional status, leading to three types: self-employed with employees, independent own-account workers, and dependent self-employed workers. The term *dependent self-employment* refers to those workers in the *grey zone* between employment and self-employment, i.e., those outsourced workers who are economically dependent on (and often hierarchically subordinate to) the firms with which they contract (Dennis 1996; Burchell et al. 1999; Muehlberger 2007; Böheim and Muehlberger 2009; Román et al. 2011; Quinlan 2012; Stewart and Stanford 2017; Williams and Horodnic 2019).

Despite the increasing attention for this group of workers, a conditional analysis on how dependent self-employed workers compare to other types of entrepreneurs in terms of performance does not exist to date, to our knowledge. Thus, even though the phenomenon of dependent self-employment is often seen as a worrisome development in modern labor markets (Eichhorst et al. 2013; ILO 2006), studies that quantify performance differentials with other types of entrepreneurs—in particular independent own-account workers—are lacking.² We contribute to extant literature by quantifying such performance differentials. While doing so, we follow the recommendation of Cieřlik and Dvouletý (2019) to identify dependent self-employed workers on the basis of the criterion of having one (dominating) client who also decides on the working hours of the self-employed.³

² The study by A. Millán et al. (2020) is an exception.

³ Another school of thought (Williams and Lapeyre 2017; Williams and Horodnic 2019) within the recently emerging literature on dependent self-employment uses much broader criteria, where the right to hire employees also plays a role

As mentioned earlier, regarding start-up motive we distinguish between opportunity-driven, necessity-driven, and hybrid opportunity-necessity entrepreneurs. With respect to the last-mentioned type, we refer here to a particular type of entrepreneur whose motivation to start a business is driven by both opportunity and necessity motives simultaneously (Caliendo and Kritikos 2019).⁴

The only studies that, to our knowledge, aim to identify the hybrid opportunity-necessity entrepreneurship type are those by Caliendo and Kritikos (2019) and Källner and Nyström (2018), despite the substantial empirical literature on opportunity and necessity entrepreneurship. In particular, Caliendo and Kritikos (2019) observe how start-ups out of opportunity and necessity have higher survival rates than do start-ups out of pure necessity. As regards the particular relation between the entrepreneur's start-up motive and earnings, the only available empirical evidence are the works by Andersson and Wadensjö (2007), Block and Wagner (2010), De Vries et al. (2020) and Van Stel et al. (2018). These studies, though, are based on relatively old data and/or a limited geographical coverage and, therefore, call for replication studies.⁵ Furthermore, none of

in the definition, leading to estimates as high as 47% of solo self-employed in the European Union being *dependent* solo self-employed (Williams and Lapeyre, 2017). In this paper we follow Cieřlik and Dvouletý (2019) who argue that the criterion of the right to employ staff is “particularly questionable” because “For the overwhelming majority of solo self-employed, functioning without personnel is their *modus operandi*, so that such condition is not considered by them as a meaningful restriction.” (p. 299). Following their recommendation in the present paper, we find 14.5% of the solo self-employed in the EU to be dependent self-employed.

⁴ Some papers in the literature also use the term hybrid entrepreneurs referring to those individuals who retain their wage job while entering into self-employment (see, e.g., Folta, Delmar, and Wennberg 2010; Raffiee and Feng 2014). To avoid any terminology misunderstanding with these *hybrid entrants*, we will mostly refer to our particular type of entrepreneurs throughout the paper as *hybrid opportunity-necessity entrepreneurs*.

⁵ Results by Andersson and Wadensjö (2007) are based on annual register data from *Statistics Sweden* for the period 1998-2002. Results by Block and Wagner (2010) are based on data drawn from the *German Socio-Economic Panel* (GSOEP) covering the period 1984-2004. Results by De Vries et al. (2020) are based on a sample of Dutch solo self-

them identify the aforementioned hybrid category. Thus, Andersson and Wadensjö (2007), Block and Wagner (2010) and De Vries et al. (2020) only consider opportunity and necessity entrepreneurs in their analyses whereas Van Stel et al. (2018) distinguish between six different and mutually exclusive reasons to start-up and, hence, hybrid motives are also not investigated.⁶ We contribute to extant literature by comparing hybrid opportunity-necessity entrepreneurs with pure opportunity and pure necessity entrepreneurs.

2.2 Hypotheses

A first comparison is between self-employed with employees and self-employed without employees (also known as solo self-employed). Extant literature has already found that the former group has higher earnings than the latter (Alba-Ramírez 1994; Earle and Sakova 2000).⁷ Self-employed with employees are creating jobs for others, implying that they have had some success in their businesses, and that they have been able to secure capital and other inputs to work with their employees (Earle and Sakova 2000). In general, self-employment with employees implies working on a bigger scale than solo self-employment, which should normally also lead to higher earnings (Lucas 1978; Sorgner et al. 2017).

employed (drawn from panel data constructed ad-hoc) for the periods 2010 and 2011. Finally, results by Van Stel et al. (2018) are based on data drawn from the *European Community Household Panel* (ECHP) for the EU-15 covering the period 1994-2001.

⁶ These authors compare earnings of those entrepreneurs who ended their previous job (proxy for start-up motive) due to the following six different and mutually exclusive reasons: *opportunity* reasons (R1: obtained better/more suitable job), *necessity* reasons (R2: obliged to stop by employer; R3: end of contract; R4: sale/closure of own or family business), reasons related to family circumstances (R5: Family circumstances) or other reasons (R6: other reasons).

⁷ Admittedly, Hypothesis 1 is not a new hypothesis to the literature. However, we test the hypothesis in this paper to see if our data confirm findings from earlier literature.

Hypothesis 1: *Among the self-employed, those with employees will earn more than those who work on a solo self-employed basis.*

The solo self-employed form a very heterogeneous group of workers that differ on several dimensions (CRSE 2017). However, a particularly useful distinction is based on the *economic dependence* associated with client diversification. We refer here to the distinction between independent own-account self-employed workers and dependent self-employed workers. Thus, *independent own-account self-employed workers* have multiple clients which enables them to set reasonable tariffs. In case the product or service that they sell is based on tacit knowledge, they are also able to sell the same knowledge-based product or service multiple times, leading to efficiency advantages and higher earnings (Burke 2012). Moreover, the contribution of independent own-account workers to the economy is often bigger than what is visible from their own direct performance. This holds particularly for knowledge-based solo self-employed (sometimes called freelancers) as they tend to enable their client firms to be much more flexible and innovative than would have been possible by relying solely on their own employees (Burke and Cowling 2020).

By contrast, *dependent self-employed workers* are economically dependent in the sense that they are exclusively (or mainly) reliant on just one client enterprise (i.e., the outsourcing firm) (Supiot 2001; Román et al. 2011). Hence, they generate their entire (or a substantial part of their) income from this business relationship and, obviously, take the entrepreneurial risk (Muehlberger and Bertolini 2008). The phenomenon of dependent self-employed workers reflects a general trend towards increasing labor market flexibility (Eichhorst et al. 2013), to which the growth of the *gig economy*, typified by online

platforms and isolated independent workers, is severely contributing (Stewart and Stanford 2017). Dependent self-employed workers are often considered precarious as they tend to do similar work as normal employees but they do not enjoy social security protection in the same way as employees do (Muehlberger and Bertolini 2008; Quinlan 2012; Atherton et al. 2018). They also tend to fall outside the scope of collective bargaining and trade union representation (Quinlan and Johnstone 2009). Indeed, it is unclear that existing regulations benefiting employees also apply to gig workers, let alone that they can be effectively enforced in the digital economy (Stewart and Stanford 2017). The precarious position of dependent self-employed workers may be expected to be also reflected in lower earnings. This gives rise to the following hypothesis:

Hypothesis 2: *Among the solo self-employed, those who are independent with multiple clients will earn more than those who are dependent on a single client.*

A second source of heterogeneity among the self-employed concerns their entrepreneurial motivation (Barba-Sánchez and Atienza-Sahuquillo 2017). First, there are those who enter self-employment to capture a new profit opportunity, i.e. individuals who freely choose an independent profession that enables them to materialize their visions (Constant and Zimmermann 2004). Second, there are those entering self-employment due to a lack of paid-employment opportunities and who can be considered self-employed as a last resort (Alba-Ramírez 1994; Mühlböck et al. 2018). This category includes those forced to work at their own risk because nobody else wants to take the risk of employing them.

Van Stel et al. (2018) argue that entrepreneurs who started a business because they spotted a business opportunity (*opportunity entrepreneurs*) may perform better than those who had no other options for work (*necessity entrepreneurs*). This may be the case, first,

because entrepreneurial ability levels (including opportunity recognition; George et al. 2016) of opportunity entrepreneurs are expected to exceed those of their necessity counterparts. Second, this may be the case because opportunity entrepreneurs were able to take more time to carefully prepare their start-up effort, which positively influences business performance (Block and Sandner 2009). Third, as the opportunity costs of opportunity motivated entrepreneurs (typically a good wage income) are often higher than those of necessity entrepreneurs, opportunity entrepreneurs may also be more motivated to earn a high income as an entrepreneur, in order to at least match their opportunity costs (Block and Wagner 2010). The above arguments lead to the following hypothesis:

Hypothesis 3: *Among the self-employed, those who started with an opportunity motive will earn more than those with a necessity motive.*

However, the dichotomous classification of entrepreneurs into only two classes of motivation (i.e., those who initiate entrepreneurial activities voluntarily –*opportunity entrepreneurs*– and those who are pushed into such activities to address their lack of employment options –*necessity entrepreneurs*–) is not as straightforward as it seems (Williams 2009). Thus, Caliendo and Kritikos (2019) raise doubts about this purely binary classification and suggest that not all unemployed start-ups are necessity entrepreneurs. Instead, they consider three groups: (i) those driven by opportunity or *pull* motives; (ii) those driven only by necessity or *push* motives; and (iii) those who become self-employed out of *both* opportunity-pull and necessity-push motives.⁸

⁸ Caliendo and Kritikos (2019) find that start-ups out of opportunity and necessity have higher survival rates than do start-ups out of pure necessity.

More specifically, Källner and Nyström (2018) suggest the existence of such hybrid opportunity-necessity entrepreneurs among displaced employees, i.e., those employees losing their jobs due to the firm's failure or plant closure and not because of unsatisfactory job performance. Such employees are quite suddenly in need to look for alternative employment (necessity motive), but they may also see opportunities to exploit entrepreneurial ideas that they may have but never pursued while in a safe wage job (opportunity motive). Thus, work experience accumulated during an individual's career serves as a breeding ground for new business ideas (Politis 2005, Shepherd and DeTienne 2005), which can be realized once these individuals decide to start-up a new venture (Abou Lebdi 2017).

In this context, the decision to become an entrepreneur after displacement depends on (i) whether the individual has a business idea in which he or she has great confidence; (ii) the available job offers; and (iii) whether the individual meets the conditions to be eligible for unemployment benefits. Hence, those individuals with lower levels of educational attainment and/or entrepreneurial abilities would rarely start a new business in presence of unemployment benefits or alternative job offers. And only in absence of alternatives to make a living (i.e., when the opportunity cost of entrepreneurship is low), these *pure necessity* entrepreneurs would start-up. Conversely, those individuals who lose their job through no fault of their own (e.g., in case of organizational failure) but who do have higher endowments of human capital are more likely to exploit some of the innovative ideas which may be circulating within existing companies (Abou Lebdi 2017; Källner and Nyström 2018). We refer here to *hybrid opportunity-necessity* entrepreneurs, from which their expected entrepreneurial income exceeds both expected wages and

unemployment insurance benefits and, therefore, entrepreneurship is seen as an attractive choice. Hence:

Hypothesis 4: *Among the self-employed, those who started with a hybrid opportunity-necessity motive will earn more than those with a pure necessity motive.*

When comparing *hybrid opportunity-necessity* entrepreneurs with *pure opportunity* entrepreneurs, however, differences in entrepreneurial talent are not expected to be systematic and, hence, cannot be a source for unequal performance between both types. But the prior argument concerning the availability of time for a better preparation of the start-up endeavor still applies here (Block and Sandner 2009). Indeed, pure opportunity entrepreneurs are expected to take more time to properly design and set-up their venture, as compared with displaced workers. All in all, we hypothesize the following:

Hypothesis 5: *Among the self-employed, those who started with a pure opportunity motive will earn more than those with a hybrid opportunity-necessity motive.*

3. Data and variables

3.1. Data and sample

We use data from the Fifth and Sixth waves of the *European Working Conditions Survey* –EWCS 2010 and 2015– (Eurofound 2012, 2016, 2018). This survey is carried out every five years by the EU Agency *Eurofound* (*European Foundation for the Improvement of Living and Working Conditions*) and offers key work-related information on 44,000 workers (including both employees and self-employed individuals) covering 35 European

countries.⁹ These workers are interviewed about several working condition aspects, including physical environment, workplace design, working hours, work organization and social relationships in the workplace. Depending on country size and national arrangements, the sample ranges from 1,000 to 4,000 workers per country.

The EWCS 2010 and 2015 allow to create two separate classifications of self-employed workers, based on self-classification. The *first classification of self-employed workers* combines information collected from two different questions. *First*, the individuals in the survey are asked about their main activity status: self-employed with employees, self-employed without employees, employed or other. *Second*, an additional question is asked to those respondents who previously indicated being self-employed without employees, i.e., whether his/her firm generally has more than one client. Based on this information, we classify self-employed workers within our dataset as (1) self-employed with employees; (2) independent own-account self-employed (i.e. self-employed without employees answering positively to the question on whether his/her firm generally has more than one client); and (3) dependent self-employed worker (i.e. self-employed without employees answering negatively to the question on whether his/her firm generally has more than one client). For the clarity of our exposition, we will refer, hereinafter, to this classification as *professional status within self-employment*. Our final sample includes men and women aged 18 to 65 who are classified as self-employed individuals within the EU-28 territory. All individuals working part-time, i.e., working under 15 hours per week, are excluded. The final dataset, after removing cases with missing data for any of the relevant variables, yields 5,136 observations.

⁹ This set includes the EU-28 together, 5 candidate countries (Albania, the Former Yugoslav Republic of Macedonia, Montenegro, Serbia and Turkey) and 2 EFTA countries (Norway and Switzerland).

The *second classification of self-employed workers* is created by means of a *third* question which is asked to those respondents who previously indicated being self-employed either with or without employees, i.e., whether he or she became self-employed mainly through own personal preference, because they had no other alternatives for work, due to a combination of both reasons, or due to neither of these reasons. Because this question was only used within the EWCS series in 2015, a subdataset was generated by excluding data from the EWCS 2010. Our subdataset when using data from the EWCS 2015 yields 2,958 observations. Based on this information, we classify the observed self-employed workers within our dataset as (1) opportunity entrepreneur; (2) hybrid opportunity-necessity entrepreneur; (3) necessity entrepreneur; and (4) entrepreneur for other reasons. Henceforth, we will refer to this classification as *start-up motivation*.

3.2. *Dependent variable*

We are interested in explaining how professional status within self-employment and start-up motivation affect the business performance of entrepreneurs in terms of earnings. To this end, we employ the variable ‘net monthly earnings’. Workers in the EWCS are asked to refer to their average net earnings in recent months and, in case they don’t know, are asked to give an estimate.¹⁰ The variable is defined in PPP dollars of 2015 and converted to natural logarithms.¹¹

3.3. *Main independent variables*

¹⁰ The interviewer is asked to explain, if necessary, that net monthly earnings are the earnings at one’s disposal after taxes and social security contributions.

¹¹ Detailed definitions of all our variables are presented in Table A1 in the Appendix.

From the information on professional status within self-employment and start-up motivation described above, we generate the following two sets of dummy variables which are used as our main predictors of earnings:

- (i) a set of three dummy variables: (i) a dummy equaling 1 for self-employed with employees; (ii) a dummy equaling 1 for independent own-account self-employed workers; and (iii) a dummy equaling 1 for dependent self-employed workers.
- (ii) a set of four dummy variables: (i) a dummy equaling 1 for pure opportunity entrepreneurs; (ii) a dummy equaling 1 for hybrid opportunity-necessity entrepreneurs; (iii) a dummy equaling 1 for pure necessity entrepreneurs; and (iv) a dummy equaling 1 for entrepreneurs for other reasons.

3.4. Control variables

In order to isolate the effects of our hypotheses-related variables, the empirical models also include a set of explanatory variables that are known to influence self-employment earnings (see, e.g., Hamilton 2000; Block and Wagner 2010; J.M. Millán et al. 2014; Van Stel et al. 2018; Parker 2018; A. Millán et al. 2020; J.M. Millán et al. 2021): educational attainment, job-related aspects (ICT use frequency at work, years of tenure, working hours, business sector) and some demographic indicators (gender, immigrant, age, cohabitation status, children, health status). In order to control for the business cycle and some structural differences between countries, the empirical models also include the national unemployment rates for periods 2010 and 2015, which we collect from Eurostat, and a period 2015 (vs. 2010) dummy.

3.5. Descriptive analysis

We first present main figures as regards the distribution of observations by professional status within self-employment and by start-up motivation for the EU-28.¹²

Concerning professional status, about 31.7%, 58.4% and 9.9% of our sample are, respectively, self-employed with employees, independent own-account self-employed and dependent self-employed workers. These figures, however, vary substantially across European countries. For instance, the share of dependent self-employed workers rises above 23% in Romania whereas it lies below 3% in Denmark.

When concentrating on start-up motivation (only available for the EWCS 2015), 60.6% of our sample report to be pure opportunity entrepreneurs. As regards their pure necessity entrepreneurs counterparts, this group accounts for 20% of our sample. Finally, the groups of hybrid entrepreneurs and entrepreneurs for other reasons account for 16.4% and 3% of our sample. However, the shares of belonging to these groups vary substantially across European countries. For instance, the share of pure opportunity entrepreneurs is 81% for Denmark whereas it is only 54.2% for Romania. Similarly, the share of pure necessity entrepreneurs varies from 7.1% for Denmark to 35.6% for Romania.

We aim to explore how professional status within self-employment and start-up motivation affect earnings. Table 1 below compares earnings and all covariates for our entrepreneurship types.

--- Insert Table 1 about here ---

¹² The whole distribution of observations across EU-28 countries is presented in Table A2 in the Appendix.

We first explore how earnings vary by different professional statuses within self-employment. When comparing earnings for the three groups, our results are consistent with Hypotheses 1 and 2. Thus, self-employed with employees have the highest earnings whereas dependent self-employed workers have the lowest. Nevertheless, it may be argued that with net monthly earnings of 1,592 PPP dollar, dependent self-employed workers are still able to make a living. Turning our attention to start-up motivation, our results give tentative support to our Hypotheses 3 to 5. Thus, pure opportunity entrepreneurs are observed to have the highest earnings whereas pure necessity entrepreneurs are observed to have the lowest. Analogously, with net monthly earnings of 1,618 PPP dollar, it can be asserted that pure necessity entrepreneurs are also able to uphold. Finally, the groups of hybrid entrepreneurs and entrepreneurs for other reasons present intermediate positions in terms of earnings.

Next, we explore how our predictors of self-employment earnings vary by professional status. We observe in our sample that self-employed with employees are relatively more often male, better educated, more likely to use ICT at work, more often working in the industry, construction and commerce and hospitality sectors, and more often living with partner and children. They also work the longest hours and feel the healthiest. When comparing independent and dependent solo self-employed workers, the latter workers are lower educated, less likely to use ICT at work, older, and more likely to have worse health perceptions. They are also more likely to work in the agricultural sector than independent own-account self-employed.

When concentrating on start-up motive, similar profiles of our relevant groups are revealed. This is in spite of the fact that the percentage shares of these groups are quite

different from those obtained for professional statuses. In particular, we observe how pure opportunity entrepreneurs in our sample are more often male, better educated, and more likely to use ICT at work. They also have better health perception, and work longer hours. In contrast, pure necessity entrepreneurs have the lowest educational attainment levels, they are the least likely to use ICT at work, they more often work in the agricultural sector and they have the worst health perception. Finally, the groups of hybrid entrepreneurs and entrepreneurs for other reasons present intermediate positions in terms of education levels and ICT use at work.

4. Methodology

As stated earlier, our data consist of two cross-sectional data sets, i.e., EWCS 2010 and 2015, grouped by country. In order to account for possible intra-country correlation when estimating earnings from self-employment, three different approaches, from weaker to stronger, are used. *First*, we use OLS regressions where standard errors are adjusted by country clustering.¹³ *Second*, we include country dummies in our OLS regressions, which allows for differences in the average level of earnings across countries, in addition to adjusting the standard errors taking into account the specific intra-group correlation. *Finally*, multilevel (hierarchical) models (Guo and Zhao 2000) are also used to further correct for biases in parameter estimates resulting from country groupings. In this framework, a significant between-group (in this case, countries) variance for the dependent variable is necessary as a precondition for running such a model (Hofmann

¹³ Regarding earnings from self-employment, a considerable proportion of observations are zeros in some human population surveys (see, e.g., Van Stel et al. 2018). In these cases the entrepreneur either only earns just enough to cover business expenses or might suffer losses (which are censored). This feature violates the linearity assumption so that the least squares method is inappropriate. As usual under these circumstances, earnings equations are estimated by means of tobit models (Tobin 1958). This feature does not occur with our sample and, hence, using OLS seems a better option.

1997; Bliese 2000; Autio and Acs 2010). We therefore perform ANOVAs with *net monthly earnings* as endogenous variable and country group membership (i.e. a set of country dummies) as exogenous variables in order to obtain the *intra-class correlation* (ICC) coefficients.

The obtained ICC value is 0.193 and its confidence interval indicates that there is 95% chance that the true ICC value lands on any point between 0.100 and 0.286. Therefore, the country effects compose approximately 19% of the total residual variance, which is within the normal range (5–20%) that can be expected of grouped data of this nature (Bliese 2000). These figures indicate that the country-level variance for the *net monthly earnings* is by no means negligible and puts into question whether the coefficients and standard errors from simple OLS regression without any control for intra-country correlation, are correct. The highly significant F value (44.46) confirms that the earnings' means are not equal across countries, which also indicates the need to account for the specific intra-group correlation.¹⁴ All in all, using multilevel models is well-founded.

5. Results

Although our descriptive analysis in subsection 3.5 seems to support the validity of our hypotheses, a conditional analysis is needed to draw robust conclusions. Models 1A–1C in Table 2, which are presented in subsection 5.1, explore the relationship between earnings and professional status within self-employment, while controlling for a wide range of possible alternative explanations of self-employment earnings. Similarly,

¹⁴ We also performed Bonferroni, Scheffe, and Sidak multiple comparison tests to examine the differences between each pair of earnings' means across the EU-28 countries. These tests apply corrections to the reported significance levels that take into account the fact that multiple comparisons are being conducted and, therefore, some differences could be significant just by chance. These tests reveal significant differences (at the 5% level) in about 60% of the 378 pairs of earnings' means.

Models 2A–2C in Table 3, which are presented in subsection 5.2, investigate the association between earnings and start-up motivation.

Models A are estimated by OLS where standard errors are adjusted by country clustering. These models include the unemployment rate as a means to control for cross-country differences (given that these models do not incorporate country dummies). Models B incorporate country dummies instead of national unemployment rates. Finally, multilevel (hierarchical) models are used in models C, instead of simple OLS, to further correct for biases in parameter estimates resulting from country groupings.

The results in Tables 2 and 3 are presented as follows. Average predicted earnings are indicated at the top of each specification. These predicted earnings help to understand the relative importance of our marginal effects presented below. Thus, each specification is presented in a two-column format. The first column shows semi-elasticities in the form of $[(dy/dx)/y]\%$, i.e., percentage changes of earnings caused by unit changes of the respective explanatory variables, whereas t-statistics associated with these effects are presented in the second column.

As regards the remainder of section 5, subsection 5.3 will present how estimated self-employment earnings vary across countries whereas subsection 5.4 presents estimation results for our control variables. Next, subsection 5.5 presents some robustness checks which are part of the analysis and, finally, a discussion of our main results is presented in subsection 5.6.

5.1. Professional status within self-employment

Table 2 shows the estimation results from three specifications, models 1A–1C, which are used to test our Hypotheses 1 and 2.

--- *Insert Table 2 about here* ---

In coherence with Hypotheses 1 and 2, our results in models 1A-1C show that self-employed with employees are associated with significantly higher entrepreneurial earnings whereas dependent self-employed workers are observed to have significantly lower earnings.¹⁵ Specifically, compared with independent own-account workers, average predicted earnings are observed to increase by about 33% for self-employed with employees, which is consistent with findings obtained by Alba-Ramírez (1994) and Earle and Sakova (2000). Conversely, earnings are observed to be some 8 to 12% lower for dependent self-employed workers, as compared with independent own-account workers. This finding is in accordance with A. Millán et al. (2020), who find that dependent self-employed workers achieve worse *job outcomes* than independent own-account workers.¹⁶ All in all, these results give strong support to the statement that “*while employers are rather clearly a successful group of entrepreneurs, the own-account workers occupy a much more ambiguous position*” (Earle and Sakova 2000, p. 597).

¹⁵ Technically, Hypothesis 2 is tested and confirmed directly as earnings of dependent self-employed workers (DSE) are compared to those of the reference group of independent own-account workers (IOA), i.e. the negative and significant coefficient of DSE in Table 2 directly supports H2. Hypothesis 1 is also supported but this is by implication: it can be directly observed that self-employed with employees (SEWE) earn more than the reference group of IOA (the coefficient of SEWE is significant and positive in Table 2). However, for H1 to be supported, SEWE also need to earn more than DSE. This latter condition follows from the transitive relation between the three groups: since SEWE earn more than IOA, and IOA earn more than DSE (H2), it is also true that SEWE earn more than DSE. Hence, SEWE earn more than both categories of solo self-employed (IOA and DSE), and H1 is therefore supported.

¹⁶ This study analyses how dependent self-employed workers, independent own-account workers and paid employees compare in terms of *job control*, *job demands* and *job returns*. To this end, the authors first develop and validate a psychometrically sound multidimensional scale for these three key constructs by conducting both exploratory and confirmatory factor analysis.

5.2. *Start-up motivation*

Table 3 shows the estimation results from three specifications, models 2A–2C, which give support to our Hypotheses 3 and 5 but not to H4.

--- *Insert Table 3 about here* ---

Thus, pure opportunity entrepreneurs present the highest earnings whereas hybrid opportunity-necessity entrepreneurs also present higher earnings than pure necessity entrepreneurs. In particular, compared with pure necessity entrepreneurs, average predicted earnings are observed to increase by between 18 and 24% for pure opportunity entrepreneurs (supporting H3), which is consistent with findings reported by Andersson and Wadensjö (2007), Block and Wagner (2010), De Vries et al. (2020) and Van Stel et al. (2018). In particular, the earnings differences, although notable, still seem to support the claim that “*only a low proportion of necessity solo self-employment may be considered precarious employment*” (De Vries et al. 2020, p. 457). Compared with hybrid entrepreneurs, earnings are observed to be some 11.5 to 14% higher for pure opportunity entrepreneurs, supporting H5.¹⁷ Finally, earnings are observed to be between 5.5 and 9% lower for pure necessity entrepreneurs, as compared with hybrid entrepreneurs. Although the sign of this difference is in line with H4, the hypothesis is not formally supported, as the coefficient for hybrid entrepreneurs in Table 3 is not significant.

5.3. *Earnings across countries*

¹⁷ In order to provide these results, we reestimated models 2A-2C by using hybrid entrepreneurs as our reference category (not presented for brevity). These results are significant at conventional levels ($p < 0.01$), thereby formally supporting Hypothesis 5. Alternatively, these can be (roughly) calculated by simply subtracting the semi-elasticity associated to hybrid entrepreneur from the semi-elasticity associated to opportunity entrepreneur. By doing so, differences are also observed to vary between 12 and 15%.

Table 4 shows differences in predicted average self-employment earnings across EU-28 countries for different professional statuses and start-up motivations.

--- *Insert Table 4 about here* ---

Despite the fact that earnings are defined in PPP dollars of 2015, notable differences across groups of countries still remain, which may be associated to their institutional frameworks.¹⁸ Thus, we observe how both Anglo-Saxon (Ireland, UK) and Nordic countries (Denmark, Finland) rank high in terms of predicted self-employment earnings, Sweden being the only exception with a medium-low position. Continental countries also rank high (Netherlands, Luxembourg, Germany) or medium-high (Belgium, Austria, France) in terms of self-employment earnings. Mediterranean countries can be found in the whole range of intermediate positions, i.e., medium-high (Italy, Malta), medium (Cyprus, Spain) and medium-low positions (Portugal, Greece). Finally, both Baltic States and Eastern European countries occupy medium (Lithuania, Czech Republic), medium-low (Slovakia) and low positions (Estonia, Slovenia, Bulgaria, Croatia, Hungary, Romania, Latvia).¹⁹

5.4. Control variables

As regards the results for our control variables, we find that education, ICT use frequency at work, tenure, and the number of working hours increase earnings from entrepreneurship, as expected. As regards the number of working hours, however, the quadratic term begins to dominate the linear term at 61 working hours per week, indicating that, beyond this number of hours, additional entrepreneurial efforts are no

¹⁸ Undoubtedly, other factors are at play here as well, including macroeconomic factors. The analysis of the underlying factors explaining cross-country differences in self-employment earnings is beyond the scope of the present work.

¹⁹ Dilli et al. (2018) and Fritsch et al. (2019) present similar approaches to account for varieties of institutional contexts.

longer productive. We also find that females and immigrants earn less than their male and native counterparts, respectively. Regarding the age of the entrepreneur, we find a non-linear, inverted U-shaped impact on earnings where the turning point is reached when the entrepreneur is 48 years old. Cohabiting individuals report higher earnings than those living without partner whereas no effect of children on earnings is observed. Reporting good health also seems to be positively associated with earnings from entrepreneurship. Finally, higher unemployment rates are associated with lower earnings, which is also as expected.

5.5. Robustness checks

We performed several robustness checks. *First*, our results are robust to quantile regression techniques, which is relevant as the distribution of entrepreneurs' incomes is very different from the distribution of employees' incomes (i.e., the variance is larger and the distribution is more skewed). Thus, mean earnings may not characterize the self-employment returns of the majority of business owners and, therefore, comparisons based on averages are likely to produce different results from those based on medians or other quantiles of the income distribution (Rosen 1981; Hamilton 2000). *Second*, we have obtained similar results when normalizing earnings by dividing by the corresponding country mean earnings and then taking the natural logarithm. *Third*, our results are similar to those obtained when considering other macroeconomic indicators such as GDP growth rates and GDP per capita (Eurostat) as alternative measures of macroeconomic conditions. *Fourth*, all models incorporated controls for intra-country correlation, as described in Section 4. Results obtained with these approaches are similar to those obtained with simple pooled regressions. *Fifth*, in order to reach our final specifications, we followed a stepwise regression approach in which each new model only incorporates

one new variant with respect to previous ones and serves as a robustness check for the obtained results in previous models. Finally, we verified the robustness of our t-statistics by re-estimating them from variance–covariance matrices of the coefficients obtained by bootstrapping. All results as regards these robustness checks are available upon request.

5.6. Discussion

Our results regarding dependent self-employed workers and necessity entrepreneurs may be a cause for concern as our results confirmed that they indeed earn significantly less than independent own-account self-employed and opportunity entrepreneurs, respectively. Governments may want to ask themselves if this type of employment is desirable and, in turn, whether ‘erga omnes’ policies, characterized by general and often automatic start-up subsidies, are appropriate. Thus, as Román et al. (2013) argue, if as part of active labor market policies, start-up incentives are intended to improve the chances of people moving back into work, they can be considered adequate instruments. On the contrary, if, as part of entrepreneurship policy, these incentives are considered as an instrument to promote more innovative and high-growth entrepreneurship, their contribution is dubious at the very least.

Since we are able to quantify earnings differentials between different groups, our paper actually makes a relevant contribution to the above debate. In particular regarding the category of dependent self-employed workers, there is a serious concern in various policy circles regarding the precarious nature of these workers (OECD 2000, 2014; ILO 2003; Supiot 2001; European Commission 2006; Eichhorst et al. 2013). The current paper found that in European countries, the dependent self-employed are indeed observed to have significantly lower earnings than independent own-account workers. However, it was also

found that on average, dependent self-employed workers still generate average monthly earnings levels which are sufficient to make a living. Moreover, the difference in monthly earnings with independent own-account workers is only between 8 and 12%. These findings suggest that the precarious nature of the dependent self-employed may be smaller than sometimes assumed by policy makers.

Possibly, many dependent self-employed workers may not be as unhappy with their employment as sometimes assumed, particularly if the alternative labour force status would be unemployment. A. Millán et al. (2020) find that, compared to paid employees and independent own-account self-employed, dependent self-employed workers are worse off in terms of job outcomes (including earnings), which is confirmed by the present study. However, both in terms of job control and in terms of job demands, the dependent self-employed take a middle position: they are better off than paid employees as far as job control is concerned, and they are better off than independent own-account self-employed as far as job demands are concerned (A. Millán et al. 2020). Hence, although dependent self-employment is certainly not the most ideal labour market position to be in, policy makers may want to carefully (re)consider how precarious the position of the dependent self-employed is. Obviously, more research is required to draw final conclusions in this regard, also in light of the current Covid-19 crisis. In case it will be concluded that dependent self-employment is undesirable, policy makers may consider lowering the extent of employment protection as this will make it more attractive for employers to offer workers a wage contract (A. Millán et al. 2013), rather than hiring their services on the basis of a dependent self-employment working relationship.

6. Conclusions

Entrepreneurship is a heterogeneous phenomenon and different types of entrepreneurial activities contribute differently to economies and societies. Although this general notion is widely acknowledged within entrepreneurship research, empirical studies that quantify such differences in economic contribution between different entrepreneurship types, are scarce. This paper addresses this issue by investigating self-employment performance across different types, based on professional status and start-up motivation. In particular, we investigated which of our identified ‘types’ of self-employment perform better in terms of earnings. This is important since high-performance types are expected to provide a relatively bigger macro-economic contribution. We found that particularly the self-employed with employees and the opportunity entrepreneurs performed relatively well compared to other types of self-employed. Although this is hardly surprising, a contribution of our paper is that common assumptions regarding performance differences across different groups of entrepreneurs are actually confirmed by our study. Moreover, we have been able to quantify these differences and found that the earnings differential between pure opportunity and pure necessity entrepreneurs is about 18%. Interestingly, hybrid opportunity-necessity entrepreneurs perform just in between the groups of pure opportunity and pure necessity entrepreneurs. This shows that the hybrid group should be distinguished as a separate group in future research on start-up motives.

We cannot rule out the possibility that our results are affected to some extent by data limitations. We particularly refer to the lack of panel data, which does not allow examining the dynamics behind the professional status choices observed in the data base. Clearly, more research is needed to determine whether other international data bases (in particular those with a longitudinal set-up) reinforce the robustness of our results or not. A second data limitation concerns the entrepreneurs’ working conditions that may affect

earnings. Although we have included several controls capturing working conditions, it is possible that our estimation results are still influenced somewhat by the omission of certain specific working conditions like the physical environment or the workplace design.

Nevertheless, we suggest that our results form a good starting point for the study of heterogeneity within entrepreneurship. However, we are aware that our dimensions of professional status and start-up motivation certainly do not frame the entire scope of entrepreneurship. Accordingly, future research should broaden the horizons of the present enquiry by extending the analysis to other categorizations of self-employed and entrepreneurs. In this regard, Wennekers and Van Stel (2017, p. 41) identify 20 entrepreneurship dimensions along which entrepreneurship types can be identified, including innovative vs. imitative entrepreneurship, start-ups vs. incumbent entrepreneurship, female vs. male entrepreneurship, to give only a few examples. Considering that in this paper we only explored two such dimensions, there is certainly still a lot of research ahead in this area.

Future research may also focus on examining other measures of performance (e.g., survival or employment growth), and other (non-European) countries. Finally, future studies should also investigate to what extent performance differences between different entrepreneurship types are reinforced or attenuated by the current Covid-19 crisis, and how different types of entrepreneurs cope with the challenge of maintaining their liquidity during the crisis (Block et al. 2020).

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Tables (to be inserted in the text)

Table 1. Descriptive statistics for self-employment earnings and main predictors

	Professional status [2010, 2015]								Start-up motivation [2015]									
	1		2		3		Total		1		2		3		4		Total	
	<i>SEwE</i>		<i>IOA</i>		<i>DSEW</i>				<i>Opp</i>		<i>Hyb</i>		<i>Nec</i>		<i>Oth</i>			
# observations	1,629		3,000		507		5,136		1,793		485		590		90		2,958	
% observations	31.7%		58.4%		9.9%		100%		60.6%		16.4%		20.0%		3.0%		100%	
Variables	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Earnings																		
Net monthly earnings - PPP \$ of 2015 (<i>1.3-55,210.9</i>)	2,954	2,555	2,011	1,796	1,592	1,457	2,269	2,097	2,618	2,617	1,956	1,320	1,618	1,182	1,897	1,289	2,288	2,223
Educational attainment																		
Basic education ^a	0.036		0.072		0.130		0.066		0.031		0.056		0.110		0.056		0.052	
Secondary education ^a	0.603		0.621		0.686		0.622		0.587		0.625		0.663		0.589		0.608	
Tertiary education ^a	0.360		0.308		0.183		0.312		0.382		0.320		0.227		0.356		0.340	
Job aspects																		
ICT use frequency at work (<i>1-7</i>)	3.84	2.15	3.16	2.25	2.19	1.95	3.28	2.24	3.60	2.20	3.27	2.19	2.62	2.09	3.20	2.22	3.34	2.21
Years of tenure in present job (<i>1-53</i>)	13.7	10.0	12.0	10.2	13.7	12.1	12.7	10.4	13.8	10.6	12.1	10.1	11.6	11.1	14.8	12.4	13.1	10.7
Working hours (<i>15-98</i>)	48.7	12.8	44.6	14.6	44.2	16.0	45.8	14.4	45.0	13.2	44.0	13.7	43.3	15.3	42.1	16.5	44.4	13.8
Business sector dummies																		
Agriculture ^a	0.091		0.114		0.385		0.134		0.108		0.130		0.197		0.178		0.131	
Industry ^a	0.110		0.093		0.099		0.099		0.103		0.095		0.078		0.111		0.097	
Construction ^a	0.133		0.120		0.087		0.121		0.119		0.118		0.119		0.078		0.117	
Commerce and hospitality ^a	0.330		0.251		0.101		0.261		0.234		0.264		0.222		0.178		0.235	
Transport ^a	0.036		0.040		0.065		0.041		0.037		0.047		0.056		0.033		0.043	
Financial services ^a	0.030		0.034		0.026		0.032		0.028		0.029		0.025		0.044		0.028	
Public administration and defence	0.004		0.002		0.004		0.003		0.001		0.002		0.002		0.011		0.001	
Education ^a	0.012		0.020		0.018		0.017		0.020		0.025		0.031		0.033		0.023	
Health ^a	0.049		0.059		0.043		0.054		0.061		0.035		0.046		0.078		0.054	
Other services ^a	0.206		0.267		0.174		0.239		0.289		0.256		0.225		0.256		0.270	
Demographic characteristics																		
Female ^a	0.309		0.402		0.383		0.371		0.354		0.375		0.415		0.522		0.375	
Immigrant ^a	0.123		0.119		0.126		0.121		0.137		0.126		0.134		0.133		0.135	
Age (<i>18-65</i>)	45.2	10.4	44.8	10.9	46.5	11.4	45.1	10.8	45.9	10.6	45.1	10.8	46.3	11.0	46.3	11.6	45.9	10.8
Cohabiting ^a	0.789		0.699		0.694		0.727		0.724		0.705		0.659		0.744		0.709	
Children under 14 ^a	0.346		0.306		0.231		0.311		0.308		0.320		0.271		0.222		0.300	
Health (<i>1-5</i>)	4.05	0.76	3.99	0.77	3.81	0.81	3.99	0.77	4.11	0.73	3.93	0.79	3.74	0.81	4.00	0.76	4.00	0.77

Notes: *SEwE* = Self-employed with employees, *IOA* = Independent own-account self-employed worker, *DSEW* = Dependent self-employed worker, *Opp* = Pure opportunity entrepreneur, *Hyb* = Hybrid opportunity-necessity entrepreneur, *Nec* = Pure necessity entrepreneur, *Oth* = Entrepreneur for other reasons; ^a Dummy variable.

Data source: EWCS 2010, 2015.

Table 2. Determinants of net monthly earnings with focus on occupational status

# Specification	1A		1B		1C	
Model	OLS		OLS		Multilevel linear regression	
Average predicted earnings (y) –in PPP \$ of 2015–	2,268.9		2,268.9		2,470.8	
Independent variables (x)	$\frac{dy/dx}{y}$ %	t-statistic	$\frac{dy/dx}{y}$ %	t-statistic	$\frac{dy/dx}{y}$ %	t-statistic
Occupational status						
1 Self-employed with employees ^a	33.1	7.76***	33.4	13.5***	33.3	13.6***
2 Independent own-account self-employed worker ^a						
3 Dependent self-employed worker ^a	-11.6	-2.24**	-8.42	-2.66***	-8.64	-2.75***
Educational attainment						
Basic education ^a (ref.)						
Secondary education ^a	27.2	1.76*	31.7	6.47***	34.1	6.92***
Tertiary education ^a	60.0	2.92***	64.7	10.7***	67.3	11.1***
Job aspects						
ICT use frequency at work (1-7)	2.78	1.69*	1.81	3.63***	1.83	3.70***
Years of tenure (1-53)	1.15	2.85***	1.09	3.54***	1.10	3.60***
Years of tenure (squared)	-0.01	-0.69	-0.02	-2.08**	-0.02	-2.06**
Working hours (15-98)	3.39	7.51***	3.24	10.8***	3.26	10.9***
Working hours (squared)	-0.03	-5.66***	-0.03	-8.62***	-0.03	-8.79***
Business sector dummies						
Agriculture ^a	-42.4	-6.79***	-34.5	-10.6***	-34.7	-10.7***
Industry ^a	-18.0	-3.99***	-13.7	-3.67***	-13.6	-3.65***
Construction ^a (ref.)						
Commerce and hospitality ^a	-21.3	-6.58***	-17.8	-5.84***	-17.7	-5.86***
Transport ^a	-1.08	-0.22	0.50	0.09	1.20	0.23
Financial services ^a	18.3	2.70***	15.4	2.35**	16.2	2.49**
Public administration and defence ^a	-41.1	-1.35	-36.4	-2.53**	-36.6	-2.56**
Education ^a	-0.53	-0.06	-7.38	-0.99	-4.69	-0.62
Health ^a	29.2	3.65***	27.3	4.65***	27.7	4.73***
Other services ^a	-5.85	-1.85*	-4.01	-1.15	-4.02	-1.16
Demographic characteristics						
Female ^a	-24.7	-6.94***	-23.4	-12.7***	-23.5	-12.9***
Immigrant ^a	-0.42	-0.09	-5.69	-1.94*	-5.47	-1.88*
Age (18-65)	2.68	2.22**	2.67	3.68***	2.61	3.62***
Age (squared)	-0.03	-2.11**	-0.03	-3.45***	-0.03	-3.40***
Cohabiting ^a	7.33	2.44**	9.32	3.89***	9.47	3.97***
Children under 14 ^a	6.12	2.34**	1.90	0.80	2.04	0.86
Health (1-5)	11.5	3.68***	6.96	5.38***	7.19	5.59***
Business cycle						
Unemployment rate (4.4-24.9)	-1.41	-1.83*			-2.13	-5.64***
Wave						
2015 ^a	0.87	1.51	5.73	2.74***	0.87	0.43
Constant	515.3	13.4***	530.1	29.5***	542.4	28.9***
Country dummies						
	No		Yes		No	
# observations	5,136		5,136		5,136	

Notes: Our dependent variable is the natural logarithm of monthly net earnings. Accordingly, we interpret the regression coefficients as semi-elasticities in the form of $[(dy/dx)/y]\%$, i.e., they show the percentage changes of earnings caused by unit changes of the respective explanatory variables. In the context of dummy variables, these reflects the impact for a discrete change of the dummy variable from 0 to 1 and are calculated as $(e^{\text{coef}}-1)\%$; * $0.1 > p \geq 0.05$; ** $0.05 > p \geq 0.01$; *** $p < 0.01$; ^a Dummy variable; The maximum correlation is 0.559 (between age and tenure), and the VIFs values (from model 1A) range from 1.03 to 1.78. Thus, multicollinearity does not pose a concern, especially in consideration of the large size of our sample; Data source: EWCS 2010, 2015.

Table 3. Determinants of net monthly earnings with focus on start-up motivation

# Specification	2A		2B		2C	
Model	OLS		OLS		Multilevel linear regression	
Average predicted earnings (y) –in PPP \$ of 2015–	2,287.9		2,287.9		2,341.3	
Independent variables (x)	$\frac{dy/dx}{y}$ %	t-statistic	$\frac{dy/dx}{y}$ %	t-statistic	$\frac{dy/dx}{y}$ %	t-statistic
Start-up motivation						
1 Pure opportunity entrepreneur ^a	23.7	4.77***	17.9	4.94***	18.4	5.10***
2 Hybrid opportunity-necessity entrepreneur ^a	8.72	1.61	5.64	1.36	5.89	1.43
3 Pure necessity entrepreneur ^a (ref.)						
4 Entrepreneur for other reasons ^a	7.91	0.67	4.83	0.63	5.12	0.67
Educational attainment						
Basic education ^a (ref.)						
Secondary education ^a	9.68	1.06	11.1	1.67*	10.7	1.63
Tertiary education ^a	35.5	3.52***	35.0	4.42***	34.8	4.44***
Job aspects						
ICT use frequency at work (1-7)	4.69	4.70***	3.63	5.59***	3.72	5.78***
Years of tenure (1-53)	1.17	2.42**	1.14	2.94***	1.14	2.95***
Years of tenure (squared)	-0.01	-0.71	-0.01	-1.42	-0.01	-1.38
Working hours (15-98)	3.59	6.97***	3.55	8.84***	3.54	8.87***
Working hours (squared)	-0.03	-5.22***	-0.03	-6.75***	-0.03	-6.76***
Business sector dummies						
Agriculture ^a	-36.9	-5.60***	-28.9	-6.54***	-29.5	-6.73***
Industry ^a	-19.8	-3.03***	-13.5	-2.74***	-14.0	-2.85***
Construction ^a (ref.)						
Commerce and hospitality ^a	-20.8	-4.91***	-17.2	-4.21***	-17.4	-4.30***
Transport ^a	0.28	0.04	3.81	0.55	3.54	0.52
Financial services ^a	11.1	1.64	5.94	0.70	6.27	0.74
Public administration and defence ^a	-86.3	-2.00**	-84.2	-5.60***	-84.3	-5.70***
Education ^a	-8.03	-0.93	-10.8	-1.27	-10.5	-1.24
Health ^a	25.3	3.08***	24.7	3.27***	24.6	3.28***
Other services ^a	-9.77	-1.94*	-7.36	-1.67*	-7.53	-1.72*
Demographic characteristics						
Female ^a	-22.3	-6.22***	-21.2	-8.76***	-21.2	-8.83***
Immigrant ^a	-1.43	-0.21	-6.22	-1.68*	-5.69	-1.55
Age (18-65)	1.87	1.49	2.02	2.12**	2.01	2.12**
Age (squared)	-0.02	-1.50	-0.02	-2.33**	-0.02	-2.31**
Cohabiting ^a	8.05	1.79*	11.4	3.71***	11.2	3.68***
Children under 14 ^a	2.11	0.51	-2.27	-0.73	-1.91	-0.62
Health (1-5)	9.58	3.79***	8.42	4.97***	8.55	5.08***
Business cycle						
Unemployment rate (4.4 – 24.9)	-1.23	-1.77*			-1.62	-1.41
Constant	545.0	17.9***	543.9	23.2***	554.9	21.1***
Country dummies	<i>No</i>		<i>Yes</i>		<i>No</i>	
# observations	2,958		2,958		2,958	

Notes: Our dependent variable is the natural logarithm of monthly net earnings. Accordingly, we interpret the regression coefficients as semi-elasticities in the form of $[(dy/dx)/y]\%$, i.e., they show the percentage changes of earnings caused by unit changes of the respective explanatory variables. In the context of dummy variables, these reflects the impact for a discrete change of the dummy variable from 0 to 1 and are calculated as $(e^{\text{coef}}-1)\%$; * $0.1 > p \geq 0.05$; ** $0.05 > p \geq 0.01$; *** $p < 0.01$; ^a Dummy variable; The maximum correlation is 0.546 (between age and tenure), and the VIFs values (from model 2A) range from 1.04 to 1.78. Thus, multicollinearity does not pose a concern, especially in consideration of the large size of our sample; Data source: EWCS 2015.

Table 4: Predicted average earnings for professional statuses within self-employment and start-up motivation across the EU-28

Country	Professional status [2010, 2015]								Start-up motivation [2015]									
	1 SEwE		2 IOA		3 DSEW		Total		1 Opp		2 Hyb		3 Nec		4 Oth		Total	
	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$	Rank#	PPP \$
Denmark	1	5,111	2	3,100	2	3,478	1	3,901	1	4,432	1	4,242	1	5,291	-	1	4,367	
Netherlands	2	4,186	1	3,181	5	2,465	2	3,415	2	3,986	17	1,655	7	2,044	1,222	3	3,249	
Luxembourg	3	4,007	3	3,010	1	3,909	3	3,349	3	3,720	2	3,355	16	1,631	2,087	2	3,362	
Germany	4	3,993	6	2,475	15	1,486	4	3,072	4	3,653	4	3,059	4	2,196	1,918	4	3,220	
United Kingdom	5	3,920	5	2,577	4	2,574	5	2,999	5	3,423	11	2,105	9	1,950	3,256	5	2,974	
Ireland	8	3,439	4	2,686	3	2,691	6	2,910	7	2,956	5	2,879	6	2,158	2,118	6	2,699	
Finland	11	2,965	7	2,475	7	2,316	7	2,611	8	2,892	9	2,193	20	1,400	1,975	7	2,538	
Italy	10	3,114	8	2,256	12	1,648	8	2,479	9	2,786	7	2,390	13	1,723	2,832	8	2,482	
Malta	7	3,553	18	1,836	10	1,907	9	2,376	16	2,437	18	1,550	18	1,611	1,558	17	2,154	
Poland	6	3,702	15	1,930	23	1,206	10	2,312	6	3,199	22	1,488	19	1,517	1,638	12	2,408	
Belgium	14	2,760	9	2,223	11	1,710	11	2,309	19	2,296	14	1,850	2	2,381	2,313	15	2,194	
Austria	15	2,735	10	2,155	6	2,379	12	2,303	17	2,328	8	2,318	10	1,919	2,068	14	2,296	
France	9	3,205	17	1,850	9	2,079	13	2,252	12	2,611	6	2,397	5	2,191	1,985	10	2,451	
Cyprus	16	2,729	12	2,046	14	1,506	14	2,191	18	2,325	16	1,826	12	1,774	-	19	2,096	
Lithuania	13	2,800	13	1,964	18	1,445	15	2,180	10	2,772	25	1,405	3	2,302	-	11	2,450	
Czech Republic	19	2,494	11	2,080	17	1,476	16	2,176	11	2,646	10	2,109	8	1,995	2,850	9	2,464	
Spain	12	2,807	16	1,884	13	1,596	17	2,151	14	2,527	15	1,850	17	1,625	2,640	16	2,185	
Sweden	18	2,508	14	1,949	8	2,293	18	2,081	15	2,483	3	3,189	11	1,911	-	13	2,314	
Slovakia	22	2,199	20	1,733	16	1,486	19	1,936	23	1,756	12	1,880	15	1,632	2,396	21	1,726	
Portugal	26	2,085	19	1,764	19	1,405	20	1,890	20	1,884	19	1,535	21	1,358	1,802	20	1,786	
Greece	20	2,462	21	1,634	20	1,262	21	1,856	24	1,718	23	1,475	22	1,226	304	23	1,595	
Estonia	24	2,179	23	1,523	24	1,131	22	1,686	13	2,548	13	1,851	25	982	1,116	18	2,099	
Slovenia	25	2,115	22	1,536	21	1,238	23	1,672	21	1,812	21	1,497	14	1,681	852	22	1,654	
Bulgaria	17	2,559	27	1,184	25	964	24	1,624	22	1,759	26	1,247	26	905	-	24	1,525	
Croatia	23	2,190	25	1,213	22	1,214	25	1,510	25	1,609	20	1,503	24	1,055	-	25	1,507	
Hungary	27	2,019	26	1,191	27	956	26	1,440	28	1,024	24	1,408	23	1,219	1,261	26	1,485	
Romania	21	2,210	28	1,037	28	616	27	1,342	27	1,372	27	1,103	28	693	-	28	1,196	
Latvia	28	1,596	24	1,318	26	960	28	1,333	26	1,591	28	1,060	27	847	6,729	27	1,476	
EU-28		2,954		2,011		1,592		2,269		2,618		1,956		1,618	1,897		2,288	

Notes: SEwE = Self-employed with employees, IOA = Independent own-account self-employed worker, DSEW = Dependent self-employed worker, Opp = Pure opportunity entrepreneur, Hyb = Hybrid opportunity-necessity entrepreneur, Nec = Pure necessity entrepreneur, Oth = Entrepreneur for other reasons; Average predicted earnings –in PPP \$ of 2015– are estimated on the basis of specifications 1B and 2B; Average predicted earnings for entrepreneurs for other reasons cannot be estimated for those countries without entrepreneurs of this type in the sample (i.e. Bulgaria, Croatia, Cyprus, Denmark, Lithuania, Romania and Sweden);

Data source: EWCS 2010, 2015.

Appendix

Table A1. Variable definitions

Variable	Description
Dependent variable	
<i>Earnings</i>	
Net monthly earnings - PPP \$ of 2015 (logs)	Average net earnings in recent months. The variable is defined in PPP \$ of 2015 and converted to natural logarithms.
Main independent variables	
<i>Occupational status within self-employment</i>	
Self-employed with employees	Dummy equals 1 for workers who declare being self-employed with employees.
Independent own-account self-employed worker	Dummy equals 1 for workers who declare being self-employed without employees and answer positively to the question on whether he/she generally has more than one client or customer.
Dependent self-employed worker	Dummy equals 1 for workers who declare being self-employed without employees and answer negatively to the question on whether he/she generally has more than one client or customer.
<i>Start-up motivation</i>	
Pure opportunity entrepreneur	Dummy equals 1 for workers who declare having become self-employed mainly through own personal preferences. This variable is generated for the year 2015.
Hybrid opportunity-necessity entrepreneur	Dummy equals 1 for workers who declare having become self-employed due to a combination of both reasons: own personal preferences and no other alternatives for work. This variable is generated for the year 2015.
Pure necessity entrepreneur	Dummy equals 1 for workers who declare having become self-employed because had no other alternatives for work. This variable is generated for the year 2015.
Entrepreneur for other reasons	Dummy equals 1 for workers who declare having become self-employed due to neither of these previous reasons. This variable is generated for the year 2015.
Control variables	
<i>Educational attainment</i>	
Basic education	Dummy equals 1 for workers with less than lower secondary education (ISCED-1997, 0-1).
Secondary education	Dummy equals 1 for workers with, at least, lower secondary education but non-tertiary education (ISCED-1997, 2-4).
Tertiary education	Dummy equals 1 for workers with tertiary education (ISCED-1997, 5-6).
<i>Job aspects</i>	
ICT use frequency at work	Variable ranging from 1 to 7. The scale refers to the individual ICT (i.e., computers, laptops, smartphones, etc.) use frequency at work. It equals 1 for individuals answering <i>never</i> and 7 for individuals answering <i>all of the time</i> .
Years of tenure	Years of experience in the company or organization.
Working hours	Working hours per week.
<i>Business sector dummies</i>	
Agriculture	Dummy equals 1 for workers whose code of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) is A = Agriculture, forestry and fishing.
Industry	Dummy equals 1 for workers whose codes of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) are B = Mining and quarrying, C = Manufacturing, D = Electricity, gas, steam and air conditioning supply, and E = Water supply; sewerage, waste management and remediation activities.
Construction	Dummy equals 1 for workers whose code of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) is F = Construction.
Commerce and hospitality	Dummy equals 1 for workers whose codes of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) are G = Wholesale and retail trade; repair of motor vehicles and motorcycles, and I = Accommodation and food service activities.
Transport	Dummy equals 1 for workers whose code of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) is H = Transportation and storage.
Financial services	Dummy equals 1 for workers whose codes of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) are K = Financial and insurance activities, and L = Real estate activities.
Public administration and defence	Dummy equals 1 for workers whose code of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) is O = Public administration and defence; compulsory social security.
Education	Dummy equals 1 for workers whose code of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) is P = Education.
Health	Dummy equals 1 for workers whose code of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) is Q = Human health and social work activities.
Other services	Dummy equals 1 for workers whose codes of main activity of the local unit of the business, by means of the Nomenclature of Economic Activities (NACE rev. 2, 2008) are J = Information and communication, M = Professional, scientific and technical activities, N = Administrative and support service activities, R = Arts, entertainment and recreation, S = Other service activities, T = Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use, and U = Activities of extraterritorial organisations and bodies.
<i>Demographic characteristics</i>	
Female	Dummy equals 1 for females.
Immigrant	Dummy equals 1 for citizens of a different country of that of residence.

Age	Age reported by the workers.
Cohabiting	Dummy equals 1 for individuals cohabiting with spouse/partner.
Children under 14	Dummy equals 1 for individuals cohabiting with any son or daughter aged under 14.
Health	Variable ranging from 1 to 5. The scale refers to the level of health declared by the worker. It equals 1 for individuals whose health is very bad and 5 for individuals whose health is very good.
<i>Business cycle</i>	
Unemployment rate	Harmonised annual unemployment rate (source: Eurostat).
<i>Wave</i>	
2015	Dummy equals 1 for observations corresponding to the EWCS 2015 and 0 for observations corresponding to the EWCS 2010.
<i>Country dummies</i>	
	28 dummies equalling 1 for individuals living in the named country: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom.

Data source: EWCS.

Table A2: Distribution of observations by professional status within self-employment and start-up motivation for the EU-28

Country		Professional status [2010, 2015]				Start-up motivation [2015]				
		1 <i>SEwE</i>	2 <i>IOA</i>	3 <i>DSEW</i>	Total	1 <i>Opp</i>	2 <i>Hyb</i>	3 <i>Nec</i>	4 <i>Oth</i>	Total
Austria	% obs.	33.6	58.8	7.6	100	39.1	16.1	29.9	14.9	100
	# obs.	44	77	10	131	34	14	26	13	87
Belgium	% obs.	36.8	59.5	3.7	100	77.4	5.1	10.8	6.7	100
	# obs.	141	228	14	383	151	10	21	13	195
Bulgaria	% obs.	32.1	60.3	7.7	100	66.7	12.2	21.1	0.0	100
	# obs.	50	94	12	156	60	11	19	0	90
Croatia	% obs.	35.9	50.9	13.2	100	39.7	22.4	37.9	0.0	100
	# obs.	38	54	14	106	23	13	22	0	58
Cyprus	% obs.	38.7	49.4	11.9	100	77.3	12.8	9.9	0.0	100
	# obs.	101	129	31	261	109	18	14	0	141
Czech Republic	% obs.	27.6	63.8	8.6	100	50.8	29.2	18.5	1.5	100
	# obs.	45	104	14	163	33	19	12	1	65
Denmark	% obs.	49.6	47.8	2.7	100	81.0	11.9	7.1	0.0	100
	# obs.	56	54	3	113	34	5	3	0	42
Estonia	% obs.	45.6	45.6	8.7	100	59.4	12.5	21.9	6.3	100
	# obs.	47	47	9	103	38	8	14	4	64
Finland	% obs.	36.8	52.6	10.5	100	80.3	11.3	6.3	2.1	100
	# obs.	70	100	20	190	114	16	9	3	142
France	% obs.	29.6	66.6	3.8	100	65.3	18.4	12.2	4.1	100
	# obs.	93	209	12	314	64	18	12	4	98
Germany ^a	% obs.	49.6	45.3	5.0	100	56.5	22.5	19.1	2.0	100
	# obs.	69	63	7	139	83	33	28	3	147
Greece	% obs.	25.5	61.1	13.3	100	45.9	26.8	24.9	2.4	100
	# obs.	94	225	49	368	94	55	51	5	205
Hungary	% obs.	33.7	56.1	10.2	100	25.7	31.4	31.4	11.4	100
	# obs.	33	55	10	98	9	11	11	4	35
Ireland	% obs.	33.8	53.3	12.9	100	68.9	11.9	17.8	1.5	100
	# obs.	71	112	27	210	93	16	24	2	135
Italy	% obs.	30.4	61.6	8.0	100	55.8	22.1	19.5	2.6	100
	# obs.	84	170	22	276	86	34	30	4	154
Latvia	% obs.	38.6	48.9	12.5	100	37.5	26.6	34.4	1.6	100
	# obs.	34	43	11	88	24	17	22	1	64
Lithuania	% obs.	23.5	58.3	18.3	100	56.4	18.0	25.6	0.0	100
	# obs.	27	67	21	115	44	14	20	0	78
Luxembourg	% obs.	41.4	53.5	5.1	100	76.2	12.7	6.4	4.8	100
	# obs.	41	53	5	99	48	8	4	3	63
Malta	% obs.	28.8	64.4	6.8	100	68.8	12.5	17.5	1.3	100
	# obs.	38	85	9	132	55	10	14	1	80
Netherlands	% obs.	27.1	66.3	6.6	100	72.8	14.6	7.8	4.9	100
	# obs.	45	110	11	166	75	15	8	5	103
Poland	% obs.	22.9	60.6	16.5	100	49.2	20.0	23.1	7.7	100
	# obs.	43	114	31	188	32	13	15	5	65
Portugal	% obs.	24.7	59.2	16.1	100	40.6	17.8	37.6	4.0	100
	# obs.	43	103	28	174	41	18	38	4	101
Romania	% obs.	23.2	53.5	23.2	100	54.2	10.2	35.6	0.0	100
	# obs.	33	76	33	142	32	6	21	0	59
Slovakia	% obs.	20.6	61.2	18.2	100	66.7	11.1	20.8	1.4	100
	# obs.	35	104	31	170	48	8	15	1	72
Slovenia	% obs.	32.0	55.7	12.3	100	64.2	15.0	15.0	5.8	100
	# obs.	65	113	25	203	77	18	18	7	120
Spain	% obs.	30.3	63.5	6.2	100	47.8	19.6	31.3	1.4	100
	# obs.	103	216	21	340	139	57	91	4	291
Sweden	% obs.	34.0	63.1	2.9	100	86.5	7.7	5.8	0.0	100
	# obs.	35	65	3	103	45	4	3	0	52
United Kingdom	% obs.	24.9	63.4	11.7	100	71.1	10.5	16.5	2.0	100
	# obs.	51	130	24	205	108	16	25	3	152
EU-28	% obs.	31.7	58.4	9.9	100	60.6	16.4	20.0	3.0	100
	# obs.	1,629	3,000	507	5,136	1,793	485	590	90	2,958

Notes: *SEwE* = Self-employed with employees, *IOA* = Independent own-account self-employed worker, *DSEW* = Dependent self-employed worker, *Opp* = Pure opportunity entrepreneur, *Hyb* = Hybrid opportunity-necessity entrepreneur, *Nec* = Pure necessity entrepreneur, *Oth* = Entrepreneur for other reasons; ^a Germany has to be excluded from our sample for 2010 due to missing data in relevant variables.

Data source: EWCS 2010, 2015 and Eurostat.