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## Talent workers as entrepreneurs: a new approach to aspirational self-employment

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# Talent workers as entrepreneurs: a new approach to aspirational self-employment

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## Abstract

Using the concept of so-called talent workers (Hsieh et al. 2016), we ask what is the link between wage employment as a talent worker and subsequent establishing of business. Individuals with tertiary education and experience in specific occupations skills are in principle more likely to develop or adopt innovations necessary for the entrepreneurial success. We employ over a decade of individual level data on changes in the labor market status for Poland – a country with high levels of self-employment and analyze transitions to self-employment as opposed to switching jobs. We find that talent workers are more likely to become self-employed than to change a job. We also find that the odds of creating more than one job position are higher among talent workers who switch to self-employment than among other groups of workers who become self-employed. These results are robust to two possibly confounding effects – within sector mobility and higher productivity of workers before entering self-employment.

## Keywords:

self-employment, talent workers, labor mobility, wage employment

## JEL Classification

J62, J24, L26

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## 1. Introduction

In the standard Schumpeterian understanding, entrepreneurs give way to innovation and thus economic growth. Conceptually, entrepreneurs are instrumental to job creation, productivity growth as well as development and commercialization of ever increasing quality and variety products, see for example Wennekers and Thurik (1999), Van Stel et al. (2005), Carree and Thurik (2010). Even in the exogenous growth models – such as the Solow growth model – entrepreneurship can provide leverage for a higher steady state growth path, see Audretsch (2007). Yet, data limitations often imply that entrepreneurship is identified with self-employment (Praag and Versloot, 2007). This indirect proxying may prove relevant for policy implications if the so-called ‘necessity self-employment’ is frequent in a country (Reynolds et al., 2002). Indeed, Estrin et al. (2013) propose a separation of what they identify as aspirational self-employment and necessity self-employment, with a conjecture that it is the aspirational self-employment that fosters economic growth, see also Estrin et al. (2011a).

For entrepreneurship to be conducive to economic growth, it is necessary that those who become self-employed have the potential to actually engage in innovative (i.e. productivity enhancing) activities. With skill-biased technological change, the ability to successfully innovate and promote new business models requires substantially more education and skills than previously. Are more productive workers more or actually less likely to start-up a new business? A number of studies – e.g. Thurik et al. (2008), Schwens et al. (2011) – shows that there are positive returns to switching from wage-employment to self-employment. This prevails despite the general feature that individuals who run businesses are on average somewhat less educated than the wage-employed, run businesses in somewhat less profitable industries and are located in more remote regions (e.g. Van der Sluis, 2005). While the empirical regularities suggest that individuals with a tertiary degree are relatively less likely to *be engaged in startups* than individuals with secondary education, it is still possible that those who chose to engage into self-employment among the tertiary educated are in fact the most innovative.

In this paper we propose to analyze the flows from wage-employment to self-employment with an emphasis on a group of highly educated individuals holding high skill jobs and recording high wages. Namely, we verify if flows from employment to self-employment tend to attract individuals with higher potential to innovate. We compare the flows to self-employment with flows to other wage-employment. We operationalize the potential to innovate using the notion of *talent workers* proposed by Hsieh et al. (2016). The advantage of this approach is that the identification relies on information usually available in standardized datasets such as censuses, labor force surveys, etc. We analyze a panel of more than a decade of labor market flows: between jobs and to self-employment.

The research problem of this paper is well rooted in the theory of entrepreneurship, relating closely to the very definition of an entrepreneur. If we follow Low and MacMillan (1988), who consider entrepreneurship to be an idiosyncratic gene which tends to touch upon any moment of population

distribution, the *talent workers* should be no different from other workers when weighing the options of changing a job or becoming self-employed. On the other hand, if we follow Lazear's (2005) 'jack of all trades' approach, indeed the *talent workers* should be less likely to change from wage to self-employment. Also Bull and Willard (1993), building on the numerous case studies, emphasize the intrinsic motivation not to work for the others (in contrast to an intrinsic motivation to invest in human capital and employer-specific skills, as would typically characterize talent workers). The widely cited work by Blanchflower and Oswald (1999) emphasizes that working for oneself implies higher life and job satisfaction.

Numerous studies elaborated on the role of the internal factors of entrepreneurship as well as external ones, see Parker (2006), Minniti and Levesque (2008). For the internal factors, studies interested in analyzing and identifying psychological traits attempt to recognize characteristics which help understand why an individual makes the decision to become self-employed, for example e.g. Caliendo and Kritikos (2008) and Hessels et al. (2008). Also, factors differentiating self-employed *per se* from entrepreneurs were under scrutiny in numerous analyses, see for example Bengtsson et al. (2013). Typically the findings point to lower risk-aversion and stronger locus of control, see Åstebro and Thompson (2011) for a recent review. Self-employed are also less biased towards *status quo*, Burmeister and Schade (2007). Interestingly, many of the gender related discrepancies can be explained by psychological differences between men and women rather than purely gender effects (Bengtsson et al., 2012).<sup>1</sup>

For the external factors, much of the earlier research has elaborated on the cross-country dispersion in self-employment rates in order to identify factors which stand behind high levels of entrepreneurship. Empirical evidence points to the relevance of institutional factors (e.g. Aidis et al. 2007, Meyer et al. 2009), cyclical factors (Naudé 2010) as well as socio-economic factors typically embodied by country-level fixed effects. Typically business or institutional environment was used to explain cross-country differences in self-employment rates and success rates, see Blanchflower (2000), Blanchflower et al. (2001). Estrin et al. (2013) is another such example, but in this case the analysis focuses on which institutions are conducive to higher rate of entrepreneurial aspirations among the self-employed. Also with relation to gender differences, Estrin and Mickiewicz (2009) find that these institutional differences explain well why in some countries female entrepreneurship is more prevalent than in others. Yet another important factor is openness and economic freedom in general. Estrin and Mickiewicz (2011b) show for example that centrally planned economies are in general characterized by lower self-employment rate even already after the transition, which they attribute to both legacy of the pre-transition economic system and to the naturally slow pace of development in business environment, emphasizing the role of general trust and strength of the

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<sup>1</sup> It is beyond the scope of most of the analyses – including our paper – to distinguish between nature and nurture in this respect.

social networks. Similar arguments are made by Audretsch et al. (2008). The mechanisms behind this empirical regularity include links to market size (Di Addario and Vuri, 2010). In addition to institutional factors, a large share of literature focuses on the role of demographics and aging in the changing self-employment patterns, especially in advanced economies, see Boente et al. (2009), Levesque and Minniti (2011) or Liang et al. (2014).

These analyses, while providing important policy implications, still give little or no explanation for why an individual would choose self-employment over wage-employment. Except for innate psychological explanations and exogenous institutional explanations, literature so far focused rather on comparing the states (wage-employed as opposed to self-employed) than on observing the choices, see Fuchs-Schündeln (2009). The notable exceptions form two strands in the literature. In the first, identifying entrepreneurship with innovativeness, Hellman (2007) proposes a theoretical framework to explain when new ideas will be developed by employees and when will the willingness to work on new ideas translate into self-employment. In his framework, strength of the intellectual property protection as well as conducive environment interact, showing that indeed with harsh environment, helpful employers and incomplete intellectual property protection, new ideas will be developed within the existing firms. Yet, the identification of entrepreneurship with innovation may be unsatisfactory from both conceptual and empirical perspectives. This point was further elaborated by – among many – de Bettignies and Chemla (2008) and Parker (2012).

A contrasting, second viewpoint assumes that self-employment is just another form of employment, whereas – figuratively – setting up a business is just another form of job search. This line of reasoning builds on the distinction between the necessity self-employment as opposed to aspirational entrepreneurship. In principle, with self-employment, there are no entry barriers, which makes it work as a counter-cyclical buffer and a labor market segment where otherwise discriminated workers can continue activity.<sup>2</sup> For example, Llisterri et al. (2006) argue that this indeed is the case for youth in Latin America. Maloney (2009) shows self-employment also works as a counter-cyclical buffer at times of low labor demand. Naudé (2010) argues that in fact, especially in the context of developing countries, wealth barriers may be less relevant than lack of access to jobs and the so-called necessity self-employment is not a trace of low entrepreneurial aspirations but quite the opposite. Also, it is the fear of not being able to find a job rather than the actual experience of unemployment that drives the decision to start a new business. In the context of transition economies, it has even been claimed that a fairly large fraction of startups are

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<sup>2</sup> Naturally, there is also abundant literature on the role of wealth, inheritance and family tradition in self-employment, see Blanchflower and Oswald (1998), Holtz-Eakin et al. (1994), Fairlie et al. (2012), Fairlie and Robb (2007), Disney and Gathergood (2009), Dick et al. (2006) or Fossen (2012), to name just a few of the most recent ones. Since we have no access to data on wealth or family history, we abstract from this literature in the remainder of our paper.

'unemployment in disguise', see Earle and Sakova (2000). With reference to a highly developed country – Finland – this line of reasoning was taken to a further level by Hyytinen and Ilmakunnas (2005, 2007), who explicitly compare a decision to change a job with a decision to start a new firm. They find that in fact decision to change a job and a decision to become self-employed are governed by different factors, the former being more predictable.

Relating to the literature, we test empirically if self-employment attracts more of the *talent workers* among those workers, who already exhibit the willingness to change their current employment. We employ data for Poland, which is a particularly interesting example: the self-employment rates are among the highest in the EU, averaging about 20% of the labor force (app. 10% outside agriculture). Given the massive transition of the economy from manufacturing to service sector – the share of the former in employment dropped from app. 60% to app. 30% - observed over the past two decades, it seems Poland is also a country with relatively high scope for labor market mobility. Exploring the *quasi*-panel design of the Labor Force Survey we construct a new dataset on labor market flows between wage-employments and self-employment. We find that *talent workers* are more likely to start a new firm than to move to another job. This result is robust to a number of checks: we control for income, ,mobility push factors and attempt to control also for unobserved heterogeneity.

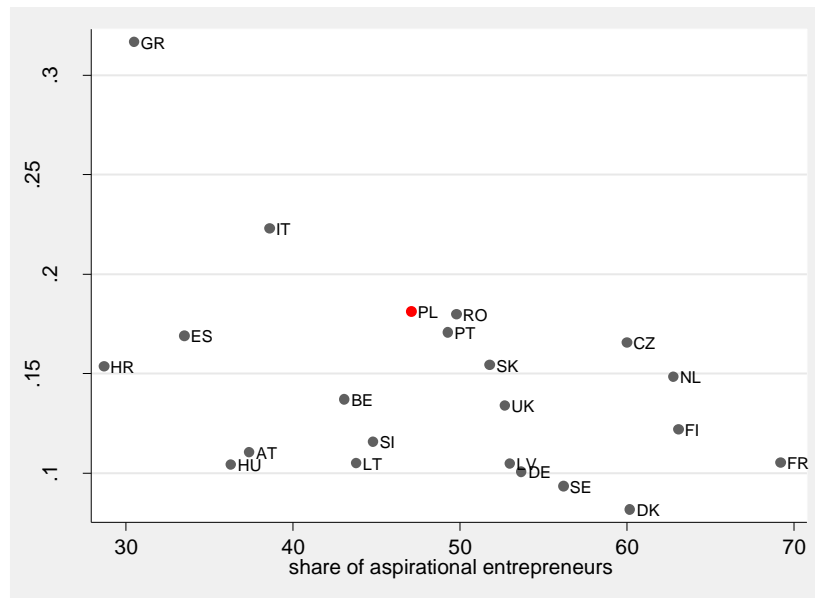
The intended contribution of this paper is then threefold. First, we capture “in action” those who purposefully engage in entrepreneurship, because we analyze explicitly the choice of becoming self-employed and compare it to moving to another wage-employment. Second, we focus specifically on the *talent workers*. The rationale behind such focus comes from the observation, that the *talent workers* are by definition more likely to be innovative, as well as aspirational self-employed. Third, we perform this analysis using a fairly long time-span for a country with newly forming entrepreneurship and relatively high rates of self-employment. These three characteristics all speak in favor of high rates of necessity self-employment, thus yielding a relatively conservative set of conditions for the surfacing of the role of *talent workers* and aspirational self-employment.

Having discussed above the insights from the literature, the reminder of this paper is structured as follows: In the next section, we shed some light on the context of self-employment in Poland. We discuss the basic tendencies, such as the role of age, education and experience in some industries/occupations for the labor market mobility. In Section 3, we move to detailing the identification strategy adopted in this study. We will evaluate those who switch into self-employment against those who exhibit any form of labor market mobility. In Section 4, we show the results for various tests, answering the question if ‘talent workers’ stand out in labor market mobility tendencies. The paper concludes with the policy implications of our study.

## **2. Data and a descriptive analysis**

Compared to other European countries, the Polish entrepreneurial sector is quite large. Currently, more than 18% of the total working population consider themselves as ‘self-employed’. This places Poland above the EU average (14%) and in the third place among EU countries – only in Greece and Italy is the self-employment sector larger in comparison to whole working age population, see Figure 1. Despite this high rate, the Global Entrepreneurship Monitor definitions reveal that less than half of this group is actually driven to start up a new firm because of a business opportunity, which is the GEM definition of aspirational self-employment, see Reynolds et al (2002).

**Figure 1. Self-employed and aspirational entrepreneurship in EU**



Source: EUROSTAT LFS Data for the self-employment rates (2013), and GEM for the aspirational self-employment (2014, Latvia and Czech Republic - 2013).

As for the purpose of our study, we rely on Polish Labor Force Survey data for years 2001 to 2013. Thus, we dispose of individual-level data with information about past and current labor market status. The time boundaries are implied by the availability of the relevant variables in the questionnaire. The question about last year’s labor market status and last year’s industry appeared only 2001. Data from 2013 are the latest available.

Labor Force Survey is conducted in Poland on a quarterly basis, but it is a *quasi*-panel, i.e. approximately 50% of the sample is observed for two consecutive quarters (with the so-called 2-2-2 design). The survey is currently conducted on a representative sample of app. 100 000 individuals, but prior to 2010 the sample size was smaller (app. 50 000 individuals). Given that some of them are children or adolescent, while others are already retired and, additionally, activity rate in the

working age population falls short of 60% in the analyzed period, our combined panel includes app. 2,6 million observations on working individuals.

The phrasing of the questions concerning last year’s labor market status and industry may imply to the responders anything between last quarter (if asked in q1 of a new year) and last 4 quarters (i.e. a 12 month period before participating in the survey). To mitigate the consequences of this problem, we use annual frequency data. Thus, although after compiling a panel some individuals may be observed more than once, we effectively only make use of one instance per individual.

In that group, labor market status (current of from the previous year) reflects well the general tendencies in the population, see Table 1. Since we are interested in those who change from wage-employment to self-employment (henceforth WE and SE, respectively), we drop from the sample individuals who are unemployed and individuals who report being self-employed in the agriculture. This yields a total sample of 337 939 individuals.

Relying on self-reported changes in labor market status we identify that approximately 0.5 per cent of the wage-employees decide to start up their own business. This totals 1 534 such individuals in our sample of 12 years<sup>3</sup>. In addition, approximately 7 per cent of the WE report changing a job. Of those who change a job within the last 12 months, approximately 13 thousand stay and app. 8 thousand change industry of employment. In the second specification, we included only workers who reported different last year and current industry of occupation<sup>4</sup>. Industry is defined according to NACE, 2 digits.

**Table 1. Sample size - unique individuals in final sample**

Labor Market Status	No of individuals	No of women	No of men	No of talent workers
Wage employees (WE)	298 129	141 771	156 358	65 257
Self-employed (SE)	39 810	12 994	26 816	8 507
Unemployed (U)	65 310	31 794	33 516	-
Inactive (I) in working age	303 917	177 536	126 381	-
WE -> SE	1 534	490	1 044	381
WE -> WE (Identification 1)	21 953	8 132	13 821	3 298

<sup>3</sup> We drop from the analysis individuals, who simultaneously run own business and maintain wage-employment, in total 1 037 observations.

<sup>4</sup> We drop workers who claimed that they have tenure longer than 13 months, but they changed industry sector within a year. There were only approximately 100 cases like that within quarter.



WE -> WE (identification 2)	8 182	3 125	5 057	381
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Data: Polish LFS, 2001q1-2013q4, rotating panel.

Notes: Identification 1 is based on self-reported tenure with the current employer (under 13 months). Identification 2 is based on reporting different industry of employment between current and previous year.

## 2.1. Talent workers and tertiary educated

Following Hsieh et al. (2016), in this paper we place particular emphasis on the so-called *talent workers*. Completing tertiary education is a necessary but insufficient condition to be a talent worker, however. Hsieh et al. (2016) suggest to include additionally employment in one of the three top levels of ISCO code occupations (managers, professionals, technicians and associate professionals).<sup>5</sup>

While typically SE have lower educational attainment than WE, *talent workers* (and university graduates as well) seem to be more frequently choosing SE than changing industry, see Figure 2. This may stem from two types of effects. First type of effect stems from our core point of interest in this paper. Our objective is to identify which economic factors explain mobility to SE – and if being a *talent worker* plays an important role in this process. Since job change is a fairly rare phenomenon, we focus on those who are prone to mobility at all. Second, typically SE are older than the working population in total, while there are strong growing cohort effects in university enrolment in the analyzed period. More specifically, about 50% of high school graduates continued education at tertiary level in the 2000s, whereas the share of highly educated workers in population was only about 17% in the beginning of the sample. If these were disproportionally the young who start up the new business instead of changing a job, better educational attainment would be explained by pure cohort effects.

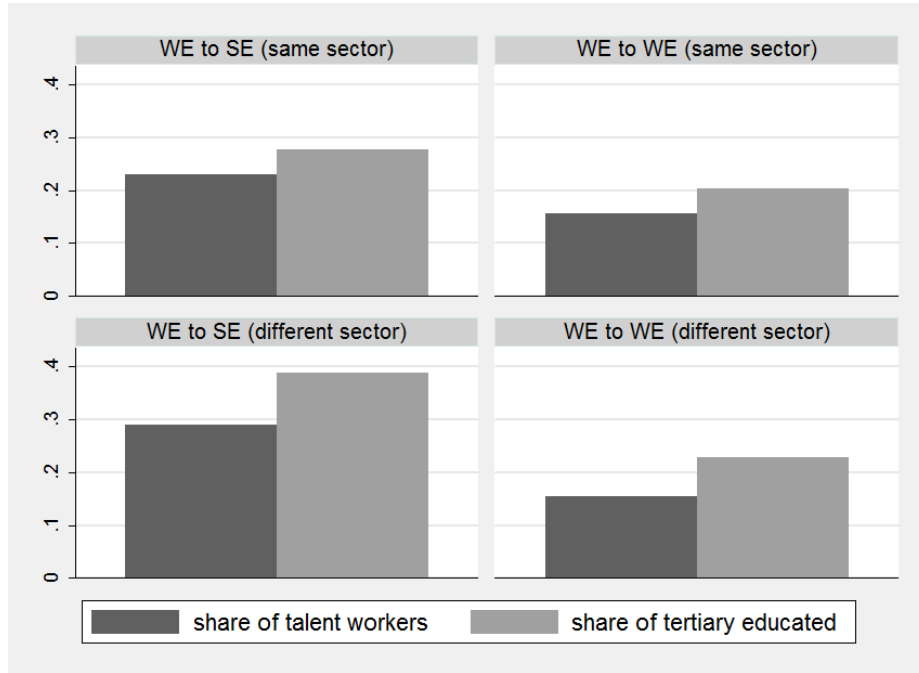
The literature in the field emphasizes the differences between aspirational and necessity self-employment. We relate to this literature by exploring two confounding aspects which can affect the decision to become self-employed: prospects for maintaining WE within industry (as a push factor to capture ‘necessity’) and income attainment (as a pull factor, to capture ‘aspirations’). To be sure that we are in fact catching the effect of talent occupation, we propose two robustness checks. First, if talent workers are more often employed in industries with higher worker mobility than we can observe higher mobility of talent workers to self-employment due to this mobility factor, not due to being a talent. Second, we can also suspect that *talent workers* are relatively better paid in comparison to workers with similar characteristic that are not considered ‘talented’. If this is the

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<sup>5</sup> Given that we require occupation, we cannot analyze flows from SE to WE or flows from inactivity/unemployment to WE/SE, since information on occupation is only recorded for the working individuals.

case, then in our analysis we may confuse the effect of talent with the effect of income position. To avoid this problem, we include both controls as discussed below.

**Figure 2. Share of tertiary educated and *talent workers* among workers who changed job.**



*Data:* Polish LFS, 2001q1-2013q4. *Note:* Denominator – number of talent/tertiary educated workers who changed wage-employment/switched to SE; numerator – number of workers who changed job/switch to SE.

### 3. Method

The interest in this paper lies in disentangling the factors behind mobility of wage-employees into self-employment with a particular emphasis on *talent workers*. We also constructed a number of indicators which help to account for other sources of variation in the data and test the susceptibility of the main result to the inclusion of these controls.

We follow two identification strategies. First, we focus on individuals who within the last 12 month changed from WE to SE (SE=1) or remained WE, but changed jobs (SE=0). On this group, we will run a probit with annual, quarterly and industry fixed effects with the aim to account for labor market conditions and seasonal effects.

$$\text{Specification 1: } P(\text{becoming SE} = 1 | \text{tenure} < 13m) = \beta * \text{talent}_j + \gamma * x_j + \delta * z_i + \varepsilon_j,$$

where  $i$  – industry sector and  $j$  – individual. We denote individual characteristics by  $x_j$ , and industry characteristics by  $z_i$ .

Second we also analyze individuals who reported changing the industry in which they are employed. Our predicted variable takes the value of 1 if that person switched from WE to SE within the last 12 months, but – in contrast to the first specification – it takes the value of 0 for all those who report the same industry currently and last year.

Specification 2:  $P(\text{becoming SE} = 1 | \text{change industry in 12m}) = \beta * \text{talent}_j + \gamma * x_j + \delta * z_i + \varepsilon_j$ .

Both models have same set of basic predicting variables  $x_j$ , which includes a variety of personal characteristics, such as age, gender, education, size of residence and marital status. Given the richness of Polish LFS, we include in the regressions gender and age, as well as marital status (recoded to a dummy, taking the value of 1 for married and 0 for single, divorced or widowed). We can also control for the size of residence with three categories: those living in villages and small cities (with less than 20 thousand inhabitants), the second level is a medium size town (between 20-100 inhabitants) and third group is a large city (more than 100 thousand inhabitants). Expectedly, we also control for education and occupation. In addition, when we run the robustness checks, the model also comprises controls for a variety of mobility and productivity (income) indicators, which are computed at individual and industry levels, see sections 3.1 and 3.2 below.

One could have doubts on validity of comparing *talent workers* in self-employment and wage-employment. As being self-employed is obviously associated with being an owner of the firm it is reasonable to assume that those who are self-employed will often describe themselves as ‘mangers’ or ‘directors’. Given that these occupations belong to talent occupations, following the definition suggested by Hsieh et al (2016), this would imply automatically that all self-employed with a tertiary education are classified as *talent workers*. Luckily, the instructions for LFS advise to classify self-employed occupation according to their actual tasks and duties. Therefore, only those self-employed whose duties are the same or very similar to wage-employed managers, are actually classified within the first occupational group according to ISCO. For example, owners of small, one-person sales firms are considered as ‘sellers’ and not ‘managers’ of the firm. Indeed, in the data on average the shares of *talent workers* among wage-employed and self- employed are similar – around 20 percent.

## 4. Results

We focus on the choice to become self-employed in comparison to changing jobs within wage-employment. Consistent with the findings of the earlier literature, our results confirmed intuition about correlation between basic demographics and the decision about becoming self-employed. Women are less likely to choose self-employment than men. Married people are more prone to

enter own firms. The relationship between age and willingness to start an own business is an inverted U-shaped. Establishing a new firm is more popular in larger cities where there are more business opportunities and infrastructure is well-developed. Table 3 and 4 for Specification 1 and 2, respectively, demonstrate that in fact *talent workers* have a higher probability of becoming self-employed. A positive correlation between switching to self-employment and being considered a *talent worker* is strongly significant in both specifications, regardless of controls included in the model. The estimates of the marginal effects are stable across specifications, yielding the probability of approximately 5 to 10 percent higher for the *talent workers* than other university graduates. The effects is statistically the same for men and women, which additionally strengthens the aspirational rather than necessity interpretation of the choice to become self-employed.

In the second specification (see Table 4) we can also include controls for a change in the industry of occupation/activity. Thus, we are able to test if those who switch to self-employment are more likely to do so in the different industry, whereas changes of employer are more likely to occur within industry. This result suggests that in terms of skills, wage-employment is only sometimes a form of preparation/training before self-employment.

To avoid confusing the effect of the *talent workers* per se, with productivity and mobility, several robustness checks are provided. We discuss them in the coming sections.

#### **4.1. Robustness check 1: mobility**

While SE is typically associated by relatively higher risk – especially in a country with low employment stability like Poland - SE may paradoxically offer lower uncertainty about the future. This reflects the difference between the manageable risks (such as those of running own business) as opposed to unmanageable risks (such as the risk of permanent job destruction in occupation or industry). If the sector of current employment provides stable employment, those who decide on becoming SE might look for challenges in running their own firm. Yet, if the sector is characterized by high turnover of workers – switching to SE may be in fact a form of ‘flight to security’. If talent occupations were more frequent in industries with high mobility to different sectors than significance of talent worker dummy in our regression might be due to this mobility factor.

To check which intuition is correct, we constructed measures of sector mobility. For each 2 digit NACE industry we calculated a variety of turnover indicators. First, we compute gross flows in the industry at each point in time (1) and relate it to overall gross flows rate at that time. Based on this indicator, dummy for high mobility (2) is equal to one if in the sector mobility is larger than average mobility in the economy and zero otherwise. Second, we use a continuous measure: surplus of mobility is the difference between average mobility in the economy and the mobility in the sector

(3). Third, we show if in the current period the industry is decreasing employment (4) or quite the opposite.<sup>6</sup>

$$(1) \text{ gross flow}_{i,t} = \frac{\text{number of workers who claim to change sector}_{i,t}}{\text{number of workers who worked in sector last year}_{i,t}}$$

$$(2) \text{ high mobility sector}_{i,t} = \begin{cases} 1, & \text{gross flow}_{i,t} > \text{average gross flow}_t \\ 0, & \text{otherwise} \end{cases}$$

$$(3) \text{ mobility surplus}_{i,t} = \text{gross flow}_{i,t} - \text{average gross flow}_t$$

$$(4) \text{ downsizing in employment}_{i,t} = \begin{cases} 1, & \text{no of workers}_{i,t} - \text{no of workers}_{i,t-1} < 0 \\ 0, & \text{otherwise} \end{cases}$$

where  $i$  signifies industry sector and  $t$  signifies a year. The mobility of workers in the economy varies largely between sectors. On average about 5% of the workers are leaving each sector every year, but there are industries in which more than one fourth of the workers lose or leave their jobs within one year. The highest mobility is observed within market services, the lowest in manufacturing, see Table A1 for the statistical summary.

#### 4.2. Robustness check 2: income

Relying on labor market insights we compute measure of relative income position. We run a simple Mincerian regression with age, gender, residence, industry, education and occupation.<sup>7</sup> Based on the obtained coefficients, we compute the fitted wages and the residuals within the reference groups. These values are imputed to our individuals. For the fitted wages we compute relative measure (percentile) – the relative income position in larger groups with the same characteristics (age group, gender, residence, education level). This measure will provide information about income / productivity position of the person among similar people. Fitted values were calculated for much more detailed division, so the distributions for groups used to calculate percentiles would make sense.

$$(1) \text{ income percentile}_{j,k} = \int_0^{\widehat{wage}_j} f_k(t) dt,$$

where  $f_k(t)$  is the probability density function of wages in group k-people in the same age group, with the same education level, gender, residence and  $\widehat{wage}_j$  is the fitted value of wage for individual  $j$  which we obtain from a standard Mincerian regression.

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<sup>6</sup> Due to significant correlation between sector's mobility indicators and income position, indicators are included in the regressions separately. Additionally, as income position is highly correlated with the size of the city where respondent is living and working (which is reasonable because in large city cost of living is higher, so wages have to be higher as well), in the specification with income indicators size of the city is omitted.

<sup>7</sup> Estimates for the log of hourly wage, no self-employed, no selection correction. Estimates separate for each year. Results reported in Table A2.

While on average residuals are zero, within reference groups there are departures. Positive residuals are indicative of this group being paid more than implied by the characteristics, while the opposite holds for the negative residuals. Tyrowicz (2011) using the same data source identifies that wage-employees who switch into self-employment were *overpaid* relative to those who have not switched already prior to becoming self-employed, but this holds true only for the aspirational self-employed and not for entire population (identification of aspirational SE is based on the ability to create jobs). In this study we compute the relative frequency of negative and positive residuals (6) as well as average residual, to capture the dispersion in overcompensation and undercompensation within the reference groups.

$$(2) \text{ overpaid group}_k = \frac{\text{no of positive residuals}_k - \text{no of negative residuals}_k}{\text{no of group members}_k},$$

where  $k$  is group people in the same age group, with the same education level, gender, residence.

Distribution of the fitted wages, calculated via a Mincerian equation shows that between workers who changed jobs there are relatively more people with characteristics of average-paid workers than in the whole working population (see Figure 1 and Table A.2 in the Appendix). Newly self-employed individuals have more often assigned wages connected with higher productivity. There is also more dispersion inside the group, but the differences are indeed small.

### 4.3. Robustness check: results

The effect of *talent workers* turns out to be robust. Robustness reveal also additional effects - wage-employees who were working in the sectors with high sector's mobility are more likely to switch to self-employment than to find a job in the different sector of wage-employment, column (2). There is no significant effect of a decrease in the employment level of a given sector on the decision to start own firm. There is an equal chance for the person to choose self-employment or switch to wage-employment in a different sector of industry, even if there are more workers fired than hired within that sector at the given time. This means that self-employment in Poland is not necessarily a sector where workers who just lost their job, or are afraid to lose it, are escaping.

In case of relative income position, belonging to the group with higher income position in comparison to similar workers does not affect probability of starting own firm. We used income percentiles as an approximation of productivity of each worker who decided to change job, but it turns out that newly self-employed individuals are not different from those who are wage-employed when it comes to assumed productivity. Both positive residuals and relative frequency of positive and negative residuals within the group with the same characteristics are positively correlated with the start-up decision. This indicates that workers who become self-employed are more likely to belong to the group considered to be 'overpaid' than those workers who change jobs within wage employment.

**Table 3. Talent workers drives self-employment entry – marginal effects from probit regressions (specification 1)**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>talent occupation</b>	<b>0.05***</b>	<b>0.05***</b>	<b>0.04***</b>	<b>0.04***</b>	<b>0.05***</b>	<b>0.05***</b>	<b>0.05***</b>	<b>0.05***</b>
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
interaction: female and talent occupation	-0.01	-0.01	-0.01	-0.00	-0.01	-0.00	-0.00	-0.00
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
different industry		0.01***						
		(0.00)						
high mobility sector			0.02***					
			(0.00)					
mobility surplus				1.27***				
				(0.12)				
Sector downsizing employment					0.00			
					(0.01)			
income percentile (within the group with similar characteristics)						0.00		
						(0.00)		
average residual							0.12***	
							(0.03)	
overpaid group								0.01**
								(0.01)
married	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
age	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
age <sup>2</sup>	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***	-0.01***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
female	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
medium size city (20-100 thousand inhabitants)	0.01**	0.01**	0.01**	0.01*	0.01**			
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
large city (above 100 thousand inhabitants)	0.01***	0.01***	0.01**	0.01**	0.01***			

	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)			
year and quarter dummies	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED
industry categories	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED
Observations	23,383	23,369	23,383	23,383	23,383	23,383	23,383	23,383

Dependent variable: self-employed among those with tenure shorter than 13 months

Note: Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; table shows marginal effects from probit models; variable size of the city excluded from specification (5), (6) and (7) due to collinearity with income percentile and average residual variables; years: 2001-2013

**Table 4. Talent workers drives self-employment entry – marginal effects from probit regressions (specification 2)**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>talent occupation</b>	<b>0.09***</b>	<b>0.10***</b>	<b>0.10***</b>	<b>0.09***</b>	<b>0.10***</b>	<b>0.11***</b>	<b>0.12***</b>
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
interaction: female and talent occupation	-0.03*	-0.03**	-0.02	-0.03*	-0.03*	-0.02	-0.02
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
sector with high mobility		0.11***					
		(0.01)					
mobility surplus beyond the mean mobility			3.93***				
			(0.22)				
sector downsizing employment				0.01			
				(0.01)			
income percentile within the group with similar characteristic					0.00		
					(0.00)		
average residual						0.38***	
						(0.09)	
overpaid group							0.05***
							(0.02)
married	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
age	0.02***	0.02***	0.02***	0.02***	0.03***	0.02***	0.02***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)



age <sup>2</sup>	-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	-0.03***	-0.03***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)
female	-0.03***	-0.03***	-0.03***	-0.03***	-0.04***	-0.03***	-0.04***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
medium size city (20-100 thousand inhabitants)	0.02**	0.02**	0.02*	0.02**			
	(0.01)	(0.01)	(0.01)	(0.01)			
large city (above 100 thousand inhabitants)	0.03***	0.03***	0.02**	0.03***			
	(0.01)	(0.01)	(0.01)	(0.01)			
year and quarter dummies	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED	INCLUDED
Observations	9,716	9,660	9,660	9,660	9,716	9,716	9,716

Dependent variable: self-employed among those who switched to self-employment or changed industry of occupation

Note: Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; table shows marginal effects from probit models; variable size of the city excluded from specification (5), (6) and (7) due to collinearity with income percentile and average residual variables; years: 2001-2013

#### 4.4. Are talent workers potentially more successful as entrepreneurs?

According to the definition, *talent workers* have higher potential to be creative – the tertiary education and occupational position are signals of these special abilities. To verify that this actually translates to higher rates of success, we explore additional information available in Polish LFS: self-reported data on creating jobs for the others. As demonstrated earlier – see for example Estrin et. al (2013) – creating new jobs is closely associated with e.g. financial success of the firm. While the information on actual number of posts is unavailable, all self-employed report if they hire additional workers. Using data on all self-employed outside agriculture we run a probit model:

$$\text{Specification 3: } P(\text{creating jobs} | \text{became SE in 12m} = 1) = \beta * \text{talent}_j + \gamma * x_j + \varepsilon,$$

where  $j$  denotes individuals. In the first specification we include only *talent worker* dummy and year and quarter effects. Second specification is much richer in a sense of number of variables included. It takes into consideration education level, occupation, age, gender, residence, marital status, industry, year and quartile.

**Table 5. Talent workers are more likely to become an employer - marginal effects from probit regression**

VARIABLES	(1) creating jobs	(2) creating jobs
talent occupation	0.28*** (0.01)	0.03*** (0.01)
occupation	NO	YES
age	NO	YES
age <sup>2</sup>	NO	YES
female	NO	YES
residence	NO	YES
married	NO	YES
year and quarter	YES	YES
Observations	82,623	82,623

Dependent variable: employer among all self-employed outside agriculture

Note: Standard errors in parentheses; \*\*\* p<0.01, \*\* p<0.05, \* p<0.1; table shows marginal effects from probit regressions; years: 2004-2013; sample consists of all self-employed in Polish LFS who answered question about employing other people in the firm.

Indeed, *talent workers* more often create additional jobs than non-talent workers who become self-employed (Table 5). Even if we control for occupation and education level – being a talent worker is still positively and significantly correlated with the probability of creating jobs. *Talent workers* are, thus more likely to create new workplaces. This confirms the intuition, that *talent workers* – if they

become self-employed – create more frequently the economically desired type of entrepreneurial sector.

## 5. Conclusions

It is customary in the literature to look at the self-employment in two ways: it is either a part of the economy where the new ideas are created and implemented or the second-class category of employment for people who are not able to keep or get a job within wage-employment. For entrepreneurship to enhance innovativeness, it is a necessary condition – though probably not a sufficient one – to attract individuals with a potential to create new value. A way to operationalize this group has been proposed by Hsieh et al. (2016) and relies on the so-called *talent workers*. Again, it is not sufficient to attract talent workers to become entrepreneurs (they also need to succeed), but if the empirical data suggested talent workers who want to change a job are less likely to become entrepreneurs than other workers, the structural effects would work against the strength of the link between entrepreneurship and innovation.

In this paper we analyzed empirically if and to what extent talent workers contribute to the start-ups. We do so in the context of Poland, which is a fast growing economy with relatively high self-employment rates. We analyzed the individual job flows data for over a decade to compare the decision to start-up a new business with the decision to move to a different employer/occupation/industry.

Our findings suggest that in Poland, when it comes to the decision of changing job, *talent workers* are more likely to establish new firm than other workers. This result is robust to several checks proving that we are not confusing effect of *talent workers* with industry specific mobility, job destruction, relative incomes or relative productivity of the worker. Even though talent workers have special place on the wage-employment labor market, it does not affect the relationship between entering self-employment and being high-skilled and well-educated.

Finally, we find that *talent workers* are not only potentially more likely to establish their own firm, but that they are also more likely to create new jobs. This may be indicative of aspirational self-employment being more prevalent in the group of talent workers. However, perhaps the barriers to creating own business vary for different fields of education (e.g. educational programs or business regulations). Thus, it seems that further research is needed to identify the effective ways of stimulating *talent workers* with education in other fields to become entrepreneurs.

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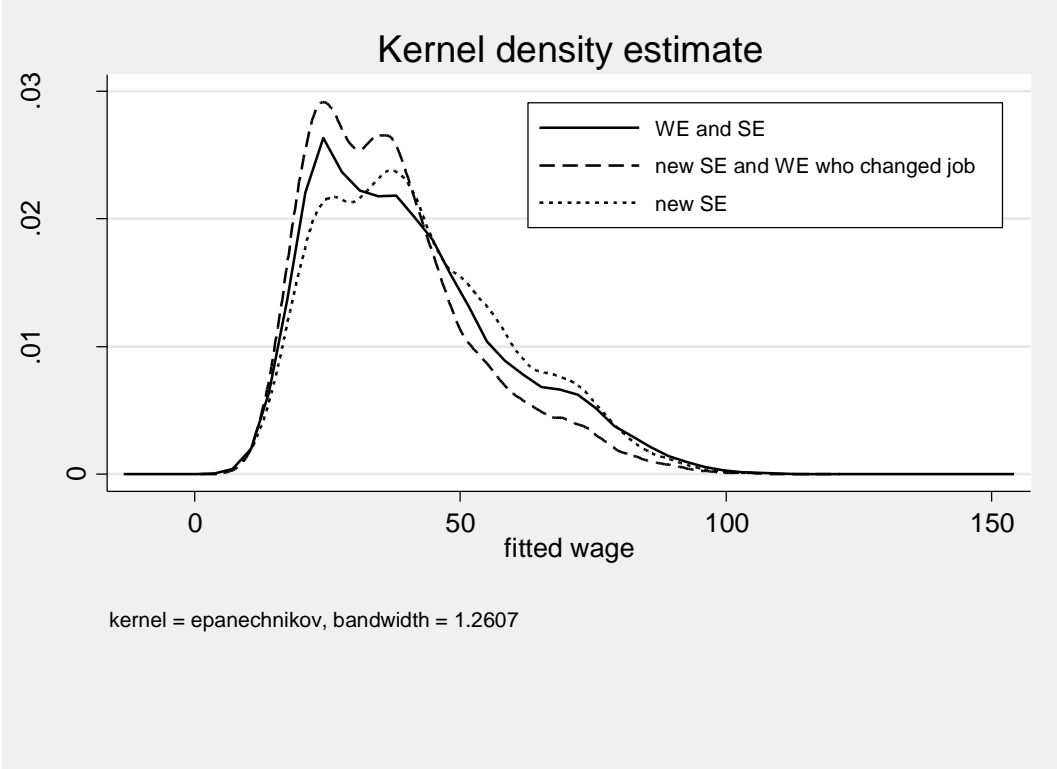
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# Appendix

**Figure A1. Distribution of fitted wages (in whole working population, for those who changed job and switched to self-employment)**



Data: Polish LFS, 2001q1-2013q4.



**Table A1. Mobility between sectors – self-employed who was wage-employed year ago**

Industry in which own firm is operating	Industry of wage employment before switching to self-employment				total
	manufacturing	construction	market services	non-market services	
manufacturing	<b>6.9%</b>	2.9%	9.1%	0.7%	<b>19.6%</b>
construction	0.7%	<b>16.3%</b>	2.5%	0.1%	<b>19.5%</b>
market services	1.4%	2.3%	<b>40.7%</b>	1%	<b>45.3%</b>
non-market services	0.3%	0.5%	6.1%	<b>8.6%</b>	<b>15.6%</b>

*Data:* Polish LFS, 2001q1-2013q4. Market services include NACE sections G to N, non-market services include sections O to S. The denominator is the number of workers who switched from WE to SE.

**Table A2. Mincerian equation regressions for log hourly wage, separately for each year in the sample.**

	(2001)	(2002)	(2003)	(2004)	(2005)	(2006)	(2007)	(2008)	(2009)	(2010)	(2011)	(2012)	(2013)
age	0.47*	0.65*	0.73*	0.56*	0.60*	0.73*	0.64*	0.96*	1.11*	1.07*	-0.17	-0.83*	0.85*
age <sup>2</sup>	-0.00*	-0.01*	-0.01*	-0.00*	-0.00*	-0.01*	-0.00*	-0.01*	-0.01*	-0.01*	0.01*	0.02*	-0.01*
female	-4.30*	-4.17*	-3.91*	-4.05*	-4.68*	-6.04*	-6.76*	-7.46*	-8.01*	-7.92*	-8.20*	-8.92*	-8.49*
high school	-9.03*	-7.84*	-8.46*	-8.20*	-9.00*	-9.59*	-9.52*	-9.77*	-10.78*	-10.83*	-11.10*	-13.20*	-11.90*
high school vocational	-9.82*	-8.87*	-9.19*	-8.89*	-9.88*	-10.14*	-10.20*	-10.20*	-11.33*	-11.50*	-11.36*	-13.48*	-12.54*
vocational elementary	-11.69*	-10.92*	-11.24*	-10.71*	-12.00*	-12.85*	-12.77*	-13.28*	-14.69*	-14.85*	-14.47*	-17.13*	-16.33*
city size	-13.47*	-12.71*	-12.62*	-13.04*	-14.07*	-14.97*	-14.61*	-15.44*	-17.02*	-17.06*	-18.61*	-20.81*	-18.93*
industry	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
occupation	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
quarter	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
Mazovia region	5.08*	5.46*	4.71*	5.06*	4.74*	5.53*	5.86*	6.51*	7.79*	7.53*	8.97*	9.21*	7.69*
Constant	39.30*	16.82	30.68*	31.47*	34.24*	38.96*	44.12*	48.54*	53.36*	54.23*	77.50*	92.41*	66.16*
Observations	29,127	26,638	24,712	24,317	24,756	26,468	28,760	22,612	15,639	14,442	14,338	13,341	12,699
R <sup>2</sup>	0.36	0.39	0.39	0.40	0.39	0.37	0.36	0.34	0.37	0.37	0.30	0.28	0.36

Dependent variable: log hourly wage

Note: \* p<0.01; table shows coefficients from OLS regression (Mincerian equation) separately for each year (2001-2013); reference group for level of education: tertiary.