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Antecedents of the small firm effect: the role of knowledge spillover and blocked mobility for employee entrepreneurial intentions

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Abstract Small firms are said to produce more entrepreneurs than larger ones ("small firm effect"). Applying existing theories, we analyze how different management positions influence employee entrepreneurship in small firms. Based on a panel study of 4832 cases, we provide evidence for the fact that small firms indeed produce more entrepreneurs. Moreover, we show that lower management positions of small firm employees are responsible for this small firm effect. We conclude that small firms seem to create an environment in which employees on low management positions strongly benefit from knowledge spillover effects as they are educated necessary skills, knowledge and expertise, and are able to build up networks conducive to entrepreneurship ("knowledge spillover effect"), while not having the multifaceted advancement opportunities as in large companies ("blocked mobility effect").

Keywords Entrepreneurial intentions · Small firms · Small firm effect · Blocked mobility

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Introduction

The individual's decision to start a new business depends on different factors. Human, social and financial capital, psychological aspects, and regional conditions often play a crucial role, even though they represent only a small selection of potential drivers pushing or pulling individuals towards entrepreneurship (e.g., Hopp and Sonderegger 2014; McGowan et al. 2015; Pfeifer et al. 2014; Sieger and Monsen 2015; Virick et al. 2015; Werner et al. 2014). Prior research has indicated that the majority of new entrepreneurs are spawned by established firms, implying that new firms are often created following a period of employment at a company (e.g., Burton et al. 2002; Gompers et al. 2005; Reynolds 1997). Accordingly, incumbent companies are recognized as being a vital source of newly created entrepreneurial ventures, especially when their created knowledge is underutilized (Hellmann 2007; Klepper 2007; Fernandes and Ferreira 2013). In the corporate and strategic entrepreneurship literature, such entrepreneurial ventures are often referred to as "spin-offs", start-ups founded by ex-employees of incumbent firms (Agarwal et al. 2004; Morris and Kuratko 2002; Kraus 2009).

Consequently, there is a growing interest concerning the impact of a certain group of variables, i.e. the workplace characteristics of parent firm employees (e.g., Agarwal et al. 2004; Hellmann 2007; Parker 2006; Parker 2009; Werner et al. 2014). Recent studies have particularly explored the link between the decision of employees to become entrepreneurs and the prominent firm-related attributes that affect the transition from paid employment into entrepreneurship, including pecuniary factors (e.g., labour income), non-pecuniary factors (e.g., peer effects, working time preferences), or firm size (e.g., Dobrev and Barnett 2005; Evans and Leighton 1989; Gompers et al. 2005; Wagner 2004).

Regarding firm size, a considerable body of empirical evidence supports the so-called *small firm effect*, suggesting that certain characteristics of small firms lead to higher entrepreneurial intentions of these firms' employees (e.g., Blanchflower and Meyer 1994; Boden 1996; Dobrev and Barnett 2005; Parker 2007; Parker 2009; Elfenbein et al. 2010; Hyytinen and Maliranta 2008; Wagner 2004). As early as 1994, the empirical study by Blanchflower and Meyer indicated that working in smaller firms is associated with a higher likelihood of becoming an entrepreneur in the future. Similarly, Boden (1996) observed a greater propensity to leave paid employment for self-employment among the employees of small businesses while Hyytinen and Maliranta (2008, p. 9) demonstrated that "new entrepreneurs rarely emerge from the largest, the most R&D-intensive or the most productive firms (…)". Elfenbein et al. (2010, p. 659) lend support to the small firm effect as well, illustrating that "nearly half of all new ventures (…) came from respondents who were employed in firms of 100 or fewer employees in the prior period". While the latter two studies focused primarily on firm size, the influence of firm age has also been analysed in this vein. For instance, Wagner (2004) found that working in both small and young businesses enhances employees' intentions to engage in entrepreneurial activities. Indeed, these parent firms can be characterized as "hothouses" for nascent entrepreneurs. Similarly, Dobrev and Barnett (2005) identified individuals working in older and larger organizations as being less likely to engage in entrepreneurship. These numerous findings indicate that the majority of new ventures are created by entrepreneurs previously employed in small businesses.

To date, the literature has brought forward three main theories explaining why small business employees leave an organization more frequently to start their own venture

than their counterparts working for large firms: a *self-selection* theory, a *knowledge spillover* model, and a *blocked mobility* approach. While the self-selection theory states that individuals who are more likely to leave salaried employment in small businesses for entrepreneurship simply share the same innate preferences, attitudes and personality traits, the reasoning behind the knowledge spillover model and the blocked mobility approach are based on specific workplace characteristics of small firms. The former model attributes the higher probability of small business employees entering entrepreneurship to the fact that employees benefit from knowledge spillovers within these businesses in the sense that they are taught the necessary skills, knowledge, and expertise to recognize opportunities and start their own organisation. Hence, small firms actively stimulate entrepreneurial activities and new venture creation because they educate tomorrow's entrepreneurs. The blocked mobility approach asserts that employees of small firms leave more frequently to become entrepreneurs due to the hindered advancement possibilities in small firms in terms of higher positions, wages, or employee innovation. For these employees, entrepreneurship then presents an "escape" out of their current salaried employment situation. Despite some empirical evidence, it remains undetermined which of these theories best explains the existence of the small firm effect, which is why we believe more research is needed to shed light on the specific workplace dynamics leading to the small firm effect. Therefore, by focusing on the management or leadership position held by employees in small and large firms, the aim of this study is to analyse how different management positions influence employee entrepreneurship in small firms. In doing so, we seek to answer the following research question: *How does the management position of employees in small firms affect their likelihood to leave their current employment situation to enter entrepreneurship*?

Using data from the German Socio-Economic Panel Study, our main finding is that the small firm effect can be explained by the higher business start-up propensity of small firm employees working on lower hierarchy levels. Contrary to the situation in larger firms, prevailing workplace characteristics on lower hierarchy levels in small firms appear to enable employees to learn more about necessary skills, knowledge, and contacts through knowledge spillovers that support them in their decision to enter entrepreneurship, while at the same time future advancement opportunities are blocked and/or limited.

We see the contributions of our paper as follows: To the best of our knowledge, this study is the first to use representative data to directly test how the likelihood to engage in entrepreneurial activity is related to specific management positions in different firm sizes, taking into account possible knowledge spillover and blocked mobility effects. Previous explanations have mostly relied on the assumption that small firms feature specific working conditions which can function as entrepreneurial "training grounds" without directly considering the specific workplace conditions in question.

Theory and hypotheses

In the following subsections, we take a closer look at the knowledge spillover model and the blocked mobility approach, assuming that both the knowledge spillover as well as the blocked mobility effect matter when it comes to the employee's intention to enter entrepreneurship. By doing so, we develop testable hypotheses for each case.

Knowledge spillover perspective

More recent literature has substantiated the dynamics and workplace characteristics of small firms that may lead to this small firm effect. These studies reveal the multiple factors that potentially cause small business employees to transition into entrepreneurship more frequently than workers at large companies. In this vein, e.g. Gompers et al. (2005) advanced the idea that particularly small entrepreneurial firms spawn more entrepreneurs. Not surprisingly, research provides several theoretical explanations for this.

The knowledge spillover model is closely linked to learning effects and asserts that the general working conditions within small ventures create an environment in which employees can take advantage of knowledge spillovers, which can be defined as the "direct or indirect transfer of knowledge from one party to another" (Gilbert et al. 2008, p. 408). In fact, organizations can be viewed as knowledge-producing and -exchanging units (Schulz 2001) in which a symbiotic relationship between the individual employee and the environment prevails (Light and Dana 2013; Ratten 2011; Suseno and Ratten 2007). In this environment, individual employees are taught specific business-related knowledge and know-how, and acquire business experience, i.e. human capital, attributable to and necessary for the transition into entrepreneurship (Gompers et al. 2005; Hyytinen and Maliranta 2008; Parker 2009; Bouncken and Kraus 2016). The creation of a new firm is a de facto manifestation of the relationship among on the one hand the knowledge spillovers between the incumbent firm and the employee and the employees' individual entrepreneurial actions on the other (Agarwal et al. 2010). The crucial factor, however, is that the knowledge in the form of human capital spilled over to employees typically resides in the employees' heads even after a voluntary exit from the former employment (Coff 1997). Human capital is therefore mobile as a consequence of employee mobility (Aldrich and Pfeffer 1976; Boeker 1997; Coff 1997) and can be transferred to the professional environment, meaning that existing companies become the source of new businesses (Agarwal et al. 2010).

The importance of knowledge and human capital for individual decision making was asserted by Becker (1964) who emphasized that education and experience are significant determinants in economic analysis. This decisive role of human capital relies on the fact that it can account for a company's key competency and while serving as a source of competitive advantage (Coff 1997). Burke et al. (2008) additionally showed that the income of self-employed individuals depends not only on resources but also to a great extent on the entrepreneurial ability of the individual. This entrepreneurial ability in turn is influenced by human capital that can either be innate or acquired through e.g. knowledge spillovers. In fact, Acs et al. (2009) showed that there is a strong relationship between the acquisition of knowledge through spillovers and entrepreneurial activity.

Research has revealed that some firms are better able to educate entrepreneurial employees by offering access to significant skills and knowledge than others (Franco 2005; Klepper 2002; Klepper 2001). Looking at the difference between small and large firms, some authors have even insinuated an advantage to employees working in small firms (Aldrich and Yang 2014) because the working conditions there are said to create an environment in which employees are able to acquire the knowledge and business experience necessary for the transition into entrepreneurship (Hyytinen and Maliranta 2008;

Parker 2009). Or put differently: Small ventures represent an environment in which knowledge spillovers to employees are typical. This kind of knowledge spillover through learning effects has its roots in several workplace conditions which typically prevail in small businesses rather than in larger ones. In large organizations, the prevalent bureaucracy can impede the development of entrepreneurial environments and ability because these firms often subdivide tasks into smaller, more specialized roles (Sørensen and Phillips 2011), resulting in more narrowly defined tasks and fewer wide-ranging learning opportunities (Sørensen 2007). An "informal, fluid and less constraining environment" (Dobrev and Barnett 2005, p. 434) however is found to support the creation of entrepreneurial ability and is more common in small (and young) firms, placing small firm employees at an advantage compared to their large firm counterparts. Since smaller firms are generally also less hierarchical and bureaucratic, we expect that employees are better able to develop their individual human capital in the form of general and entrepreneurship-specific skills such as managerial competencies. In fact, small business employees often face diverse task packages (Bublitz and Noseleit 2014; Elfenbein et al. 2010; Hyytinen and Maliranta 2008; Parker 2009) through which they are educated as "jacks-of-all-trades" (Lazear 2005), being able to perform more and increasingly diversified tasks required for entrepreneurship (Lechmann and Schnabel 2014). The jack-of-all-trades theory asserts that future entrepreneurs are generalists (broad skill set) rather than specialists (deep skill set) and must have sufficient expertise in a variety of fields, i.e. a balanced skill set, in order to successfully manage a start-up (Lazear 2005). The notion that a successful entrepreneur must possess a diverse skill set relies on various studies. In his seminal article, Kaldor (1934) indicated that the coordinating ability of the entrepreneur is crucial for the development of a firm. Similarly, Marshall (1930) stated that a successful entrepreneur must have both intelligence on the one hand and general ability on the other. This body of research argues that in order to be successful, the entrepreneur needs to fulfil several roles in an organization simultaneously: "decision-maker, combiner of resources, risk-taker or manager" (Van Praag and Cramer 2001, p. 45). Hyytinen and Ilmakunnas (2007) showed that such a varied task package and the associated job experience are responsible for greater entrepreneurial aspirations as well as switching intentions. Consequently, since it is easier to develop a balanced skill set in small firms because tasks are more comprehensive and knowledge spillovers take place, these small organizations are expected to spawn entrepreneurs more frequently. However, this learning-by-doing and knowledge spillover aspect is not the only consequence of the greater variety of tasks. Employees in these jobs also gain a broader knowledge of the external environment which enables them to identify entrepreneurial opportunities (Gompers et al. 2005; Harms et al. 2009).

In addition to this diverse task notion, working in a firm offers valuable access to information in how people interact with each other and share knowledge and know-how (Arenius and De Clercq 2005). In small firms, social contacts appear to be more frequent and employees are able to access crucial networks and resources. Hence, employees in small firms can expand their networks with customers and suppliers (Gompers et al. 2005; Hyytinen and Maliranta 2008; Saxenian 1994) as they are exposed to external actors more intensively. The lack of such a network puts large firm employees at a disadvantage compared to small firm employees. Here, external exposure might help "to form an accurate picture of the entrepreneurial opportunities available" and "to mobilize the resources needed for organizational survival"

(Sørensen and Phillips 2011, p. 6). Elfenbein et al. (2010) and Dobrev and Barnett (2005) also emphasized the importance of access to outside networks, contacts and resources, which can be valuable to the entrepreneurial entry of small firm employees.

A third argument states that small firms are better transmitters of entrepreneurial propensities due to the fact that within small firms, pro-entrepreneurial attitudes are transferred more easily because of the existence of and a closer contact to role models (Stuart and Ding 2006). Several studies have examined the role of social capital as they stress the importance of access to e.g. role models within an individual's (social) network (Arenius and Minniti 2005; Bauernschuster et al. 2010; Delmar and Davidsson 2000; Taylor 1996). In theory, these role models who are parents, relatives, friends, or other entrepreneurs can positively influence the decision to launch an own business since they can provide support, knowledge, and encouragement (Arenius and Minniti 2005; Davidsson and Honig 2003; Delmar and Davidsson 2000). Although role models are generally accepted as positively influencing the intention to become an entrepreneur, the question remains why entrepreneurs in small firms in particular act as better role models than their counterparts in large firms. The influence of the founding business owner as a role model is likely to be felt more intensively by employees when there are fewer hierarchical layers as well as when the contact with the business owner is more personal and physically closer (Littler et al. 2003; Robbins 1983). In small firms, first-hand information and knowledge about the start-up process are spilled over to employees as they learn about potential stumbling blocks directly from the entrepreneur. The larger the firm is and the more management layers there are, the more impersonal the contact with the founding entrepreneur will be. And eventually, in very large firms the founding entrepreneur might have even already bought him−/herself out so that he/she can no longer serve as a role model.

But it's not only the size of the enterprise and the related firm-specific characteristics that determine the knowledge spillover potential and hence the learning potential of an individual. The type and hierarchical level of the respective employment position and, strongly related to the hierarchical level, the capability to accumulate the required human capital also appear to play an important role.

Working in a firm before starting an own company can take different shapes, and the access to relevant information differs by the position an individual holds (Dobrev and Barnett 2005). An individual can be an employee in a simple position on a low hierarchical level or a manager in a higher position with coordination and leadership authority. Either way, individuals can have the opportunity to benefit from knowledge and information spillovers as they learn about routines and habits on-the-job through learning by doing, which in turn can be effectively used for a later entry into entrepreneurship (Aldrich and Yang 2014).

Although both simple workforce members as well as managers are exposed to relevant habits and routines, employees in managerial positions might be provided better access to knowledge and skills conducive to entrepreneurial entry and success. Due to their hierarchical position, managers might have better access to information regarding market needs, product and marketing ideas, networks and contacts (Kim et al. 2006) and thus a greater likelihood to be exposed to knowledge spillovers. On the other hand, managers in higher positions might delegate more tasks to employees at lower levels which as a result might decrease their own on-the-job learning potential while increasing the learning potential on the lower levels. This could especially be the case

in larger companies which are characterized by many hierarchical levels and, consequently, more task delegation activities than in smaller firms.

Blocked mobility approach

Apart from the knowledge spillover model, an alternative approach concerns the labour mobility within or between organizations. There are several workplace attributes of small firms that decrease the number of advancement options, or in other words, block internal labour mobility, causing those firms' employees to look for other options in the form of either a switch to another company or leaving to found an own organization. For one thing, small firms often provide only limited opportunities for promotions and sometimes tend to have poorly developed internal labour pools (Sørensen 2007). As small firms simply have less (top) positions available, promotions from a low management position to higher or top management are difficult to achieve, if not even impossible/blocked. As Mueller (2006) and Parker (2009) explain, the promotion for managers is particularly difficult because the top position in most cases is already occupied by the entrepreneur. More positions are however available in larger organisations – especially for managers in lower hierarchical positions. Hence, formal career paths within these organizations are more common because their internal labour markets are more developed, offering more advancement opportunities (Baron and Bielby 1980; Baron et al. 1986).

Additionally, small firms typically pay lower wages (Brown and Medoff 1989; Troske 1999) than their larger counterparts. As a consequence, the opportunity costs of quitting the current employment agreement are lower (Elfenbein et al. 2010) and the possibilities of earning a better salary in the future due to good performance are blocked because these positions are simply very rare within the present firm (if they are available at all). Several studies identify possible financial gain as one of the central motives for leaving the prior employer to become an entrepreneur (Arenius and Minniti 2005; Mueller 2006). The combined effect of limited promotion possibilities – especially from lower management positions – and lower overall wages in small firms increases the attractiveness of self-employment for their employees.

The firms' engagement in employee innovation, i.e. innovations created and brought forward by employees, is a third factor playing a role in occupational mobility. While working, employees often develop innovative business ideas which they might want to deploy within the incumbent firm. Not every employer however exploits potential employee business ideas, and some are rather reluctant to do so, resulting in underutilized knowledge that can support the creation of spin-offs (Agarwal et al. 2004). Although an employee might believe in the potential success of his/her innovation, due to the liability of smallness, small businesses might not have the resources to invest in an idea (Hyytinen and Maliranta 2008). Resources are limited and their application must be carefully considered. On the other hand, large firms not only possess more financial and human resources, but are also found to be better at accommodating employees' creative ideas, processing information on new business opportunities in a more structured and sophisticated way.

To sum up, limited promotion opportunities, lower wages, and a lower engagement in employee innovation can block job advancement in terms of a higher position, higher wage, or self-induced innovation in small firms. This blocked mobility (which is especially dominant in lower management in smaller firms' positions) might result in

frustration and dissatisfaction among small business employees, pushing them into self-employment (Brockhaus 1980). Following this line of thought, Brockhaus (1982) found that the majority of the self-employed were not only dissatisfied with their former employment in general but especially with the internally (not) offered promotion possibilities.

Distinguishing between both the knowledge spillover and the blocked mobility effect for the intention to enter entrepreneurship, we therefore propose the following two hypotheses:

Hypothesis 1 If both the knowledge spillover effect and the blocked mobility effect matter, employees of small firms who currently work in lower management positions are more likely to leave their current employment to enter self-employment than their counterparts in large(r) firms.

Hypothesis 2 If both the knowledge spillover effect and the blocked mobility effect matter, the effect of upper hierarchical levels on entry into entrepreneurship should be irrespective of firm size.

Data and variables

To test these two hypotheses, our paper employs data from the SOEP conducted by the German Institute for Economic Research (DIW Berlin). Started in 1984, and updated annually, the SOEP is the largest wide-ranging representative panel study of private households in Germany. Every year, about 11,000 households and nearly 30,000 people are interviewed by the *TNS Infratest Sozialforschung* German fieldwork organization. The data gathered here includes information on all household members, with issues including the composition of the individual households, occupational biographies of the households' members, their employment status and earnings, health issues, and satisfaction indicators. As such, the data source provides information on socio-demographic characteristics such as gender, age, education, fields of professional experience, and a number of firm-specific characteristics of employees' firms like firm size, industry, and job tenure. A more detailed description of the survey can be found in Wagner et al. (2007) or on the website of the DIW Berlin (www.diw.de/soep).

Our analysis makes use of the survey wave 26 from the year 2010 because this specific survey includes a block of questions dealing with hierarchical positions (management positions) for the responding employees. Of note here is that our estimation sample includes full- and part-time blue- and white-collar employees who work in the private sector, i.e. we excluded employees working in the public sector because of the special working conditions and (seniority-based) promotion rules found here. This restriction resulted in an estimation sample of 4832 observations.

Dependent variable

To capture the entrepreneurial intentions of employees, we compose the dependent variable *Entrepreneurial Intentions*, allowing us to analyse the very early stages of new

firm creation and focus on the potential influence of certain factors on the individual's intention to enter entrepreneurship. We generate our variable by relying on the answers given to the question regarding future career changes: "How likely is it that the following career changes will take place in your life within the next two years?" The respondents were asked to indicate the probability of switching into self-employment in the near future on a scale of zero to 100 % in increments of ten. Zero means that such a change will definitely not take place and 100 means it will definitely take place in the near future. We regrouped the answers on the basis of a three-item Likert scale ranging from '1' (those who do not consider becoming self-employed at all), '2' (those who rated their probability of becoming self-employed at 10–40 %), and '3' (those who rated their probability at a minimum of 50 %). Respondents who rated their likelihood of becoming an entrepreneur at a minimum of 50 % are likely to already be actively involved in starting a business, i.e. they are likely to be latent entrepreneurs. Overall, our classification brings forth approximately 6 % (5.9 %) latent entrepreneurs. This distribution matched quite well with what Brixy et al. (2010) found using data from the German GEM project. For easier interpretation, the results presented in the next sections will be based on regression models using this three-item ordinal scale.

Independent variables

One of the central variables in our model is the one representing *Small Firm Size*. In the SOEP wave 26, respondents were asked to estimate how many people approximately work for their current employer. The respondents were specifically asked to indicate how many employees work in their company by choosing one of two categories: '20 employees and less' and 'more than 20 employees' (reference category). Because we are interested in the effect of small firms on the employees' entrepreneurial intentions, we characterized small firms as being the firms with less than 20 employees (also following the categorization of Wagner 2004)).

The second independent variable of interest is *Management Position* and refers to whether the employees hold a position in which they supervise others, either in top (e.g., executive board, business director, division manager), middle (e.g., department head, regional director), or lower (e.g., group supervisor, section head, management of a small branch office) management positions. With this classification in mind, we use three indicators of a management position: *Low Management Level*, *Middle Management Level*, and *Upper Management Level*. We classify those respondents who answered the leadership question with 'no' as employees holding *No Management Position* (reference category).

The third independent variable is the interaction term between small firm size and the categorical variable on the management position: *Interaction between Small Firm Size and Management Position*. This interaction term is essential for analysing whether the leadership experience and the corresponding learning influence the employees' intentions to leave the incumbent firm for self-employment. Similar to the last independent variable, we compose three interaction terms: *Small Firm Size * Low Management Level*, *Small Firm Size * Middle Management Level*, and *Small Firm Size * Upper Management Level*.

Control variables

We included several control variables that might affect the entrepreneurial drive, as shown by previous research. First, we included *Tenure* and *Education*. Both variables describe different aspects of human capital and are found to influence the individual's decision for a switch to entrepreneurship (Delmar and Davidsson 2000; Mueller 2006; Taylor 1996). We also controlled for *Log Net Monthly Earnings* because variables describing the existing financial capital of individuals tend to influence their occupational choice as well (Arenius and Minniti 2005; Mueller 2006; Uusitalo 2001). As mentioned earlier, job dissatisfaction can push individuals into entrepreneurship which is why *Job Satisfaction* is controlled for (Brockhaus 1980). To include the internal organizational constraints an employee may be confronted with when he/she decided whether to enter self-employment or not, we included *Firm's Labour Workforce* and *Full-Time Employment* as control variables (Fladung and Iseke 2010). Since *Gender* (female) and *Age* are stated as negatively influencing an employee's probability to switch to entrepreneurship (Arenius and Minniti 2005; Delmar and Davidsson 2000; Uusitalo 2001), these effects are controlled for by entering corresponding control variables. Several studies also confirm that national backgrounds may play a role when individuals decide on an entrepreneurial career instead of salaried employment. For instance, research in ethnic minority entrepreneurship determines that self-employment can present an "escape route" for employees who feel they have been discriminated against in the labour market (Parker 2004). Still, minorities may also face problems when they want to enter self-employment (Taylor 1996), so to capture these opposite influences, we included *Nationality* as a control variable. Research on the human, social and financial capital of entrepreneurs has shown that having *Self-employed Parents* can have a significant positive effect on the choice for entrepreneurship (Mueller 2006). Self-employed parents can provide social networks, as well as human and financial capital which are crucial resources for self-employment (Dunn and Holtz-Eakin 2000). The working status was controlled for by including a *Blue-Collar Workers* variable. Research has shown that former blue-collar workers are likely to enter self-employment because it can be an option when it comes to achieving a higher income or escaping possible workplace discrimination (Mueller 2006). Table 1 provides a description of the variables in our model.

Analytical approach

In the empirical models discussed below, we regress the propensity of employees to leave paid employment for entrepreneurship on firm size, management positions, and the control variables discussed above. In particular, three different specifications of the empirical model are estimated using a Tobit analysis (or censored regression model). First, we test the ceteris paribus role played by *Small Firm Size* and the control variables discussed above in determining the probability of leaving paid employment to become self-employed (Model 1). Then, we include *Management Position* by using the operationalization described above (Model 2). Finally, to test our hypotheses, we interact small firm size with the management position variable (Model 3). Moreover, in Model 4 we exchange the dependent variable of Model 3 with the three-item ordinal scale variable described above, taking the value '1' if the employees do not consider

Table 1 Description of variables

Variable	*Variable description*
Dependent variable	
Nascent Entrepreneurship	How likely is it that the following career changes will take place in your life within the next two years? Answer: have become self-employed and/or freelance, and/or self-employed professional [scale from 0 = 'definitely not' to 10 = 'definitely']
Independent variables	
Small Firm Size	Approximately how many people does the company employ as a whole? Answer: 20 employees and less, more than 20 employees [1 < =20 ; 0 > 20]
Leadership Position	In your position of work, do you supervise others? In other words, do people work under your direction? [1 = Yes, leadership position ; 0 = No leadership position]. *If so, what kind of leadership position do you hold*?
Low Management Position	Are you in low management (for example, group supervisor, section head)? [1 = Yes ; 0 = No]
Middle Management Position	Are you in a middle management position (for example, department head, regional director)? [1 = Yes ; 0 = No]
Upper Management Position	Are you in a top management position (for example, executive board, business director, division manager)? [1 = Yes ; 0 = No]
Control variables	
Tenure	Since when have you been working for your current employer? [Years]
Education	Years of formal education [Years]
Log Net Monthly Earnings	How high was your net wage income from employment last month? [Log Euros]
Job Satisfaction	How satisfied are you with your job? [scale from 0 = 'totally unsatisfied' to 10 = 'totally satisfied']
Firm's Labour Workforce	Will the number of employees increase, decrease, or stay the same over the next 12 months? [1 = Decrease; 0 = Else]
Gender	Gender? [1 = Female; 0 = Male]
Age	Your age? [Years]
Nationality	Your citizenship? [1 = German; 0 = Foreign]
Parent(s) Self-Employed	Are (were) your parents self-employed? [1 = Yes ; 0 = No]
Full-time Employment	Are you currently engaged in paid employment? [1 = Full-time Employed; 0 = Part-time Employed]
Blue Collar Worker	What is your current occupational status? Answer: Blue collar worker [No = 0; Yes = 1]

becoming self-employed at all, '2' if they rated their probability of becoming self-employed at 10–40 %, and '3' if they rated their probability at a minimum of 50 %. The appropriate econometric model to use in this case is a regression model for ordinal outcome variables. In the cases where we illustrate our results (e.g., Fig. 1), we display the predictive probabilities of the likelihood of becoming an entrepreneur at a minimum of 50 % compared to the case where the employees do not consider becoming self-employed at all.

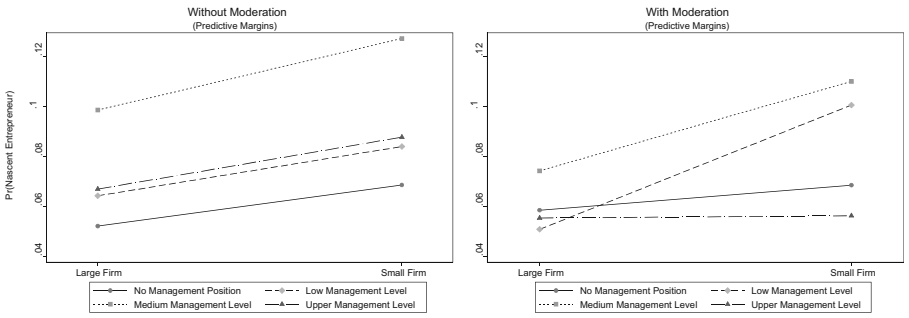
Note how the empirical models presented in this paper have robust standard errors with correction for heteroscedasticity. We also computed several regression diagnostics for all of the models and checked the variance inflation factors (VIF) to exclude multicollinearity. Table 2 provides descriptive statistics to all response variables and the correlations of the key variables used in our empirical analysis.

Results

Table 3 presents the estimation results of the Tobit analysis (Models 1–3), and – for easier interpretation of the results – of the Ordered Probit analysis (Model 4). What is striking at first glance is the empirical support for the small firm effect. Our estimations in Model 1 render a significant and strongly positive coefficient estimate for *Small Firm Size* ($\beta = 7.545$; $p < .001$). In line with other research literature, this finding insinuates that being employed in a small firm significantly increases the likelihood of leaving the firm to become an entrepreneur. However, management position per se has no significant effect on the propensity to switch to entrepreneurship.

The coefficient of the small firm size variable remains significant and strongly positive in Model 2, in which we enter different *management positions*. Models 3 and 4 display the results of the models including the interaction effects. We find a significant positive coefficient estimate for the interaction term *Small Firm Size * Low Management Level* in both the Tobit ($\beta = 13.665$; $p < .001$) and ordered Probit ($\beta = 0.598$; $p < .001$) regression models. The significant coefficients both support Hypothesis 1: Small firm employees who currently work on lower hierarchy levels are more likely to leave their current employment situation to enter entrepreneurship than their counterparts in large firms.

To give a better impression of how management positions in different firm sizes affect entrepreneurial intentions in all positions, we plotted the predictive probabilities of these variables in Fig. 1 (based on the Ordered Probit estimates of Model 4). The results in the right panel clearly show that the small firm employees' entrepreneurial intention is the highest of all in lower management positions. Moreover, the results also indicate that the effect of an upper management position on latent entrepreneurship is



Source: SOEP 26 (2010)

Fig. 1 Visualizing the effect of firm size, managerial position and entrepreneurial intentions of employees (predictive margins)

Table 2 Descriptive results and pair-wise correlations among variables

		Mean	S.D.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Self-Employment [0; 100]	7.53	17.71	0.00	100.00	1.00																
2	Firm Size (1 < =20)	0.27	0.44	0.00	1.00	0.07	1.00															
3	Leadership Position (1 = Yes)	0.30	0.46	0.00	1.00	0.07	−0.06	1.00														
4	Management Level (1 = Low)	0.19	0.39	0.00	1.00	0.03	−0.04	0.76	1.00													
5	Management Level (1 = Middle)	0.08	0.26	0.00	1.00	0.05	−0.09	0.44	−0.14	1.00												
6	Management Level (1 = Upper)	0.03	0.16	0.00	1.00	0.03	0.04	0.26	−0.08	−0.05	1.00											
7	Tenure (Years)	10.74	9.68	0.00	48.20	−0.13	−0.15	0.12	0.07	0.08	0.05	1.00										
8	Education (Years)	12.40	2.53	7.00	18.00	0.14	−0.07	0.20	0.07	0.16	0.17	−0.08	1.00									
9	Wage (Log Net Monthly)	7.24	0.62	3.95	9.90	0.05	−0.30	0.36	0.15	0.28	0.23	0.27	0.35	1.00								
10	Job Satisfaction [0; 10]	6.87	2.06	0.00	10.00	−0.10	0.01	0.06	0.01	0.03	0.08	−0.03	0.06	0.06	1.00							
11	Labor Force Downsize (1 = yes)	0.29	0.45	0.00	1.00	0.03	−0.22	0.06	0.02	0.07	−0.00	0.17	0.04	0.22	−0.17	1.00						
12	Gender (1 = Female)	0.43	0.50	0.00	1.00	−0.06	0.12	−0.17	−0.10	−0.11	−0.07	−0.08	0.00	−0.46	0.04	−0.09	1.00					
13	Age (Years)	42.96	10.76	18.00	79.00	−0.14	−0.05	0.06	−0.01	0.08	0.07	0.49	−0.02	0.09	−0.06	0.05	−0.01	1.00				
14	Nationality (1 = German)	0.94	0.24	0.00	1.00	−0.00	0.03	0.06	0.04	0.03	0.03	0.02	0.15	0.04	0.02	0.00	0.02	0.04	1.00			
15	Parent(s) Self-Employed (1 = Yes)	0.10	0.30	0.00	1.00	0.07	0.05	0.05	0.01	0.04	0.07	0.01	0.07	0.04	0.01	0.01	0.00	0.01	0.02	1.00		
16	Full-time Employment (1 = yes)	0.78	0.41	0.00	1.00	0.02	−0.16	0.19	0.11	0.11	0.07	0.08	0.06	0.61	−0.03	0.11	−0.49	−0.08	0.00	−0.02	1.00	
17	Blue Collar Worker (1 = Yes)	0.37	0.48	0.00	1.00	−0.06	0.02	−0.18	−0.07	−0.16	−0.12	−0.01	−0.46	−0.16	−0.11	−0.01	−0.28	−0.00	−0.14	−0.06	0.12	1.00

Source: SOEP 26 (2010)

Table 3 Firm size, management position and entrepreneurial intentions of employees

	Model 1			Model 2			Model 3			Model 4		
	Coef.		t-value	Coef.		t-value	Coef.		t-value	Coef.		z-value
Small Firm Size (1 < =20 employees)	7.545	***	3.56	7.856	***	3.68	5.070	**	2.04	0.176	*	1.74
Leadership Position (1 = yes)	2.509		1.26									
Low Management Level[a]				0.600		0.27	−3.113		−1.20	−0.155		−1.51
Middle Management Level[a]				8.792	***	2.78	7.618	**	2.25	0.267	*	1.96
Upper Management Level[a]				−1.801		−0.33	0.076		0.01	−0.061		−0.23
Small Firm Size * Low Management Level							13.665	***	2.87	0.598	***	3.03
Small Firm Size * Middle Management Level							5.039		0.63	0.283		0.85
Small Firm Size * Upper Management Level							−4.357		−0.42	−0.157		−0.36
Controls												
Tenure (in years)	−0.610	***	−5.07	−0.604	***	−5.03	−0.603	***	−5.04	−0.025	***	−4.96
Education (in years)	2.989	***	7.58	3.003	***	7.62	2.996	***	7.62	0.129	***	8.18
Log Net Monthly Earnings (in Log Euros)	8.928	***	3.71	8.532	***	3.48	8.426	***	3.44	0.370	***	3.72
Job Satisfaction (scale from 0 = 'totally unsatisfied' to 10 = 'totally satisfied')	−3.894	***	−9.21	−3.889	***	−9.19	−3.876	***	−9.17	−0.153	***	−9.22
Firm's Labor Workforce (1 = downsize)	6.093	***	3.11	5.944	***	3.03	6.020	***	3.07	0.237	***	3.03
Gender (1 = female)	−11.72	***	−5.36	−11.58	***	−5.30	−11.49	***	−5.28	−0.478	***	−5.31
Age (in years)	−0.862	***	−8.99	−0.871	***	−9.08	−0.863	***	−9.00	−0.037	***	−9.36
Nationality (1 = German)	3.360		0.87	3.334		0.86	3.406		0.88	0.170		1.09
Parent(s) Self-Employed (1 = yes)	8.545	***	3.15	8.658	***	3.18	8.636	***	3.18	0.324	***	3.03
Full-time Employment (1 = yes)	−8.174	***	−2.76	−8.001	***	−2.70	−7.814	***	−2.64	−0.290	***	−2.43

Table 3 (continued)

	Model 1		Model 2		Model 3		Model 4	
	Coef.	t-value	Coef.	t-value	Coef.	t-value	Coef.	z-value
Blue Collar Worker (1 = yes)	−2.588	−1.09	−2.308	−0.97	−2.552	−1.07	−0.104	−1.07
Observations	4.832		4.832		4.832		4.832	
Pseudo-R^2	0.0313		0.0317		0.0322		0.0807	

Source: SOEP 26 (2010)

[a] Ref.: No Management Position. Regressions in all columns include indicator variables for industrial sector (agriculture, energy, mining, manufacturing, construction, trade, transport, banking and insurance). Robust standard errors

***, **, * indicate significance at 1 %; 5 % and 10 % levels, respectively

the same for both firm sizes (β = −0.157; p = .36 in Model 4). This finding supports Hypothesis 2. As a side note, we find evidence that this finding also holds true for employees holding no management position. Surprisingly, we additionally find for employees in large companies that those in middle management positions are the ones with the highest probability of latent entrepreneurship while employees in low management positions have the lowest likelihood of becoming engaged in entrepreneurial activity. In small companies, employees in lower management positions have the highest inclination towards entrepreneurship. These results coincide with the findings in Model 2. If we do not include the interaction terms in the regression model, employees at a middle management level have the highest propensity of leaving salaried employment for entrepreneurship (β = 8.792; p < .001).

With respect to the control variables, we obtain results which are in line with the expectations based on previous research. For the variables *Tenure*, *Gender*, *Age*, *Job-satisfaction* and *Full-time Employment*, the results show a negative influence on the probability of switching to entrepreneurship from paid employment, while *Education*, *Log Net Monthly Earnings*, *Firm's Labour Workforce* (expected downsizing) and *Parent*(*s*) *Self-employed* show significant positive effects. Only the remaining variables *Nationality* and *Blue Collar Worker* are insignificant at conventional levels.

Discussion and conclusion

Several studies have identified a link between firm size and the entrepreneurial intentions of employees, showing that the entrepreneurial intentions of employees decrease in firm size (Blanchflower and Meyer 1994; Boden 1996; Dobrev and Barnett 2005; Elfenbein et al. 2010; Hyytinen and Maliranta 2008; Wagner 2004). Put simply, small firms are found to be more prone to producing entrepreneurs than their larger counterparts. Using a sample based on the German SOEP, we present supporting evidence for this assertion in how small firm employees start their own businesses more frequently than large firm employees. As such, our study can be rooted in the fields of corporate and strategic entrepreneurship, which – among other things – investigate the propensity for "spin-offs" of existing firms, as well as within the field of entrepreneurial ambition.

Current research provides three main explanations for this so-called "small firm effect", i.e. a simple self-selection process, a knowledge spillover model, and a blocked mobility approach. In this study, we focus on the knowledge spillover model and the blocked mobility approach to analyse how different management positions influence employee entrepreneurship in small firms. The knowledge spillover model implies that small firm employees are more likely to leave their current employment situation to enter entrepreneurship than their counterparts in large firms because existing firms represent "knowledge fountainheads" (Agarwal et al. 2010) in which knowledge spillovers are common. Our empirical analysis supports this hypothesis, indicating the importance of knowledge spillovers and the associated learning of small firms' employees who start their own ventures (e.g., Acs et al. 2009). In line with previous research, the diverse range of tasks educates employees as being jacks-of-all-trades (Lazear 2005). In small firms, employees gain access to significant knowledge, information, skills, networks, and contacts which are conducive to the intention to start an

own venture (e.g., Dobrev and Barnett 2005; Elfenbein et al. 2010; Hyytinen and Ilmakunnas 2007; Hyytinen and Maliranta 2008; Saxenian 1994) and which typically walk out the door with them after quitting the job (Coff 1997). Since task packages are more diversified (Bublitz and Noseleit 2014; Elfenbein et al. 2010; Hyytinen and Maliranta 2008; Parker 2009) and the contact to the entrepreneur is closer in small firms (Stuart and Ding 2006), employees in these firms engage more intensively in the entrepreneurial actions of the incumbent firm, facilitating the spillover of new venture formation knowledge (Agarwal et al. 2010). In this sense, while leaving a small firm to create a spin-off and become an entrepreneur, prior small firm employees possess the ability to capitalize on knowledge previously gained during the time working for the incumbent organization (Agarwal et al. 2004). This finding portrays the symbiotic relationship between individuals and knowledge environment (Light and Dana 2013; Ratten 2011; Suseno and Ratten 2007). Here, the creation of entrepreneurial ventures is the result of the intersection between knowledge spillovers and the employees' individual entrepreneurial actions (Agarwal et al. 2010).

In this study, we go one step further, distinguishing between different levels of managerial experience, as well as low, middle, and top management levels, finding that the employees from small firms in lower management positions in small firms are the ones who become entrepreneurs most frequently.

When it comes to employees holding upper managerial positions, we argued that they are less likely to become entrepreneurs either because there is more at stake for them because they have already e.g. achieved a higher salary, or because they delegate their tasks more than they execute them on their own, which might put them at a disadvantage compared to lower management employees. This hypothesis could also be borne out of our data.

These findings have important implications for theory, practice, and public policy. In terms of theoretical implications, our study sought to test existing theoretical models, the knowledge spillover, and the blocked mobility model by examining how workplace-related factors influence an employee's intention to become an entrepreneur. We particularly addressed the impact of management positions on the entrepreneurial intentions of employees in small firms based on arguments derived from the knowledge spillover model and the blocked mobility approach. With respect to practical implications, we provide evidence for the dynamics leading to the small firm effect, and even show that it is not the limited mobility within small firms that's the essential determinant of entrepreneurial intentions among employees, but the prevailing environment which leads to knowledge spillovers and facilitates learning-by-doing in small firms instead. These dynamics can be of particular interest for both small firm managers at upper and lower levels of a company's hierarchy. On the one hand, for small firm managers who work in lower managerial positions but seek to become an entrepreneur, the findings reveal that they can benefit from knowledge spillovers and learning-by-doing within the small firm in which they are currently working. In their position in a small firm, they can gain insights into business processes which can be useful for an own new venture creation. On the other hand, for small firm managers working in upper managerial positions, this study holds the potential to advance their awareness of the possible entrepreneurial intentions and actions of their employees. In terms of public policy, the results of our study show that the choice for entrepreneurship is, at least to some degree, path-dependent, implying that it is influenced by prior career

steps. Furthermore, they once again emphasize the central role of small firms as incubators for new ventures, and even seem to play a disproportionate role in creating new entrepreneurs. So if a government wants to stimulate national entrepreneurial activity, potential entrepreneurs from small incumbent firms should not be excluded from policy considerations.

As with any other study, our analysis has its limitations. First, our data does not reveal whether the respondents in our sample actually (will) enter entrepreneurship by starting their own business or just intended to do so at the time the questionnaire was completed. Hence, although we can test whether or not our central variables influence the intention to switch to entrepreneurship, we cannot determine the influence on the probability of an actual switch. But meeting the call for more research regarding the effects leading to latent entrepreneurship, we focus on these entrepreneurial intentions rather than on actual switches, which appears to be an effective approach for measuring latent entrepreneurship. Another limitation of our study concerns the learning model. Although our data provides evidence for the importance of learning, we cannot determine which workplace characteristics in small firms promote this learning effect. Based on prior research, we expect the relationships outlined, even though the data does not allow a test of which workplace characteristics of small firms are truly the most important ones. These questions were simply not asked. The geographical context in which we conducted our study represents another significant limitation. Because the study is based on a German dataset, and cultural influences cannot be completely eliminated, similar studies in other national and cultural contexts are recommended for the future to continue advancing knowledge in this field. For further research, it would also be interesting to analyse how different small firm workplace characteristics influence the decision of employees to become an entrepreneur. In this regard, we believe that the application of a more qualitative research approach can be very helpful in how it can result in a deeper holistic understanding of how these working conditions in different management positions evolve and affect the likelihood of managers to engage in entrepreneurial activities (Dana and Dana 2005; Dana and Dumez 2015). Furthermore, it would be interesting to simultaneously test all three existing theories/models (the self-selection theory, the knowledge spillover model, as well as the blocked mobility approach) in one single study to determine which effect influences employees' entrepreneurial intentions the most.

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