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WHEN DO EMPLOYEES LEAVE THEIR JOB FOR ENTREPRENEURSHIP: EVIDENCE FROM LINKED EMPLOYER-EMPLOYEE DATA***

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ABSTRACT: Existing firms are argued to be an important source of new entrepreneurs. Yet, relatively little is known about the characteristics of firms that breed new entrepreneurs. We use a large linked employee-employer dataset to trace and characterize the types of firms from which new entrepreneurs come in Finland. We find evidence for entrepreneurial learning in smaller firms, for they spawn new entrepreneurs more frequently than larger firms. We also find that the productivity of firms and their R&D-intensity are negatively related to the probability that employees transit into entrepreneurship. These results are robust to controlling for a number of employee and employer attributes.

Keywords: entrepreneurship, occupation choice, mobility

JEL-code: G14, G31, G32

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TIIVISTELMÄ: Toiminnassa olevien yritysten voidaan ajatella olevan uusien yrittäjien tärkeä lähde. Niiden yritysten ominaisuuksista, joiden työntekijöistä tulee uusia yrittäjiä, tiedetään kuitenkin varsin vähän. Käytämme laajaa yhdistettyä työntekijä-työnantaja-aineistoa jäljittääksemme ja kuvataksemme sitä, minkä tyyppisistä yrityksistä uusia yrittäjiä tulee. Löydöksemme kertoo, että pienten yritysten työntekijöistä tulee uusia yrittäjiä todennäköisemmin kuin suurten yritysten työntekijöistä. Tämä voi kertoa mm. siitä, että pienissä yrityksissä työskentelevät oppivat työssään yrittäjyyteen tarvittavia taitoja ja asioita. Havaitsemme myös, että yrityksen tuottavuus ja T&K intensiteetti vähentää henkilökunnan todennäköisyyttä siirtyä yrittäjyyteen. Tuloksemme eivät muutu, vaikka työntekijä- ja työnantaja-ominaisuuksien vaikutuksia otetaan huomioon monin eri tavoin.

Avainsanat: yrittäjyys, uravalinta, liikkuvuus

JEL-luokittelu: G14, G31, G32

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1 INTRODUCTION

Existing firms are argued to be an important source of new entrepreneurs, especially in the U.S. (e.g., Bhide 1994, Gompers, Lerner and Scharfstein 2005, Hellman 2005).[1] Yet, little is known about the firms that breed (or "spawn") new entrepreneurs: From what kind of firms do employees departure to become entrepreneurs? In particular, do certain corporate attributes increase labor mobility and particularly the likelihood of an employee leaving her job for entrepreneurship? We take in this paper advantage of a unique and large linked employee-employer dataset from Finland to address these questions. Besides having around 1.5 million person-year observations (0.44 million private sector employees during 5 years), the strength of this dataset is that it allows us i) to trace and characterize the types of firms from which each new entrepreneur comes from and ii) to contrast these transitions into entrepreneurship with other forms of labor market mobility.

The available literature identifies a couple of prominent firm attributes that are likely to have an effect on the rate at which an established company breeds new entrepreneurs. The first of them is firm size. Size matters, because especially smaller incumbents can serve as hatcheries in which entrepreneurial learning takes place. Opportunities for such learning are many, not least because the employees of smaller firms often work alongside of the firms' manager-founder(s), allowing them to observe how small businesses are run (see, e.g., Gompers, Lerner and Scharfstein 2005 and the references therein). A contrasting view of the effect of firm size is that employees are pushed from large, bureaucratic firms into entrepreneurship

[1] Bhide (1994) documents, for example, that 71% of the founders of companies on the 1989 Inc. 500 list of the fastest growing companies in the U.S. essentially replicated or modified an idea that they had encountered in their previous employment.

because of the reluctance of such firms to develop their employees' entrepreneurial ideas further within the firm.[2]

The second firm attribute that is likely to have an effect on a firm's likelihood to breed new entrepreneurs is its innovativeness. The likelihood that an employee learns about new technologies, product innovations and new forms of organizing production is more likely, the more R&D-intensive and innovative her current employer is. Albeit employees may pay for transferable knowledge (human capital) through lower wages (Møen 2005), the incentive to make commercial use of an innovative employer's knowledge by quitting and starting a rival start-up may remain (Arrow 1962). While this view suggests a direct relation between a firm's innovativeness and the likelihood of the firm spawning new entrepreneurs, there are confounding effects. Kim and Marschke (2005) argue, for example, that the greater the risk that the employees of a firm departure (to join or start a competitor), the eager the firm is to prevent unauthorized use of its knowledge stock through, e.g., patenting. Another protective measure is to increase the firm's ability to capitalize its employees' ideas within the firm (cf. Gromb and Scharfstein 2003; Hellmann 2005).[3] These firm-level protective measures may lead to an inverse relation between a firm's innovativeness and the likelihood of the firm spawning new entrepreneurs.

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[2] The organizational capacity of larger - and presumably more bureaucratic and hierarchical - firms to respond to entrepreneurial ideas (and change more generally) may for example be limited (Henderson 1993). Such organizations also process soft information about new business ideas rigidly (Berger et al. 2004; Stein 2002) and have internal capital markets that may disproportionately favor the established lines of business (Scharfstein and Stein 2000). This view is termed by Gompers et al. the "Xerox view" of entrepreneurial spawning, so called because Xerox is (according to Gompers et al.) one of most prominent examples of large bureaucratic firms whose top executives were in the 1960s and 1970s reluctant to fund its employees' entrepreneurial ideas.

[3] A firm's ability to capitalize its employees' ideas reflects at least party its willingness to allow for "intrapreneurship", i.e., within-firm entrepreneurship.

Neither theory nor available evidence has pinned down whether the relation between these two prominent corporate attributes - size and innovativeness - and the likelihood that an employee leaves her job for entrepreneurship, is direct or inverse. In this study, we try to uncover the direction of these relations. We do so by investigating occupational choices in the Finnish labor market in 1997-2002 and particularly by tracing the types of firms from which those who transit into entrepreneurship come from.

Using these data, we find evidence for entrepreneurial learning in smaller firms, for they spawn new entrepreneurs more frequently than larger firms. The result is robust to controlling for firm productivity and R&D-intensity, industry, foreign ownership and a number of employee attributes. This finding is not due to the employees of smaller firms being generically more mobile, as in our data, firm size is not similarly (i.e., inversely) related to the likelihood that a private-sector employee switches into a new job. We also document that the relation between a firm's innovativeness and the likelihood of the firm spawning new entrepreneurs is inverse: Both the productivity and R&D-intensity of a firm are negatively related to the probability that one of its employees transits into entrepreneurship. The inverse relation is not due to the employees of less innovative firms being intrinsically more mobile, as our proxies for firm innovativeness have either no or a positive effect on the likelihood of inter-firm labor market switches. In sum, our findings allow us both to reject the view that employees are pushed from larger, bureaucratic firms into entrepreneurship and to question the (often-cited) conjecture that especially the most innovative firms are at risk to loose good ideas and employee-inventions because their employees are most prone to quit and rush to establish new firms.

The rest of the paper is organized as follows: In the next section we outline a framework for our empirical analysis. In section 3 we discuss the data. In section 4 we present the results of our empirical analysis. Section 5 contains a brief summary.

2 EMPIRICAL FRAMEWORK

Consider an employee, labeled *e*, who faces a choice among staying in her current job (*Stay*), switching to a new job (*Switch*), becoming an entrepreneur (*Selfemp*) and transiting into unemployment (*Unemp*). The utility she obtains from alternative j is U_{ej}, where $j \in \{Stay, Switch, Selfemp, Unemp\}$. The behavioral rule she follows when making her occupational choice is to choose alternative *i* if and only if $U_{ei} \geq U_{ej}$ for all $j \neq i$. Since not all aspects of utility are observed, we set $U_{ej} \equiv V_{ej} + \varepsilon_{ej}$, where V_{ej} is the observed part and ε_{ej} is the unobserved part. We do not observe attributes of the various alternatives, but instead have a vector of employees' characteristics and their current employer's attributes, labeled x_e. The observed part is assumed to be linear in parameters with constant, i.e., $V_{ej} = x_e'\beta_j + \alpha_j$ and each ε_{ej} is independently and identically distributed and of type I extreme value. With these assumptions, the multinomial logit (MNL) choice probability is (McFadden 1974):

$$\Pr(e's\ choice = i) \equiv P_{ei} = \frac{\exp(x_e'\beta_i + \alpha_i)}{\sum_{j=1}^{4} \exp(x_e'\beta_j + \alpha_j)} \qquad (1)$$

for *e* = 1, …, *N*.

As the attributes of the alternatives are not observed, the parameters of this model are unidentified unless the parameter vector of one of the alternatives is normalized. For estimation we set $\beta_{Stay} = \alpha_{Stay} = 0$, in which case the remaining coefficients measure the change relative to the employees who stay in their current job. Under this normalization, $\alpha_{Selfemp}$ is for example interpreted as the average effect of un-included factors on the utility of becoming self-employed relative to staying in one's current job.

We estimate the model by the method of maximum likelihood and report average marginal effects. The marginal effects are evaluated for each individual and then averaged over

the sample, which means that we report $N^{-1}\sum_{e=1}^{N}\beta_i P_{ei}(1-P_{ei})$ (see Cameron and Trivedi 2005 and Bartus 2005). The marginal effects measure the impacts of infinitesimal changes in the continuous variables and discrete changes in the dummy variables. To allow for within-firm correlation in employees' propensity to leave their firm, we use standard errors that are clustered at the level of plants in which the employees work.

A well-known weakness of the MNL model is that the ratio of P_{ei} to P_{ek} does not depend from alternatives other than *i* and *k*. To check that this independence from irrelevant alternatives (IIA) is not what drives our results, we also experiment with a multinomial probit (MNP) model. Albeit the MNP model is flexible enough to allow for any pattern of substitution, it is not a panacea for us: Parameter stability/identification is problematic in the MNP models, particularly in cases like ours, where data on the attributes of alternatives are unavailable (Keane 1992; see also Cameron and Trivedi 2005).

3 DATA

3.1 Description of data source and transitions

The data used in this paper is a random sample from the Finnish Longitudinal Employer-Employee Data (FLEED) of Statistics Finland. The FLEED data are constructed by linking various administrative registers, such as Employment Statistics (in Finnish: Työssäkäyntitilasto), Business Register, Financial Statements Statistics and the R&D survey of Statistics Finland. The basic unit in this dataset is an individual who belongs to the working population of Finland and who – if organizationally employed – can in most cases be linked to the company and plant in which she works. The original FLEED dataset has three characteristics that are particularly important for this study: The dataset (i) follows over time basically the *entire*

working population of Finland, (ii) includes a wealth of information about the individuals and their occupations and (iii) makes it possible to trace individuals' labor market transitions.

The sample available to us covers years 1997-2002 and consists of roughly every third individual in the original FLEED data. In this study we restrict our analysis on the labour market behavior of (business) sector employees, which leaves us with about 1.490 million person-year observations that consist of 441 000 individuals during a 5-year period.

Table 1 gives an overview of the data and particularly of the transitions we observe: transitions from salary work into a new job (*Switch*), self-employment (*Selfemp*) and unemployment (*Unempl*). The table also reports the share of immobile employees, who do not leave their current job (*Stay*). As this transition matrix shows, around 20% of those who are employed in year *t* transit into a new occupation during year *t*+1. About 15% of employees switch annually to a new job and around 4-5% transit into unemployment. Only 0.6-0.7% of the employed transit into entrepreneurship, which makes these transitions a relatively rare labor market event.

[INSERT TABLE 1 ABOUT HERE]

The transition matrix of Table 1 shows in addition that the shares of individuals who make a move on the labor market have remained constant over time. The stability of these aggregate shares goes well with the finding that also the determinants of individual-level transitions have in our data been stable: As we report in more detail in connection with the robustness tests, the results we are about to report do not depend on the time period we choose. We have, in particular, run all the univariate analyses and MNL estimations of this paper separately for each year in our data, but found no major differences between the years. It is therefore appropriate to focus on a shorter period. In what follows, we concentrate on those individuals who

were employed at the end of 2001 and examine the transitions that they made by the end of 2002. As shown on the last row of Table 1, this restriction means that we investigate occupational choices of 308938 employees. These employees either stayed in their current job (80.09%) or transited from salary work into a new job (15.01%), unemployment (4.14%) or entrepreneurship (0.67%) in 2002. Our aim is to trace the types of firms from which the 2180 employees who transited into entrepreneurship came from and contrast these transitions with the other forms of labor market mobility.

3.2 Definitions of conditioning variables

Firm size and innovativeness

To study how the size of firms for whom the employees in our data worked at the end of year *t* affect transitions in year *t*+1, we need a measure for firm size. The measure we use is the logarithm of the number of employees the firm (plant) had at the end of the year *t.* This variable, labeled *Lnsize,* is based on the midpoint of the seven employment categories to which each firm (plant) in our data has been assigned to. We reverse-engineered the categorical size variable into a continuous one to ease the interpretation of our results, but it is worth stressing already here that our results are robust to using dummy variables instead (see robustness tests for details).

Measuring firm innovativeness is rarely straightforward, which is why we use two proxies. The first, *Lnprod,* is a standard measure of firm productivity and equals the logarithm of the ratio of value added per person. The second, *R&D-dummy* is a dummy that equals one if the ratio of R&D expenditures to turnover exceeds 3.5%, and is zero otherwise.[4] Because a firm's productivity originates both from informal and formal R&D as well as from process,

[4] This cutoff level is exogenously given to us, as the data do not allow us to reliably measure the ratio of R&D expenditures to turnover for firms that do only a little formal R&D.

product and organizational innovations, *Lnprod* is a broader measure of a firm's innovativeness than *R&D-dummy*. Our results are robust to using an alternative measure of firm productivity and to not including *R&D-dummy* simultaneously into the models (again, see robustness tests for details).

Individual characteristics

We use a number of control variables to capture the effect of an individual's characteristics on the propensity of her leaving her current employer. These conditioning variables include *Schooling* (= the number of schooling years typically needed for one's highest degree), *Age* (= age in years), *Age2* (= age squared), and *Gender* (= 1 if female and zero otherwise), which a number of previous studies have found to be important determinants of labor market switches. We include *Tenure* (= years of firm-specific experience, as measured by the length of the current employment) and *Tenure2* (= tenure squared). We include these control variables, as the relation between tenure and quit intentions may be negative due to employee heterogeneity (even when there is no true negative state dependence in turnover). Moreover, firms may use wage as a means of lowering the quit rates, which suggests that *Lnincome* (= logarithm of total taxable income in year *t*) should be included. This variable may also proxy the productivity of the employee in her current job, as well as her ability.

As transitions from paid work into entrepreneurship may be intimately linked to the availability of capital, we control for *Wealth* (= 1 if taxable wealth is higher than the 75th percentile in year *t*) and *Spouse's income* (= 1 if the spouse's taxable income in year *t* is higher than the median of such incomes, and = 0 otherwise).[5] We further control for saving behavior by including *Savings rate* (= taxable wealth at *t* minus taxable wealth at *t*-2 divided by the av-

[5] Evans and Jovanovic (1989) provide empirical evidence from the U.S. and Johansson (2000) from the Finnish perspective.

erage taxable income during the two-year period). The reason for constructing this variable and using it as a control is that initially wealth constrained people may work hard for someone else and save in the hope of eventually becoming a self-financed entrepreneur (Ghatak, Morelli and Sjöström 2001).

Besides the individual-specific controls listed here, we have experimented with other specifications in which additional individual characteristics have been included in the MNL model. The results of these estimations are reported in connection with robustness tests.

Other firm controls

We use a number of controls for firm attributes other than size and innovativeness. These controls include *Foreign-ownership* (= 1 if foreign-owned at the end of year *t*, and 0 otherwise)[6], and *Declining employment* (= 1 if a plant's employment shrank between year *t* and *t*-2, and 0 otherwise). We also control for industry (24 categories, based on NACE Rev. 1-classification) and the age of the establishment (7 categories, based on the year of entry) for which the employees work at the end of year *t*.

The mean, standard deviation, as well as 1%, 25%, 50%, 75% and 99% percentiles of each conditioning variable are given in Appendix 1. These statistics pertain to year *t*, which refers to 2001. The appendix also reports these statistics conditional on the type of labor market transition that takes place in year *t*+1 (i.e., 2002).

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[6] Ownership status is based on "the ultimate beneficiary owner" (UBO). In our classification, a firm is labeled foreign owned when the ultimate foreign ownership is at least 20 per cent.

4 ANALYSIS OF TRANSITIONS

4.1 Conditional transitions

Table 2 conditions the transitions taking place in year *t*+1 on firm size and innovativeness. The conditioning variables are *Lnsize* (Panel A, with the seven size categories in the table corresponding to the original employment categories that are available in the data), *Lnprod* (Panel B, with four productivity quartiles) and *R&D-dummy* (Panel C). The panel shows that new entrepreneurs come rarely from the largest or the most productive firms, as the probability of an entry into self-employment is decreasing in firm size and innovativeness. So are switches into unemployment, whereas interfirm switches take most frequently place from the smallest and largest (employing at least 300 persons) firms. The fact that interfirm switches take frequently place from the largest firms is to an extent technical: The interfirm transitions refer to employee movements between establishments. Therefore, a proportion of the switches into a new job are intra-company transitions in the multi-establishment companies. In our data, 30% of all switches to a new job take place within the same company, whereas the corresponding number for the largest companies is 54%.[7]

[INSERT TABLE 2 ABOUT HERE]

4.2 MNL estimations

Table 3 presents the average marginal effects from the MNL estimations, together with their standard errors and *p*-values. In the first column (Model 1), only industry dummies are included in addition to *Lnsize*, *Lnprod* and *R&D-dummy*. For the second column (Model 2) we include the remaining firm/plant level controls, whereas for the third column (Model 3), we

[7] A few percent of those employees that have stayed in the same establishment have moved to another company because the owner-company of the establishment has changed during the year.

only add the individual characteristics. The marginal effects in the fourth column (Model 4) are based on a specification that includes both sets of control variables.

The table shows that $\Pr(choice = Selfemp)$ is decreasing in *Lnsize*, *Lnprod* and *R&D-dummy* in each column and that the magnitudes of the estimated effects are stable across the columns. These results reinforce the earlier univariate finding of ours that both firm size and innovativeness decrease the likelihood of a firm spawning new entrepreneurs. Moreover, it seems that the negative effect of firm size and innovativeness on entrepreneurial spawning is not due to the employees of smaller and more innovative firms being generically more mobile: In columns 1-4, *Lnsize* is directly related to $\Pr(choice = Switch)$, whereas the effect of *Lnprod* on the probability is unstable (with a positive effect in columns 3 and 4). The effects of *Lnsize* and *Lnprod* on $\Pr(choice = Switch)$ are similar to these variables effects on $\Pr(choice = Selfemp)$ even if we allow for non-linearities (see robustness tests). Finally, *R&D-dummy* has a positive and statistically significant effect on $\Pr(choice = Switch)$. This finding is in contrast to how *R&D-dummy* affects $\Pr(choice = Selfemp)$.

[INSERT TABLE 3 ABOUT HERE]

The results of our MNL estimations speak for entrepreneurial learning in smaller firms, for they spawn new entrepreneurs more frequently than larger firms. This result is consistent with the view that the employees of smaller firms learn how small businesses are run when working alongside of the firms' manager-founder(s). The negative relation can also emerge because of a number of related reasons: First, the employees of smaller firms may learn a balanced set of skills necessary to start up a business (Lazear 2004), because there are fewer opportunities for within-firm specialization in such firms. Second, it is likely that in a small

firm, the job tasks that employees are assigned are frequently multi-faceted. The employees of smaller firms are therefore often exposed simultaneously to a network of customers and suppliers of labor, production technologies and capital (Saxenian 1994). Such exposure certainly eases an employee's transition into entrepreneurship.

It is worth emphasizing that the negative relation between firm size and entrepreneurial spawning is robust to simultaneously controlling for firm productivity and (past) growth of the spawning firms. This suggests that it is not the innovativeness of smaller firms either that encourages spawning.

Our results are not consistent with the view that innovative/R&D-intensive firms are particularly prone to breed new firms. Instead, the results are consistent with such firms taking protective measures against extensive employee transition into entrepreneurship. Examples of such measures are use of patenting (Kim and Marschke 2005) to discourage employee start-ups and active encouragement of within-firm exploitation of employees' ideas (Gromb and Scharfstein 2003). The positive marginal effect of *R&D-dummy* on Pr(*choice* = *Switch*) is, however, consistent with the existence of *interfirm* transfers of business and technological knowledge embodied in the human capital of the switching employees (Arrow 1962, Møen 2005, Kim and Marschke 2005).

A final observation that emerges from Table 3 is that the probability of an entry into unemployment is decreasing in *Lnsize*, *Lnprod* and *R&D-dummy*.[8] These effects are similar to what we found for the likelihood that an employee becomes self-employed. Does this mean that self-employment is unemployment in disguise (cf. Earle and Sakova 2000)? It might

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[8] To save space, we do not report in the table the marginal effects of the control variables, but note just briefly that the data provide some evidence for a wealth -effect: The propensity of becoming an entrepreneur is increasing in *Wealth* and *Spouse's income*. The average marginal effect of *Savings rate* is positive, but insignificant (*p*-value = 0.12).

mean, if the similarity of the effects emerges because smaller and less innovative firms *push* employees out. However, it is not clear why that effect would not be captured by *Declining employment* -variable (and other controls) nor why the push would show up as a higher likelihood of transiting into un- and self-employment *but not* as a higher likelihood of interfirm mobility.

4.3 Robustness analysis

We have run a number of robustness tests:

First, we have repeated all the univariate analyses and MNL estimations separately for each year in our data. Our results are not dependent on the time period we choose: For example, when we reproduce Table 2 separately for t = 1997, …, 2000, the differences to Table 2 (with t = 2001) are minor. What's more, yearly MNL estimations using data from these earlier periods produce results that are very similar to those reported in Table 3 (these results are available from the authors on request).

Second, to check that deficiently measured firm productivity, ignoring the efficiency in the usage of capital input, is not what drives our results we change *Lnprod* to a measure of firm-level total factor productivity. None of the results in Table 3 are challenged when this alternative measure of productivity is used: The average marginal effect of the logarithm of the total factor productivity on $\Pr(choice = Selfemp)$ is for example -0.00689 (p-value < 1%). Moreover, if we drop *R&D-dummy*, the results for *Lnprod* become stronger. Finally, if we drop *Lnprod,* firm size still has a negative effect on $\Pr(choice = Selfemp)$.

Third, Table 2 suggested that the effect of *Lnsize* and *Lnprod* on $\Pr(choice = Switch)$ might be non-linear. We can allow for such effects in the MNL estimations by including squared terms for both variables: None of our basic findings change as a result. In particular, we again find a negative (but decreasing) effect of *Lnsize* and *Lnprod* on

$\Pr(choice = Selfemp)$ over the relevant range. Moreover, switches into unemployment or to a new job are not similarly related to the size of firms as are the transitions into entrepreneurship. If anything, switching to a new job is more likely for an employee working in larger firms. Neither has firm productivity the same, uniformly negative effect on $\Pr(choice = Switch)$ as it has on $\Pr(choice = Selfemp)$ when these more flexible specifications are used.

Fourth, the results of columns 3-4 (Models 3 and 4) show that the negative effects of *Lnsize*, *Lnprod* and *R&D-dummy* on $\Pr(choice = Selfemp)$ are robust to controlling for a number of employee attributes, such as schooling, age, gender, tenure, wage (income), taxable wealth, spouse's income, and ability to save. As many of these controls are often-used proxies for a person's ability, we have no reason to expect that employees' ability, possible correlated with certain firm characteristics, would be a major driver of our findings. However, we can do a bit more by demonstrating that the MNL estimations are robust to adding a number of new control variables into the model. The variables we have tried include years of schooling of the co-workers (proxied by the highest degree achieved), employee's tenure choice (i.e. home-ownership), and a variable capturing falling average income in the plant in which the employee works. We also experimented by splitting the sample into three groups, the first for those with low education (secondary level education or lower), the second for those with medium level education (lower-degree level tertiary education) and the third for those with the university level education. This robustness test addresses the concern that most of employee transitions into self-employment have little to do with innovative activity (and thereby with the innovativeness of present employer), especially in the case of less educated workers. These estimations showed that the more innovative firms do not breed new entrepreneurs

more frequently than the less innovative firms even if we focus on the group of better educated private sector employees.[9]

Fifth, to check whether the IIA property of the MNL model is driving our results we have done two things: i) we dropped *Unemp* from the choice set and re-estimated the models reported in Table 3. The main results remain unchanged; ii) we have estimated a MNP model. Despite its deficiencies in cases where there are no data on the attributes of alternatives (Keane 1992), the MNP estimations confirms the basic findings of Table 3.

Finally, the MNL results that we have presented so far are based on standard errors that are clustered at the level of plants. Our results are robust to not clustering at all, or clustering at the firm-level.

5 CONCLUSIONS

This paper documents that during recent years, 0.6-0.7% of the private sector employees have annually transited into entrepreneurship in Finland. As compared to other types of labour market transitions, the transitions into entrepreneurship are a relatively rare labor market event.

As far as we know, the only pieces of available evidence on the characteristics of firms that breed new entrepreneurs come from Gompers, Lerner and Scharfstein (2005). Using a sample of 1370 public companies from the U.S., they find that especially young firms that were once innovative and venture capital -backed and are located in the U.S. hotbeds of

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[9] More specifically, the results (available on request) for those with the university level education indicate that both the size and the innovativeness of the employer (measured by productivity and R&D intensity) have a significant positive effect on the propensity to switch the employer whereas these factors significantly decrease an individual's probability to leave her job for entrepreneurship. The effect of size and innovativeness on the propensity to switch to a new job is hence different from their effect on the propensity to transit intro entrepreneurship. The difference seems to be more pronounced for the highly educated workers.

venture capital activity (such as Silicon Valley) are important sources of new firms. Inspired in part by this finding, the aim of this paper has been to shed new light on these characteristics by focusing on the role of firm size and innovativeness.

Our findings corroborate the main result of Gompers et al., but only partially:

- Like Gompers et al., we find evidence for entrepreneurial learning in smaller, entrepreneurial firms, for they spawn in our data new entrepreneurs more frequently than larger firms;
- Unlike like Gompers et al., we document an inverse relation between the innovativeness of firms and the likelihood of them spawning new entrepreneurs.

In sum, the results of this paper allow us to reject the view that employees are pushed from larger, bureaucratic firms into entrepreneurship. Nor can we bring evidence for the often cited conjecture that especially the most innovative firms are most likely to loose good ideas when their employees quit and rush to establish new firms. Whether this finding emerges because such firms are wittingly (and capable) protecting their IPRs or because they are good at internally capitalizing their employees' ideas is an interesting question that clearly warrants further research.

Our study does not answer the question of whether, and if so by which means, we should encourage employees to leave their job for entrepreneurship, especially if they work for an innovative, private sector employer. Yet, because the pool of current business sector employees is often perceived to constitute the most prominent source of high-quality entrepreneurship in developed economies, the finding that transitions into entrepreneurship are relatively rare and that the innovative incumbent companies are *not* the primary sources of

new entrepreneurship sound somewhat disturbing, if not alarming.[10] The reason for our concern is that a growing theoretical and empirical literature emphasizes the process of "creative destruction" as a source of long-term economic growth (see e.g. Foster, Haltiwanger, Krizan 2001; Klette and Kortum 2004). The process needs to be incessantly nourished by innovations and market experimentation of new ideas. Experimentation, in turn, calls for a sufficient supply of high-quality, daring entrepreneurs. The most recent analyses suggest that these related market processes, i.e., selection of talent into entrepreneurship and market experimentation, are especially instrumental for the long-term growth of the economies close to the global technology frontier (see, e.g., Acemoglu, Aghion and Zilibotti 2006).

[10] On the other hand, new innovation-induced entry is only one side of the long-term growth process. Successful adoption and commercialization of innovations within existing firms is yet another source of growth. It is likely to call for a considerable amount of high-quality "intrapreneurship" among employees; see also Holmes and Schmitz (1990).

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Appendix 1. Descriptive statistics

					Percentile				
	Variable	N	Mean	Std	p1	p25	p50	p75	p99
Stay	*Lnsize*	247428	4.40	1.76	0.92	2.67	5.30	5.99	5.99
	Lnprod	247428	10.77	0.57	9.37	10.43	10.74	11.05	12.16
	R&D-dummy	247428	0.09	0.28	0.00	0.00	0.00	0.00	1.00
	Schooling years	247428	12.15	2.28	9.00	12.00	12.00	14.00	17.00
	Age	247428	39.97	10.92	19.00	31.00	40.00	49.00	61.00
	Tenure	247428	8.82	9.20	0.00	1.67	5.33	13.00	35.75
	Lnincome	247428	10.11	0.51	8.47	9.88	10.13	10.40	11.31
	Gender	247428	0.36	0.48	0.00	0.00	0.00	1.00	1.00
	Declining employment	247428	0.38	0.49	0.00	0.00	0.00	1.00	1.00
	Foreign-owned	247428	0.17	0.38	0.00	0.00	0.00	0.00	1.00
	Savings rate	247428	0.04	0.12	-0.12	0.00	0.00	0.04	0.31
	Wealth	247428	0.27	0.44	0.00	0.00	0.00	1.00	1.00
	Spouse's income	247428	0.53	0.50	0.00	0.00	1.00	1.00	1.00
Switch	*Lnsize*	45348	4.30	1.85	0.92	2.67	5.30	5.99	5.99
	Lnprod	45348	10.69	0.74	8.69	10.24	10.62	11.03	12.16
	R&D-dummy	45348	0.13	0.34	0.00	0.00	0.00	0.00	1.00
	Schooling years	45348	12.39	2.34	9.00	12.00	12.00	14.00	17.00
	Age	45348	34.61	10.97	18.00	25.00	33.00	43.00	59.00
	Tenure	45348	4.74	6.92	0.00	0.58	1.92	5.67	31.67
	Lnincome	45348	9.88	0.72	7.54	9.55	9.99	10.33	11.31
	Gender	45348	0.41	0.49	0.00	0.00	0.00	1.00	1.00
	Declining employment	45348	0.35	0.48	0.00	0.00	0.00	1.00	1.00
	Foreign-owned	45348	0.17	0.37	0.00	0.00	0.00	0.00	1.00
	Savings rate	45348	0.03	0.10	-0.12	0.00	0.00	0.00	0.31
	Wealth	45348	0.17	0.37	0.00	0.00	0.00	0.00	1.00
	Spouse's income	45348	0.46	0.50	0.00	0.00	0.00	1.00	1.00
Selfemp	*Lnsize*	2180	2.74	1.85	0.92	0.92	1.95	4.31	5.99
	Lnprod	2180	10.50	0.59	8.28	10.24	10.51	10.81	12.05
	R&D-dummy	2180	0.03	0.17	0.00	0.00	0.00	0.00	1.00
	Co-worker schooling	2180	12.07	2.23	9.00	12.00	12.00	14.00	17.00
	Age	2180	37.96	9.67	20.00	31.00	37.00	45.00	59.00
	Tenure	2180	3.96	5.07	0.00	0.75	1.92	5.25	24.25
	Lnincome	2180	9.85	0.73	7.39	9.51	9.92	10.28	11.31
	Gender	2180	0.28	0.45	0.00	0.00	0.00	1.00	1.00
	Declining employment	2180	0.35	0.48	0.00	0.00	0.00	1.00	1.00
	Foreign-owned	2180	0.07	0.25	0.00	0.00	0.00	0.00	1.00
	Savings rate	2180	0.04	0.13	-0.12	0.00	0.00	0.02	0.31
	Wealth	2180	0.24	0.43	0.00	0.00	0.00	0.00	1.00
	Spouse's income	2180	0.54	0.50	0.00	0.00	1.00	1.00	1.00
Unemp	*Lnsize*	13982	3.83	1.88	0.92	1.95	3.54	5.99	5.99
	Lnprod	13982	10.54	0.57	8.69	10.25	10.55	10.83	12.16
	R&D-dummy	13982	0.05	0.23	0.00	0.00	0.00	0.00	1.00
	Schooling years	13982	11.39	2.01	9.00	9.00	12.00	12.00	17.00
	Age	13982	40.05	12.65	18.00	29.00	40.00	52.00	62.00
	Tenure	13982	5.20	8.49	0.00	0.50	1.33	5.75	37.08
	Lnincome	13982	9.78	0.61	7.63	9.53	9.88	10.15	10.92
	Gender	13982	0.35	0.48	0.00	0.00	0.00	1.00	1.00
	Declining employment	13982	0.37	0.48	0.00	0.00	0.00	1.00	1.00
	Foreign-owned	13982	0.14	0.35	0.00	0.00	0.00	0.00	1.00
	Savings rate	13982	0.03	0.11	-0.12	0.00	0.00	0.01	0.31
	Wealth	13982	0.22	0.41	0.00	0.00	0.00	0.00	1.00
	Spouse's income	13982	0.39	0.49	0.00	0.00	0.00	1.00	1.00
All	Variable	N	Mean	Std	p1	p25	p50	p75	p99
	Lnsize	308938	4.35	1.79	0.92	2.67	5.30	5.99	5.99
	Lnprod	308938	10.74	0.60	9.31	10.41	10.72	11.04	12.16
	R&D-dummy	308938	0.09	0.29	0.00	0.00	0.00	0.00	1.00
	Schooling years	308938	12.15	2.29	9.00	12.00	12.00	14.00	17.00
	Age	308938	39.17	11.16	19.00	30.00	39.00	48.00	61.00
	Tenure	308938	8.02	8.99	0.00	1.25	4.42	12.08	35.50
	Lnincome	308938	10.06	0.56	8.19	9.83	10.10	10.38	11.30
	Gender	308938	0.36	0.48	0.00	0.00	0.00	1.00	1.00
	Declining employment	308938	0.38	0.48	0.00	0.00	0.00	1.00	1.00
	Foreign-owned	308938	0.17	0.38	0.00	0.00	0.00	0.00	1.00
	Savings rate	308938	0.04	0.11	-0.12	0.00	0.00	0.03	0.31
	Wealth	308938	0.25	0.43	0.00	0.00	0.00	1.00	1.00
	Spouse's income	308938	0.51	0.50	0.00	0.00	1.00	1.00	1.00

Table 1: Transition matrix 1997-2001

Year *t*	Status in *t*+1 Stay	Switch	Selfemp	Unemp	Total
1997	231,964	40,378	1,750	11,169	285,261
	81.32	14.15	0.61	3.92	100.00%
1998	239,949	45,479	1,997	12,925	300,350
	79.89	15.14	0.66	4.30	100.00%
1999	234,968	45,805	2,021	10,371	293,165
	80.15	15.62	0.69	3.54	100.00%
2000	240,471	46,680	2,048	13,299	302,498
	79.50	15.43	0.68	4.40	100.00%
2001	247,428	45,348	2,180	13,982	308,938
	80.09	14.68	0.71	4.53	100.00%
Total	1,194,780	223,690	9,996	61,746	1,490,212
	80.18	15.01	0.67	4.14	100.00%

Table 2: Conditional transitions

Panel A

Size of the firm	Status in 2001 Stay	Switch	Selfemp	Unemp	Total
0-4 employees	23,757	5,425	793	2,254	32,229
	73.71	16.83	2.46	6.99	100.00%
5-9 employees	18,534	3,766	332	1,443	24,075
	76.98	15.64	1.38	5.99	100.00%
10-19 employees	21,287	3,818	257	1,573	26,935
	79.03	14.17	0.95	5.84	100.00%
20-49 employees	28,830	5,117	235	1,906	36,088
	79.89	14.18	0.65	5.28	100.00%
50-99 employees	20,191	3,202	113	1,182	24,688
	81.78	12.97	0.46	4.79	100.00%
100-299 employees	32,855	4,793	150	1,549	39,347
	83.50	12.18	0.38	3.94	100.00%
300- employees	101,974	19,227	300	4,075	125,576
	81.21	15.31	0.24	3.25	100.00%
Total	247,428	45,348	2,180	13,982	308,938
	80.09	14.68	0.71	4.53	100.00%

Table 2: (continued)

Panel B

Productivity	Status in 2001 Stay	Switch	Selfemp	Unemp	Total
Quartile 1	46,532	13,890	749	4,454	65,625
	70.91	21.17	1.14	6.79	100.00%
Quartile 2	64,274	10,718	688	4,332	80,012
	80.33	13.40	0.86	5.41	100.00%
Quartile 3	69,158	9,116	443	3,166	81,883
	84.46	11.13	0.54	3.87	100.00%
Quartile 4	67,464	11,624	300	2,030	81,418
	82.86	14.28	0.37	2.49	100.00%
Total	247,428	45,348	2,180	13,982	308,938
	80.09	14.68	0.71	4.53	100.00%

Panel C

R&D-intensity	Status in 2001 Stay	Switch	Selfemp	Unemp	Total
R&D-dummy = 0	226,236	39,325	2,118	13,229	280,908
	80.54	14.00	0.75	4.71	100.00%
R&D-dummy = 1	21,192	6,023	62	753	28,030
	75.60	21.49	0.22	2.69	100.00%
Total	247,428	45,348	2,180	13,982	308,938
	80.09	14.68	0.71	4.53	100.00%

Table 3: MNL estimations

	Model 1			*Model 2*			*Model 3*			*Model 4*		
	Coef.	Std.err.	p-value	Coef.	Std.err.	p-value	Coef.	Std.err.	p-value	Coef.	Std.err.	p-value
Switch												
Lnsize	1.00	0.12	0.00	1.24	0.14	0.00	1.57	0.12	0.00	1.72	0.14	0.00
Lnprod	-1.04	0.54	0.06	-0.60	0.52	0.25	0.38	0.50	0.45	0.67	0.49	0.17
R&D-dummy	6.38	1.37	0.00	6.56	1.36	0.00	6.03	1.39	0.00	6.25	1.38	0.00
Selfemp												
Lnsize	-0.28	0.01	0.00	-0.27	0.01	0.00	-0.26	0.01	0.00	-0.26	0.01	0.00
Lnprod	-0.20	0.03	0.00	-0.20	0.03	0.00	-0.21	0.03	0.00	-0.21	0.03	0.00
R&D-dummy	-0.31	0.11	0.01	-0.31	0.11	0.01	-0.31	0.11	0.01	-0.32	0.11	0.00
Unemp												
Lnsize	-0.22	0.04	0.00	-0.26	0.04	0.00	-0.04	0.04	0.37	-0.08	0.05	0.07
Lnprod	-1.53	0.19	0.00	-1.56	0.19	0.00	-1.08	0.19	0.00	-1.12	0.19	0.00
R&D-dummy	-2.62	0.55	0.00	-2.60	0.55	0.00	-1.78	0.54	0.00	-1.75	0.54	0.00
Industry dummies		Yes			Yes			Yes			Yes	
Firm/plant controls		No			Yes			No			Yes	
Individual characteristics		No			No			Yes			Yes	
Number of observations		308938			308938			308938			308938	
Log likelihood		-188026.0			-186626.8			-178838.8			-178054.4	
Pseudo R2		0.041			0.048			0.088			0.092	

Note: Coefficients refer to the average marginal effects. They and the standard errors have been multiplied by 100.

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