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New Start-ups and Firm In-migration – Evidence from the Swedish Wholesale Trade Industry

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Abstract

The purpose of this paper is to distinguish between the determinants of new start-ups and in-migration of firms using a data-set that covers 13,471 limited liability firms in the Swedish wholesale trade industries during the period 2000-2004. Our results indicate that the presence of a university more than doubles the expected number of entrants and increases the expected number of in-migrating firms with 30%. A large share of educated workers and a high local unemployment rate is also associated with more start-ups and firm in-migration.

Keywords: Firm growth, firm size, job creation, small firms

JEL-codes: D22, L11, L25, L26

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1 Introduction

It is well-documented (Geroski, 1991; Carreira and Texeira, 2010; Haltiwanger et al., 2010) that new firms produce a number of benefits. For instance, the entry, or the threat of entry, of new firms is assumed to force prices down, thereby eliminating excess profits. Moreover, high entry rates may stimulate innovation, increase productivity and product quality, and new and young firms have been shown to be important job contributors.

The purpose of this paper is to examine what influence new start-ups and in-migration of wholesale trade firms into local markets in Sweden, using a data-set that cover 13,471 limited liability firms during the period 2000-2004. This paper makes two contributions to the existing literature on firm entry.

First, most previous entry studies (Dunne et al., 1988; Audretsch and Fritsch, 1994; Keeble and Walker, 1994; Love, 1996) have used aggregated data on firm entry or have focused on manufacturing firms. The entry dynamics of retail trade firms have been investigated by Pakes and Ericson (1998), Ilmakunnas and Topi (1999), and Daunfeldt et al (2006), where the latter study is the only one (as far as we know) examining the entry pattern of wholesale trade firms. This is surprising since the non-manufacturing sector of the economy grows, which implies that it has become increasingly important to gather information on the entry process of these firms as well.

Second, although Daunfeldt et al. (2006) studied the entry behavior of retail and wholesale trade firms in Sweden between 1990 and 1996, finding that that recent entry and large local markets attracted the entry of

wholesale trade firms; they could not distinguish between new start-ups and in-migration of firms. Already Heflebower (1957, p. 364) points out the problem in ignoring entry by firms established in other industries or to assume that such firms have no advantages as entrants. From the perspective of a municipality or region, it should matter little whether a new addition to the population of firms is a genuine entry or the result of in-migration of an already established firm – if anything, the case could be made that this latter is more preferable as these firms are more likely to be larger and hence provide more jobs.

Our results indicate that expected profits are of rather small importance for new entry and inmigration of firms into local wholesale trade markets in Sweden, supporting results from other industries (Geroski, 1995). Instead, the presence of a university more than doubles the expected number of entrants and increases the expected number of in-migration of firms with 30%. In addition, a 5% increase of the share of individuals with a post-secondary school education increases the expected number of new start-ups with 23%. High municipality unemployment rates increases both start-ups and firm in-migration. The estimated effect of a 1% increase in the local unemployment rate is to increase the expected number of entrants with 32% and in-migrating firms with 18%. Having access to a well educated workforce thus seem to be an important source of entrepreneurial opportunities in the wholesale trade sector. Finally, more firms seem to start-up businesses in municipalities governed by a socialist government, whereas political preferences have no influence on the expected number of in-migrating firms.

The next section presents hypotheses for what affects new entry and in-

migration of firms. Data and descriptive statistics are described in Section 3. In section 4 the empirical methodology is presented, while the results are presented and commented in section 5. Finally, section 6 summarizes and draws conclusions.

2 Theoretical background and hypotheses

The importance of entry was already emphasized by Schumpeter (1934, 1943), who argued that they were vital for the role of creative destruction, i.e., the process of transformation that accompanies innovation, and, ultimately, for subsequent economic growth to occur. New firms are seen as innovative entrepreneurs that sustain long-term growth in the region as their innovations challenge incumbents and even destroy the value of established firms. However, Schumpeter also emphasized that entry is not a homogenous phenomenon, but a combination of a large number of imitators and a tiny majority of leaders or innovators (Schumpeter 1934). In some industries, the creative destruction-role of new firms may be dominant, whereas in others, entry can to a larger extent be "turbulence" (Santarelli and Vivarelli 2007). In fact, entry is made for a large set of reasons besides entrepreneurship, such as over-optimism, the pursuit a relaxed lifestyle, or escaping unemployment, starting a firm often being a last resort rather than a first choice (Coad 2009, p. 131).

Entry on local markets is typically identified as the first time we observe a firm identity number in a given region (Daunfeldt et al., 2006, 2010), which means that we cannot distinguish between new start-ups and in-migration

of firms. Entry studies on more aggregated levels, on the other hand, does not observe when firms re-locate their businesses; which means that they are only focused on entry of new firms. Very few studies have previously tried to distinguish new entry from in-migration of firms, even though it is likely that these firms have different characteristics and that these differences could be of great importance for the local policymakers (Knoben and Weterings, 2010). New start-ups are, for example, often characterized by low growth ambitions (Wiklund et al., 2003; Coad, 2009); whereas one of the main reasons why firms re-locate their business is ambitions to grow faster (Pellenberg et al., 2002; Brouwer et al., 2004).

The study of what determines entry has a long history. Initial focus lay on industry-specific factors (Bain, 1956), but later studies (Santarelli and Vivarelli, 2007) have also emphasized the importance of region-specific conditions. Table 1 provides a summary of factors that have been proposed as important determinants of entry and which hypotheses that are most common in the literature.

[Table 1 About Here]

Theoretical models of entry generally assume that the expected profitability of entering or re-locating to a local market has a positive effect on entry (Orr, 1974; Nakosteen and Zimmer, 1987). However, empirical evidence suggests that the size of this effect is rather small. Geroski (1995, p. 427), for example, summarized the entry-literature by concluding that: *"Entry seems to be slow to react to high profits"*. Another question that might influence new start-ups and re-location of firms is the expected sunk

costs involved with starting a new firm. Sunk costs cannot be retrieved if an investment fails. Hence, in industries characterized by larger sunk costs, less entry may be expected (Sutton 1991) and firms will stay at their current location, even if there might be other locations with even higher levels of the expected profits (Auty, 1975).[1] Another potential industry-specific entry barrier is the industry minimum efficient scale (MES) of production. Industries with a larger MES, should see a larger scale disadvantage of small firms. Entrants will thus be forced to grow quickly or exit (Strotman 2007, p 89). However, as noted by Geroski (1995), the barriers may work not so much as deterrents to entry as to survival.

Related to entry barriers should be the degree of competition in the market, where a higher number of competitors or, alternatively, a clearly dominant incumbent firm can be expected to deter entry. The fewer the market participants, i.e. number of firms, the greater the probability that they can overcome their collective action problem and act together to deter entry (Geroski, 1995). Also, on highly concentrated local markets with a dominant incumbent, a potential entrant might have to invest more in marketing, which increases the costs associated with entry.

Industry size is included in the model to account for potential agglomeration effects. Already Marshall (1890) emphasized that entrepreneurs might benefit by locating its businesses in regions characterized by a high degree of technological and knowledge spillovers among firms. This suggests that

[1] Large expenditures on advertising and R&D by incumbents can also serve as entry barriers, as they should increase the costs of entry substantially. However, we choose to exclude this variable from the analysis since more than 95 percent of the wholesale trade firms in Sweden have no investments in R&D and we cannot observe their expenditures on advertising.

new entry and firm in-migration should be more common in local markets where the industry is already well established (Glaser et al., 1992).

Santarelli and Vivarelli (2007) infer that since it has long been observed that entrepreneurial activity varies across geographic space, all positive effects of entrepreneurship and entry ought to be particularly obvious at the regional level. Davidsson et al (1994a), for example, claim that regional characteristics to a large extent can explain entry in Sweden during the period 1984-89.

Population density has been identified as one of the most important regional determinants of firm entry. Previous studies suggest that entry is more common in more densely populated regions since a larger market imply a larger cake from which the potential entrepreneur can reap profits (Audretsch and Fritsch, 1994; Guesnier, 1994). Unemployment in the municipality, meanwhile, can be argued to have a positive effect on new start-ups since one reason to become self-employed is to escape unemployment (Coad 2009, p 131). This has also been shown empirically (Parker 1996, Davidsson et al, 1994). McLaughlin and Robock (1949) also indicated that firms might move to regions with better labor availability, suggesting that firm in-migration should be positively related to the local unemployment rate.

The education level in the region is often argued to have a positive effect on entry. The Knowledge Spillover Theory of the Firms (Audretsh et al., 2006; Acs et al, 2004) implies that knowledge spillovers are an important source of entrepreneurial opportunities and that we should observe more new entry and firm in-migration in regions that have access to a well educated

work force. Higher education might also encourage individuals to enter into entrepreneurship (Daunfeldt et al, 2006). The presence of a university in the region might also lead to university spin-offs, and that firms re-locate to this region in order to exploit business opportunities (Goldstein and Renault, 2004).

As Baumol (1990) attests, entrepreneurial activity is dependent on the political and institutional setting in which it takes place. Left-of-center parties, for example, are generally perceived as holding less favorable views vis-à-vis entrepreneurship (Ayittey 2008, p 146f) and Love (1995) has shown that a general environment friendly to small firms has a positive effect on entry. The degree of concentration of political power might also influence entry. On the one hand, a high power concentration could be conducive to entry, as potential entrepreneurs and firms that are planning to re-locate their businesses should appreciate stable rules-of-the-game. But it could also have a detrimental effect, as too stable a powerbase would imply less of a need from the perspective of politicians to improve local business conditions.

New start-ups and firm in-migration might also be influenced by the local tax rate. Parker (1996) finds marginal taxes to have a positive effect on the entry decision, and infers that self-employment should offer greater opportunities to avoid taxes than paid employment (Long, 1982; Blau 1987). However, Fölster (2002) has shown a strong negative connection between tax burden and the share of self-employed in Sweden.

3 Data and empirical method

3.1 Data

All limited-liability firms in Sweden are legally required to submit an annual report to the Swedish patent and registration office (PRV). This study uses data collected from MM (Market Manager)-Partner, now merged with PAR, a Swedish consulting firm that gathers economic information from PRV. This information is primarily used by decision-makers and stakeholders in Swedish commercial life. The data include all variables that can be found in the annual reports, e.g., number of employees, salaries and wages, fixed costs, profits, and liquidity. The original dataset consists of data from 288,757 firms from all sectors of the economy, being active at some point in the period 1995-2005. Our sample is restricted to Swedish limited-liability companies active in 5-digit wholesale trade industries between 2000 and 2004.[2] The years prior to 2000 were left out since reliable data on firm migration was not available.

The dependent variables in our analysis are the number of new start-ups that survives and conducts business during the study period, and the number of new firms that re-locates to industry j in municipality m during period t. We focus on surviving firms since these are the firms contributing to local employment and local growth.[3] As we are interested in the geographical

[2] Wholesale trade firms are classified into 5-digit industries according to the European Union's NACE-standard, a classification based on firm activity commonly employed by Statistics Sweden (SCB).

[3] Also, the firms that enter and exit the market within the same year, or within a few years, often does not have data for all variables all year. Including these firms would then introduce measurement errors in the dataset since we measure all variables on a yearly basis.

location and re-location of firms, only firms having a registered visitor´s address were included in the study. Mail order- and internet based firms were thus left out of the analysis. Also, the original dataset contained both single and multi-plant firms. However, the nature of the annual reports data does not allow in-depth analysis of multi-plant firms, and therefore, we have chosen to focus our study on single plant firms only.[4]

In total, the data set consists of 13,471 wholesale trade firms and 51,288 year-observations. Since we are studying entry and in-migration into local markets, data have been aggregated by municipality, industry sector and year so that the dependent variable represents the number of entering (or in-migrating) firms in a specific municipality, five digit NACE-code industry, and year. All independent variables have been aggregated in the same way, and represents the average of the independent variable in the municipality, industry and year in question. After aggregation, this leaves us with a final data-set that consists of 14,828 observations.

The municipality-specific data were provided by Statistics Sweden. These data include measures of demographics, average income, political preferences, educational level, and unemployment in each municipality and year. In addition, some municipality-specific information is drawn from the *Kfakta06* database developed by associate professor Leif Johansson at the Department of Political Science, Lund University.

[4]The numbers in the annual reports are aggregated to the main office (HQ) for firms having more than one production plant, which means that it is not possible to identify how each plant contributes to the final results. It should, however, be noted that previous studies of firm migration has indicated that single plant firms adopt different migration strategies, as compared to larger multi-plant firms (McCann, 2004).

3.2 Descriptive statistics

The literature overview in Section 2 suggests that a number of industry and regional-specific factors could have important influences on the decision to start a new firm or re-locate an existing one. Descriptive statistics of the variables included in the empirical analysis are presented in Table 2.

[Table 2 About Here]

Our dependent variables are the number of new start-ups and in-migration of firms in municipality m ($m = 1, .., 289$) in a 5-digit wholesale trade industry j ($j = 1, \ldots, 732$) at period t ($t = 2000, \ldots, 2004$), respectively. The data is multinomial since the dependent variable has a finite number of possible outcomes (Heij et al., 2004, p. 463) and the descriptive statistics suggests that we have overdispersion in the dependent variables, i.e., the variance is larger than the mean.

Profit opportunities for potential entrants are measured by the average returns on total assets (ROA) in industry j in municipality m in period $t-1$[5], whereas mean reported book-value of buildings and machinery is used as our measure of sunk costs.

Market concentration (potential presence of dominant incumbent firms) is controlled for using a Herfindahl-index, measuring market-concentration in each 5-digit industry j active in municipality m during the period 2000-2004. It is calculated as the sum of squares of firms' market-shares, i.e., $s_{1m}^2 + s_{2m}^2 + ... + s_{km}^2$, where k is the number of firms in municipality m.

[5] We have also used returns on equity (ROE) in the preceeding period to measure expected profit opportunities. All results remain qualitatively the same, and are available upon request.

If all firms had equal revenues, the concentration rate would then be $1/k$, whereas it would be one if the entire local market were supplied by one firm. The variable is scaled by 100 for ease of interpretation. A value close to or equal to 100 thus implies a high market concentration or even a monopoly, whilst a low value implies more competition. We also control for local competition by using the number of firms active in a specific industry j located in municipality m.

Industry size is measured using total sales for industry j in municipality m at time t. Another industry-specific determinant that has received a lot of attention in previous studies is the minimum efficient scale (MES). In the literature, MES has been measured in several ways. Audretsch (1995), for example, adopts the standard Comanor and Wilson (1967) proxy for measuring MES, i.e., the mean size of the largest plants in each industry accounting for one-half of the industry value of shipments. Other commonly used proxies for MES are the size of the industry's median plant and the ratio of that plant's output level to the industry total (Sutton, 1991). We use the size of the average firm in industry j at time t as our measure of MES.

Region-specific conditions are very seldom analyzed when investigating firm entry, even though studies (e.g., Davidsson et al., 1994) have indicated that the regional context matters for firm entry. We therefore also control for a number of municipality-specific factors that might affect firm growth rates. The municipality-specific data include population density and the number of unemployed individuals in the municipality. Population density is measured as the number of inhabitants per square kilometer in the mu-

nicipality. Unemployment is the percentage of openly unemployed in the municipality in ages 18-64 between 1998 and 2000, and ages 16-64 between 2001 and 2005. The jump in the data series should be of limited concern since most people do not finish school and hence run the risk of becoming unemployed before the age of 18.

We also control for the presence of a university or a university college, the educational level of the population, political preferences, and political power. The availability of higher education is represented by a dummy variable assigned a value of one if a university or a university college is located in the region. Data concerning educational level within the municipality refers to the percentage of people in ages 16-74 with a post-secondary school education of at least 3 years. Political preferences are indicated by a dummy variable representing all local parliaments where non-socialist parties have the majority. Like market concentration, political strength is measured by a Herfindahl-index, computed as the sum of squares of the shares in the local parliament of the political parties, and scaled to be an index between 0 and 100. Finally, the municipal tax rate is measured in percentage points.

4 Empirical method

Firm entry is in this paper divided into new start-ups and firm in-migration. When deciding on whether to start-up a new firm or re-locating an existing firm to another local market, we assume that the entrepreneur valuates the profitability associated with the project, other industry-specific conditions, as well as factors at the region-level that might influence the decision to enter

the local market (see also Daunfeldt et al., 2006). To test whether the same factors that determine entry of new firms also determine firm in-migration, the following model is estimated:

$$E_{jmt} = f(\alpha_0 + \alpha_1' \mathbf{X}_{jmt-1} + \alpha_2' \mathbf{Y}_{jmt} + \alpha_3' \mathbf{I}_j + \alpha_4' \mathbf{R}_m + \alpha_5' \mathbf{T}_t) + \varepsilon, \quad (1)$$

$$M_{jmt} = f(\beta_0 + \beta_1' \mathbf{X}_{jmt-1} + \beta_2' \mathbf{Y}_{jmt} + \beta_3' \mathbf{I}_j + \beta_4' \mathbf{R}_m + \beta_5' \mathbf{T}_t) + \delta, \quad (2)$$

where E_{jmt} is the entry of new firms, and M_{jmt} is in-migration of existing firms into industry j in municipality m at time t; $\mathbf{X}_{jmt-1}$ is a vector of industry-specific determinants; $\mathbf{Y}_{jmt-1}$ is a vector of municipality-specific determinants; $\mathbf{I}_j$, $\mathbf{R}_m$ and $\mathbf{T}_t$ are industry, region and time-specific fixed effects; α_0, β_0 are constants; $\alpha_1' - \alpha_5'$, $\beta_1' - \beta_5'$ are parameter vectors to be estimated; and ε and δ are random error-terms.

The industry-specific vector $\mathbf{X}_{jmt-1}$ includes mean returns on total assets (ROA), mean book-value on buildings and machinery, and total industry sales in industry j in municipality m in period $t-1$. The size of the median plant in terms of net sales in the local market is used as our measure of MES, whereas market concentration is measured using a Herfindahl-index.

The municipality vector, $\mathbf{Y}_{jmt}$, includes population density, the local unemployment rate, the educational level, the presence of a university, political preferences, political power of the local parliament, and the municipality tax rate.

Finally, industry and region-specific fixed effects are included in the model to control for time-invariant unobserved heterogenity at the industry

and regional level, while time-variant heterogenity is controlled for using time-specific fixed effects. Industry-specific fixed effects are calculated on the 3-digit NACE-level, whereas region-specific fixed effects are measured on the county level. All fixed effects are omitted from the result tables to save space, but are available from the authors upon request.

As the number of firms entering a market is a positive integer, a count data model was used. The common starting point for most count data analysis is the Poisson regression model. However, a restrictive feature of the Poisson regression model is the restriction that the variance should equal the mean. For our response variables new start-ups and in-migration, the variance is larger than the mean (Table 2). Also, our dataset has an excess of observations where no entry or in-migration has occurred during the study period. Since the unconditional variance exceeds the unconditional mean (overdispersion), and there is an excess of zero-entry observations in our data, the Poisson regression model can not be used. Instead, three different count data models that can all account for both overdispersion and excess zeros have been estimated. These are the negative binomial regression (NB) model , the zero-inflated Poisson regression model (ZIP) and, finally, the zero-inflated negative binomial model (ZINB).

The NB model has a higher probability of count zero and also a longer tail than the standard Poisson regression model (Olsson 2002, Sheua et al 2004). It models between-subject heterogeneity or cross-section heterogeneity - when different groups of subjects display different variance patterns but are homogenous within groups, something that could explain overdispersion.

The NB regression model will, however, still enforce the same process for

the zero and non-zero counts. Another option is the ZIP regression model, as this modification of the standard Poisson model makes it possible to model overdispersion not arising from heterogeneity, but from the nature of the process generating the zeros. Kennedy (2003) suggests either the ZIP or the NB regression models as the "two most prominent models incorporating overdispersion".

Finally, in case one wants to take into account both the possibility of a splitting mechanism for the zero-counts and between-subject heterogeneity, a ZINB regression model is plausible as it will enable us to distinguish between the two effects that could potentially cause the overdispersion.

At this point, there is no clear candidate among these three models, and thus all three will be applied, and the choice of model used in the final estimations determined based on Schwarz's Bayesian information criteria. As it turns out, the results from all three models are similar (see Appendix A for a comparison of fitted against acctual values in the different models), but the NB regression model is prefered based on Schwarz's Bayesian information criteria. As such, the results presented in the next section is from the NB model, and the results from the other regression models are presented in Appendix B.

5 Results

The results from the estimation of equation (1) and (2) are presented in Table 3.

[Table 3 about here]

New start-ups does not seem to be influenced by the profit opportunities in the municipality. The estimated effect of a increase in profit opportunities is actually negative and statistically significant for the number of in-migrating firms, but the effect is small and of no major economic significance. The value of buildings and machinery, our measure of sunk costs, is surprisingly positive and significant for in-migrating firms, but again the size of the effect is marginal. An estimated increase in the market concentration rate reduces the incidence ratio for new entry with only 0.5%, implying that a 1% increase in the market concentration rate will reduce the expected number of entrants with 0.5%. Thus, industry-specific factors does not seem to be important determinants of either new entry or in-migration of existing firms.

Turning to the vector of region-specific factors, we note that both the presence of a university and the access to an educated workforce increase both the number of new start-ups and the number of in-migrating firms. The estimated incidence-rate ratios suggest that the presence of a university more than doubles the expected number of new entrants, and increases the expected number of in-migrating firms with 32%. The estimated incidence-rate ratio for the share of individuals with higher education is 1.04 for new entry and 1.02 for firm in-migration. This suggests that a 5% increase in the share of individuals with higher education is associated with a 22% increase in the expected number of new entrants, as well as a 10% increase in the number of in-migrating firms. Our results thus seem to suggest that knowledge spillovers are important determinants of new entry and in-migration, supporting Audretsch et al. (2006) and Acs et al. (2008) Knowledge Spillover

Theory of the Firms as well as endogenous growth theory (Romer, 1990) that highlights the importance of knowledge spillovers for economic development.

In accordance with previous studies (Davidsson et al., 1994), we also find that the local unemployment rate is associated with an increase in the number of both new entrants and in-migrating firms. This is expected since one reason to become self-employed is to escape unemployment, whereas in-migrating firms might move to regions with better labor availability. The estimated incidence-rate ratios implies that a one percent increase in the local unemployment rate increase the number of new entrants with 32%, and firm in-migration with 18%. We also observe that the expected number of new entrants are reduced with 25% if the municipality is governed by a non-socialist local government.

Finally, most of our region-specific fixed effects are associated with estimated incidence-rate ratios that are significantly lower than one both for entry and in-migration, compared to our comparison county of Stockholm. This suggests that the expected number of both new entrants and in-migrating firms are lower in those counties compared to the Stockholm county. All industry fixed effects are jointly statistically significant for both new entry and in-migration, suggesting that new entry and in-migration is also influenced by unobserved time-invariant heterogeneity at the industry level. The result is less conclusive for time-specific fixed effects, which are jointly statistically significant for entry, but not in-migration.

6 Summary and conclusions

The purpose of this paper has been to study the determinants of new start-ups and in-migration of firms into 5-digit wholesale trade industries in Swedish municipalities during the period 2000-2004. Previous entry studies have not been able to distinguish between new start-ups and inmigration of firms, eventhough it can be argued that the latter are more important for regional development since these firms have higher growth ambitions according to the literature. Our paper thus contributes to the literature by explicitly focusing on whether different factors influence new entry and firm in-migration. Another contribution is that very few studies have analyzed entry into wholesale trade industries. This is surprising since the wholesale trade industry, as a medium of exchange, constitute an important part of the economy; and also because the importance of the non-manufacturing sector has increase around the world in recent times.

Our results indicate that entry of new wholesale trade firms and inmigration of existing ones primarily are influenced by region-specific factors, supporting Davidsson's et al (1994) claim that the regional context is important for firm entry. The expected number of new entrants and in-migrating firms significantly increase if the local market has a university and an educated workforce. This seems to suggest that knowledge spillovers create entrepreneurial activity in terms of more new entry and firm in-migration. Another important determinant is the local unemployment rate. The results imply that entrepreneurs are more likely to set-up new businesses in municipalities with high unemployment rates. This is expected since high

unemployment rates has been shown to increase self-employment. We also observe that more firms migrate to municipalities with higher unemployment rates, although the size of the effect is smaller in this case. Finally, more entry occur in municipalities with a socialistic local government. This contradict our hypothesis, but one reason might be that unemployed individuals in those municipalities are more likely to start-up their own businesses compared to those that are unemployed in non-socialistic governments.

This study has been focused on whether the factors that influence the decision to enter a new local market differs between new start-ups and in-migrating firms. We believe that future studies more closely should focus on the difference between new start-ups and firm in-migration in general. For example, what is the contribution of new entry and in-migration in terms of job opportunities and productivity growth? A fruitful area of further research would also be to focus more on high-impact entrepreneurship, i.e., distinguishing between new entry and firm in-migration that really makes a difference at the local market.

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Appendix A: Choice of estimation technique

Note that the actual and predicted values of firm entry are very similar in the three different models. However, the NB regression model is prefered based on the Schwarz's Bayesian information criteria.

[Table A1 About Here]

Again, actual and predicted values are similar. Also when modeling firm in-migration, Schwarz's Bayesian information criteria suggest that the prefered model is NB regression.

[Table A2 About Here]

Appendix B: Additional results

The models presented in this Appendix are identical to the model presented in equations (1) and (2), with the notable exception that we now also model excess zeros. The inflation part of the models have been kept quite simple. In the case of firm entry a constant, and the industry- and firm specific fixed effects have been used to model excess zeros, while in the case of firm migration only a constant was included in the inflation model. In both cases, more elaborate models would have been preferable, and such models where also tried but without achieving convergence.

[Table B1 About Here]

Comparing the results from the ZINB- (Table B1) and ZIP regression models (Table B2) in terms of estimated incidence-rate ratios to the ones presented in the paper, it should be noted that the results from all three models are almost identical.

[Table B2 About Here]

Table 1: What affects new start-ups and in-migration of firms?

Determinants	Hypothesis
Industry-specific	
Profit expectations	+
Sunk costs	-
Market concentration	-
Industry size	+
MES	-
Number of firms	+
Region-specific	
University	+
Educational level	+
Population density	+
Political power	+/-
Non-Socialist	+
Unemployment rate	+
Tax rate	+/-

Note: + = positive impact, and - = negative impact.

Table 2: Descriptive statistics

Variable	Mean	St.dev.	Min	Max	N
New entry	0.099	0.415	0	11	14828
In-migration	0.101	0.389	0	10	14828
ROA	4.191	36.294	-999	705.3	13764
Sunk Costs	3626000	$6.43E^{+7}$	0	$5.42E^{+9}$	13919
Market concentration	82.847	25.196	3.7	100	12967
Industry size	$6.51E^{+7}$	$3.40E^{+8}$	0	$1.2E^{+10}$	13340
MES	$1.64E^{+7}$	$5.75E^{+7}$	0	$2.4E^{+9}$	13340
Number of firms	2.962	6.844	1	167	13340
University	0.212	0.408	0	1	14828
Educational level	25.562	9.239	0	57.558	14828
Population density	311.375	718.351	0	4075	14828
Political power	24.237	4.506	0	50.771	14828
Non-Socialist	0.335	0.472	0	1	14828
Unemployment rate	3.204	1.116	0.9	8.3	14781
Tax rate	30.996	1.227	27.15	34.04	14828

Table 3: Estimation results, Determinants of firm entry and in-migration, NB-regr.

Variable	New entry		In-migration	
	Irr.	Std.err.	Irr.	Std.err.
ROA (L)	1.000	0.001	0.998***	0.001
Sunk Costs (L)	1.000	5.24E^{-10}	1.000***	2.50E^{-10}
MES (L)	1.000	6.37E^{-10}	1.000	7.31E^{-10}
Industry size (L)	1.000	7.09E^{-11}	1.000*	6.40E^{-11}
Market concentration (L)	0.995***	0.002	1.001	0.001
Number of firms (L)	0.993*	0.004	0.997	0.004
University (D)	2.021***	0.248	1.312***	0.128
Educational level	1.042***	0.006	1.022***	0.005
Population density	1.000***	6.20E^{-5}	1.000***	4.41E^{-5}
Political power	1.013	0.012	1.002	0.009
Non-Socialist (D)	0.756**	0.090	0.954	0.084
Unemployment rate	1.320***	0.085	1.178***	0.058
Tax rate	0.933	0.058	0.945	0.045
Region specific F.E.	Yes		Yes	
Industry specific F.E.	Yes		Yes	
Time specific F.E.	Yes		Yes	
N of obs	12051		12051	
BIC	6002.546		7898.542	
McFadden's adj. R^2	0.128		0.090	

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

BIC = Schwarz's Bayesian information criteria. Irr = Incidence-rate ratios.

NB-regr. = Negative binomial regression.

Table A1. Actual and prdicted values, firm entry.

Count	Actual	NB-regr.	ZINB-regr.	ZIP-regr.
0	0.940	0.940	0.940	0.940
1	0.049	0.048	0.049	0.048
2	0.007	0.008	0.008	0.008
3	0.002	0.002	0.002	0.002
4	0.001	0.001	0.001	0.001
5	0.000	0.000	0.000	0.000
6	0.001	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000
Sum	1.000	1.000	1.000	1.000
BIC		6002.546	6207.336	6252.137
McFadden's adj. R^2		0.128	0.124	0.136

Table A2. Actual and prdicted values, in-migration.

Count	Actual	NB-regr.	ZINB-regr.	ZIP-regr.
0	0.912	0.913	0.912	0.913
1	0.076	0.074	0.073	0.074
2	0.008	0.010	0.011	0.010
3	0.002	0.002	0.002	0.002
4	0.001	0.001	0.001	0.001
5	0.000	0.000	0.000	0.000
6	0.000	0.000	0.000	0.000
7	0.000	0.000	0.000	0.000
8	0.000	0.000	0.000	0.000
9	0.000	0.000	0.000	0.000
Sum	1.000	1.000	1.000	1.000
BIC		7898.542	7907.935	7927.397
McFadden's adj. R^2		0.090	0.090	0.100

Table B1: Estimation results, Determinants of firm entry and in-migration, ZINB-regr.

Variable	New entry		In-migration	
	Irr.	Std. err.	Irr.	Std. err.
ROA (L)	1.000	0.001	0.998***	0.001
Sunk Costs (L)	1.000	$5.70E^{-10}$	1.000***	$2.50E^{-10}$
MES (L)	1.000	$6.51E^{-10}$	1.000	$7.31E^{-10}$
Industry size (L)	1.000	$7.17E^{-11}$	1.000*	$6.40E^{-11}$
Market concentration (L)	0.995***	0.002	1.001	0.001
Number of firms (L)	0.993*	0.004	0.997	0.004
University (D)	1.998***	0.247	1.311***	0.128
Educational level	1.043***	0.006	1.022***	0.005
Population density	1.000***	$6.16E^{-5}$	1.000***	$4.65E^{-5}$
Political power	1.015	0.013	1.002	0.009
Non-Socialist (D)	0.786**	0.095	0.954	0.084
Unemployment rate	1.354***	0.091	1.178***	0.058
Tax rate	0.959	0.062	0.945	0.045
Region specific F.E.	Yes		Yes	
Industry specific F.E.	Yes		Yes	
Time specific F.E.	Yes		Yes	
Inflate-model:	Constant, Region F.E. and Time F.E.		Constant only.	
N of obs	12051		12051	
BIC	6207.336		7907.935	
McFadden's adj. R^2	0.124		0.090	

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

BIC = Schwarz's Bayesian information criteria. Irr = Incidence-rate ratios.

ZINB-regr. = Zero inflated negative binomial regression.

Table B2: Estimation results, Determinants of firm entry and in-migration, ZIP-regr.

Variable	New entry		In-migration	
	Irr.	Std. err.	Irr.	Std. err.
ROA (L)	1.000	0.001	0.998***	0.001
Sunk Costs (L)	1.000	8.30E^{-10}	1.000***	1.76E^{-10}
MES (L)	1.000	6.44E^{-10}	1.000	8.25E^{-10}
Industry size (L)	1.000	6.24E^{-11}	1.000	5.96E^{-11}
Market concentration (L)	0.996**	0.002	1.002	0.002
Number of firms (L)	0.991**	0.004	0.998	0.004
University (D)	2.070***	0.265	1.323***	0.131
Educational level	1.042***	0.006	1.023***	0.005
Population density	1.000***	6.62E^{-5}	1.000***	4.78E^{-5}
Political power	1.014	0.013	1.004	0.009
Non-Socialist (D)	0.736**	0.092	0.955	0.085
Unemployment rate	1.339***	0.088	1.192***	0.058
Tax rate	0.897	0.060	0.953	0.047
Region specific F.E.	Yes		Yes	
Industry specific F.E.	Yes		Yes	
Time specific F.E.	Yes		Yes	
Inflate-model:	Constant, Region F.E. and Time F.E.		Constant only.	
N of obs	12051		12051	
BIC	6252.137		7927.397	
McFadden's adj. R^2	0.136		0.100	

Note: ***, ** and * denote significance at the 1%, 5% and 10% levels, respectively.

BIC = Schwarz's Bayesian information criteria. Irr = Incidence-rate ratios.

ZIP-regr. = Zero inflated Poisson regression.