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Do foreign players change the nature of the game among local entrepreneurs?

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No. 942

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DO FOREIGN PLAYERS CHANGE THE NATURE OF THE GAME AMONG LOCAL ENTREPRENEURS?***

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ABSTRACT: The effect of foreign-owned companies on entrepreneurial survival in the Finnish business sector is analyzed by using a new, exceptionally rich linked data on employees, entrepreneurs and their companies. Our new indicator of foreign presence, based on the observed spatial scopes of the local labor markets, outperforms other commonly used alternatives for measuring regional effects. According to the results, foreign-owned companies crowd out local entrepreneurship. They increase competitive pressure in a way that selects efficient entrepreneurs from inefficient ones, which stimulates productivity-enhancing restructuring at the micro-level. In contrast to the theoretical prediction, higher education does not seem to make entrepreneurs less vulnerable to the foreign presence despite their possibly higher ability to adopt knowledge from foreign-owned companies.

Keywords: Foreign ownership, entrepreneurship, local labor markets, competition, survival, company efficiency, selection effect, absorptive capacity

JEL-code: F23, L10, M13, O31, R11, R23

MALIRANTA, Mika – **NURMI**, Satu, **MUUTTAVATKO ULKOMAALAISET PELURIT PELIN LUONNETTA PAIKALLISTEN YRITTÄJIEN KESKUUDESSA?** Helsinki: ETLA, Elinkeinoelämän Tutkimuslaitos, The Research Institute of the Finnish Economy, 2004, 22 s. (Keskusteluaiheita, ISSN 0781-6847; No. 942).

TIIVISTELMÄ: Ulkomaalaisten yritysten vaikutusta yrittäjien jatkamistodennäköisyyteen Suomen yritystoiminnassa on tutkittu käyttämällä uusia ja poikkeuksellisen arvokkaita yhdistettyjä aineistoja palkansaajista, yrittäjistä ja heidän yrityksistään. Tutkimuksessa käytetään uutta ulkomaalaisten yritysten läsnäolon intensiteetin mittaa, joka pohjautuu havaittuihin työssäkäyntialueisiin. Uusi indikaattori näyttää toimivan paremmin kuin perinteiset tavat tutkia alueellisia vaikutuksia. Tulosten mukaan ulkomaalaiset yritykset syrjäyttävät paikallista yrittäjyyttä. Ne lisäävät kilpailupainetta niin, että tehokkaat yrittäjät valikoituvat tehottomista. Näin ne lisäävät alueiden tuottavuutta vahvistavaa mikrotason rakennemuutosta. Teoreettisten ennusteiden vastaisesti yrittäjän hyvä koulutus ei sinänsä näytä tekevän hänestä vähemmän altista ulkomaalaisten yritysten syrjäyttävälle vaikutukselle, vaikka koulutuksen voisi odottaa parantavan kykyä omaksua ulkomaalaisista yrityksistä leviävää tietämystä.

Avainsanat: Ulkomaalaisomistus, yrittäjyys, kilpailu, eloonjääminen, yrityksen tehokkuus, valikoitumisvaikutus, omaksumiskyky

JEL-koodi: F23, L10, M13, O31, R11, R23

Ei-tekninen tiivistelmä

Tutkimuksessa selvitetään sitä, miten ulkomaalaisten yritysten läheisyys vaikuttaa yrittäjän jatkamistodennäköisyyteen Suomen alueilla. Tarkasteltavana on yli 40 000 elinkeinonharjoittajaa ja heidän yritystään vuosina 1994–2002. Tulosten mukaan ulkomaalaiset yritykset pienentävät paikallisten yrittäjien jatkamistodennäköisyyttä, kun lukuisat muut asiaan vaikuttavat tekijät otetaan huomioon tilastollista menetelmää käyttäen. Toisin sanoen ulkomaalaisten yritysten läheisyydellä on itsenäinen yrittäjän lopettamisen todennäköisyyttä lisäävä vaikutus.

Tutkimuksen tärkein havainto on kuitenkin se, että ulkomaalaiset yritykset näyttävät syrjäyttävän erityisesti sellaisia paikallisia yrittäjiä, joiden yritysten tuottavuus (ja kannattavuus) on huono. Yrityksen suorituskykyä mitataan tutkimuksessa usealla erilaisella indikaattorilla. Ulkomaalaiset yritykset vähentävät varsinkin huonosti tuottavien yrittäjien jatkamistodennäköisyyttä.

Sen sijaan tuottavuudeltaan hyvien yrittäjien kohdalla vaikutus on jopa päinvastainen, eli ulkomaalaisten yritysten läsnäolo näyttää pikemminkin parantavan heidän jatkamisensa edellytyksiä. Tulosten mukaan ulkomaalaiset yritykset vaikuttavat näin ollen siihen tapaan, jolla alueen yrittäjät valikoituvat; mitä enemmän alueella on ulkomaalaisia yrityksiä, sitä enemmän yrittäjien valikoituminen vahvistaa alueen keskimääräistä tuottavuutta.

Korkea koulutus lisää yrittäjän jatkamistodennäköisyyttä. Ulkomaalaisten yritysten läsnäolo näyttää kuitenkin pienentävän yrittäjän jatkamistodennäköisyyttä samalla tavalla riippumatta hänen koulutustasostaan. Toisin kuin hyvä tuottavuus, korkea koulutus ei yksinään siis näytä tekevän yrittäjää vähemmän alttiiksi ulkomaalaisten yritysten aiheuttamalla kilpailupaineelle.

Tutkimus perustuu poikkeuksellisen suureen aineistotyöhön, jolla on luotu ainutlaatuinen aineisto käyttämällä hyväksi useita erilaisia Tilastokeskuksen rekisteriaineistoja. Jokaiselle kunnalle on tutkimuksessa määritelty oma työssäkäyntialue, joka koostuu tyypillisesti kyseisestä kunnasta ja sitä ympäröivistä 3-8 lähikunnasta. Yleensä alueen reuna on noin 100 kilometrin päässä. Alueet on määritelty käyttämällä palkansaajia ja heidän työpaikkansa toimipaikkaa koskevia rekisteriaineistoja. Näistä aineistoista ilmenee palkansaajan asuinkunta ja hänen työpaikkansa sijaintikunta. Näiden aineistojen avulla on näin voitu selvittää, mistä kunnista tietyn kunnan työntekijät ovat kotoisin, eli mikä kuntajoukko muodostaa kutakin kuntaa ympäröivän työssäkäyntialueen.

Jokaiselle noin 450 työssäkäyntialueelle on laskettu ulkomaalaisten yritysten läsnäolon intensiteettiä kuvaava tunnusluku. Yritys- ja toimipaikkarekistereistä on ensin laskettu ulkomaalaisten yritysten työllisyysosuudet kaikissa kunnissa. Näistä luvuista on laskettu kuntakohtaiset ulkomaalaisten yritysten läsnäolointensiteettiä kuvaavat indikaattorit. Näissä laskelmissa kutakin lähikuntaa on painotettu sen mukaan, mikä on sen työllisyysosuus. Työssäkäyntialueen etäisessä osassa oleva ulkomaalainen yritys saa näin pienemmän painoarvon kuin aivan lähellä oleva.

Vertailun vuoksi tässä tutkimuksessa on testattu myös aikaisemmassa kirjallisuudessa käytettyjä mittaustapoja. Käy ilmi, että näillä karkeammilla indikaattoreilla ei havaita tilastollisesti (eikä taloustieteellisessä mielessä) merkitsevää yhteyttä ulkomaalaisten yritysten läsnäolon ja yrittäjien jatkamistodennäköisyyden välillä.

Perinteisten mittareiden ongelmana lienee se, että taloudelliset vaikutukset eivät noudata riittävän tarkasti tilastojen aluejakoja. Tilanne voi olla hyvin erilainen saman alueen vastakkaisilla reunoilla ja toisaalta hyvin samanlainen vierekkäisissä kunnissa, jotka luokituksen mukaan kuitenkin ovat eri alueella. Tämä tutkimus näyttää siis tarjoavan esimerkin sellaisesta tutkimuskysymyksestä, jonka selvittämisessä Suomen monipuoliset ja kattavat rekisteriaineistot ovat hyvin arvokkaita. Tässä käytettävää lähestymistapaa määritellä työssäkäyntialueita voitaneen soveltaa myös moniin muihin tutkimuskysymyksiin. Näihin kuuluu muun muassa tuottavuusvaikutusten leviäminen alueilla.

1. Introduction

Both entrepreneurship and foreign direct investments as potential sources of economic growth have achieved a lot of attention in the public policy discussion.[1] The economic literature on the different effects and underlying mechanisms pertaining to the foreign direct investments (FDIs) is large. Entrepreneurship and self-employment have been subject to somewhat less abundant analysis. The analysis of interdependences between the entrepreneurship and the FDIs, however, has been clearly more limited.

The terms entrepreneur and self-employed are used more or less interchangeably in this study. However, at some points there is clearly a need for a more careful consideration of the interpretation of these terms. More than a half of the individuals studied here are own-account workers (self-employed people without employees). In addition, a large proportion of these persons (and their companies) are probably working in a dependent relationship with just one large enterprise. So, most of these persons and companies can hardly be seen as an important source of creativeness and competitiveness in the economy or contributors to the "true entrepreneurship" as defined by Wennekers and Thurik (1999), for instance. On the other hand, the group of entrepreneurs studied is rather heterogeneous. Our analysis indicates that there is a great deal of variation in the ways how individuals and their companies respond to the regional presence of foreign ownership. This is likely to reflect the fact that our sample also includes a notable share of "true entrepreneurs" that are screened out in this analysis. These entrepreneurs may be those who have a particularly important role in generating new economic activities and employment opportunities in the region.

The Finnish economy is an interesting case for the reason that it is every now and then claimed to be lacking foreign ownership as well as entrepreneurship. As for the foreign ownership in the last few decades, the assertion seems to lie on a solid ground. As late as in the early 1990s FDI was strictly regulated in Finland. According to a measure constructed by OECD (see Golub, 2003), Finland had in 1990 the highest level of restrictions among OECD countries after Norway and Iceland. During the 1990s the liberalization of inward foreign investments has been particularly dramatic in Portugal, France, Norway, and Finland. In Finland this change stems from a new law enacted in the deepest stage of the great depression in 1993, which abolished the essential parts of the restrictions concerning foreign ownership. Thereafter, indeed, penetration of the foreign ownership exhibited strong and sustained growth. According to the calculations by Ilmakunnas and Maliranta (2004) the employment share of foreign-owned plants in Finnish manufacturing increased from about 10 per cent to about 20 per cent in the period 1994–2001. Notwithstanding the recent upsurge, it seems that the Finnish policy still leans more on the improvement of the domestic innovation system than attracting FDIs and hoping for R&D spillovers, contrary to the Dutch or the Irish policy, for example (see e.g. Van Beers, 2004).

Whether Finland lacks entrepreneurship, the answer is not so clear. It is true that the proportion of the self-employed of the population aged 18–64 years has declined substantially in

[1] The current government of Finland has a special Entrepreneurship Policy Programme, which is aimed at fostering economic growth and employment through various projects. These projects will deal with issues such as entry, growth and internationalisation of enterprises, regional entrepreneurship and functioning of markets. The increasing significance of foreign direct investments as a source for new technology and economic growth has been recognised, for example, by Finland's Ministry of Finance (2002; 2004).

Finland since the mid-1960s (see e.g. Blanchflower, 2004). On the other hand, this tendency has been quite common among industrialized countries and reflects largely substantial decline of the agricultural sector. The proportion of the self-employed of all non-agricultural employment exhibits a much more stable pattern in Finland, and in many other OECD countries. Some decline can be found in Finland during the past ten years, which may be related to the relatively strong economic recovery that has provided many involuntary self-employed individuals an opportunity to switch to wage-earning (see Kangasharju ja Pekkala, 2002; Maliranta ja Nurmi, 2004; Poutvaara ja Tuomala, 2004). Self-employment rates are generally low across the OECD countries, and Finland is quite average in this respect.

This paper deals with two ultimate questions: Firstly, how does the presence of foreign-owned companies (hereafter FOCs) affect the number of the self-employed, and, secondly, the average characteristics of the self-employed? We deal with these questions by looking at the survival of the self-employed. To answer the first question, we analyse how the presence of FOCs in close proximity affects the risk of leaving the self-employment. In other words, do FOCs crowd out domestic entrepreneurs? To shed light on the second question, we study whether the presence of FOCs has different impacts on the entrepreneurs that are different in terms of company efficiency or absorptive capacity? Put differently, does the presence of FOCs affect the structure of entrepreneurship through cleansing a disproportional share of skilled or less-skilled entrepreneurs?

The principal method of analysis is the Cox's (1972) proportional hazards model that enables us to compare the differences in the risk of failure between entrepreneurs of different educational and family background, efficiency and income. We use an exceptionally rich linked data on individuals and their companies, which include information on entrepreneurship and the performance of the entrepreneurial companies over time. This data can be linked with different measures of the presence of the FOCs in the region, which allows us to integrate the analysis of globalisation and entrepreneurship.

This paper contributes to the literature in a number of ways. First, we construct a new measure of foreign presence in the region based on the functional region (or the travel-to-work area) of the municipality where the self-employed are located. The advantage of this measure is that it allows capturing effectively the impacts of foreign ownership within the local labor market around each self-employed individual. According to our definition, regions are typically comprised of four to six neighbouring municipalities. In addition, our preferred gauge is based on the idea that the effect of the presence of a foreign company to the self-employed is bigger when the "distance" is short. The longer the distance to the neighbouring municipality (within the same local labor market), the less weight is given to the presence of foreign companies in that municipality. For our preferred measure the weights (or "distances") are determined on the basis of the proportions of workers from different municipalities of residence. These weights are computed by using linked employer-employee data that include information on the location of both the employee and the employer.

Second, using a rich econometric framework we are able to obtain a fairly robust estimate of the effect of foreign presence on the risk of failure faced by the domestic entrepreneurs. Thirdly, this effect can be further divided into three separate competition effects based on theory, of which for the price effect and the selection effect we can find empirical support, whereas the adaption effect seems to be weaker. Finally, as a novelty, we construct a unique linked data set with a very rich information content on entrepreneurs. This data can be used in future analysis, where the effects of globalisation can be studied more extensively taking into

account various aspects of entrepreneurial performance, including productivity and labor demand. The analysis can be easily extended to estimate the effects of foreign ownership on all business sector companies.

Earlier literature includes a number of studies that deal with partly the same questions as we do, but involve important differences in many respects as well. Since linked entrepreneur-company data is rarely available, it is usually not possible to control for both the individual characteristics of the owners and the characteristics of the company. In addition, the measurement of foreign presence varies considerably. Görg and Strobl (2003) examine the impact of the foreign presence on the survival of plants. They do not, however, consider spatial effects. In addition, their analysis does not include careful control for some relevant plant-specific aspects (e.g. efficiency). Finally, while their work does not focus on micro-companies, there is no possibility or need to control for individual characteristics of the entrepreneurs behind the companies. Johansson (2000a) has controlled the effect of various individual characteristics on entrepreneurial survival. For regional effects, the local unemployment rate is investigated. However, due to the lack of linked individual-company data company characteristics are not included. Bernard and Jensen (2002) study the differences in the survival rates between U.S. multinational and domestic companies. They emphasise the need for a careful control for plant quality. Their analysis does not consider indirect effects that the presence of the foreign ownership (or multinational companies) may have on domestically-owned plants in the same geographical region, although various regional effects are carefully controlled for. Nurmi (2004) is a second example of an analysis involving a comprehensive set of characteristics that may affect plant survival in addition to an indicator for foreign ownership at the company level. The work by Haskel, Pereira and Slughter (2002) is an example of an analysis of intra-regional effects of the foreign presence. However, they focus on the productivity effects. Furthermore, the regions (the U.K is divided into 11 regions) are too broad to deal with the effects of foreign presence in close proximity. Rice and Venables (2004) find that the effect of the presence of “economic mass” is greatest within 40 minutes travel distance and the effect ceases when the distance is more than 80 minutes. Their analysis gives empirical support to our approach to gauge regional effects.

This paper is structured as follows: The second section introduces the theoretical background and the hypotheses to be tested. In the third section, the data sets used are briefly described. The fourth section illustrates the key element of the analysis, which is the measurement of the intensity of foreign presence. In section five, empirical findings concerning the determinants of entrepreneurial survival, in particular, the impact of foreign presence, are presented and discussed. Finally, section six concludes and gives some suggestions for future research.

2. Theoretical underpinnings

There is a rich theoretical literature that considers various effects that FOCs may have in the host country. Arguably the FOCs have some firm-specific assets, which enable them to use inputs more productively than an average indigenous company. The penetration of foreign ownership may entail transfer of these assets that raise the productivity levels of the acquired companies above the average local level (see e.g. Markusen, 1995). In addition, FDIs may involve knowledge spillovers that may also improve productivity among the other domestic companies in the same region and/or in the same industry (see e.g. Blomström ja Kokko, 1998).

Apart from the associated transfer of advanced technology, the penetration of the foreign ownership may affect local aggregate productivity through various competition effects. Traditionally, the analysis of the effects of competition has been based on static models and various static indicators of the intensity of competition, such as, the number of companies, concentration, advertising ratios, etc. Much of the earlier analysis is focused on price competition. Increased competition should have *a negative price effect*, which with the given efficiency and production levels will lead to lower profits and survival probability. An important mechanism, working very much in a similar way, derives from the labor markets. FOCs may increase wage level in the region, which raises competitive pressure among local companies.[2]

Recent developments in the industrial organization literature have indicated a need to follow the trails marked out by Schumpeter, Hayek and the Austrian school and to apply dynamic approaches of competition and (in)efficiency (see Baldwin, 1993; Audretsch, Baumol ja Burke, 2001). In this spirit, Boone (2001) states that aggressive interactions between companies characterize the nature of the game in a competitive environment. According to this view increased competition increases the importance of being efficient.[3] This is an essential source of industry dynamics. When considering appropriate indicators for the intensity of competition in a dynamic sense, Boone (2000; 2004) discusses different competition effects. *The selection effect* arises, when an increase in competition leads to exits of less-efficient companies (or plants) and possibly entries of more-efficient companies. *The reallocation effect* is closely related to the previous effect, but refers to the dynamics among the surviving companies. According to this view of competition, an increase in the intensity of competition should affect more positively (or less negatively) output (or input) growth among more-efficient than among less-efficient continuing companies. This would lead to productivity-enhancing restructuring at the micro-level.[4] The third effect, essentially different from the previous two, is *the adaption effect*. According to this effect, a rise in competition may induce companies to raise their productivity. This might involve innovating (among more-efficient companies), imitating or fat-trimming (among less-efficient companies). In practice, this may involve companies making efforts to adopt knowledge spillovers.[5]

Against this background, what may we expect to happen to local entrepreneurs when FOCs penetrate into the region by acquiring local companies, by expanding their current operations or by establishing new plants? Knowledge spillovers that spread through various channels (flows in regional labor markets, demonstration effects captured in the arm's-length relationships, etc.) can be expected to increase the efficiency of local entrepreneurs and thereby their

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[2] Although in this study we will focus on the self-employed that usually do not have many employees, the wage effect may play, of course, a central role in the entrepreneurial decisions.

[3] Apart from increasing competition, lower entry costs may lead to a smaller number of firms and a higher average profit rate in the market, which should not be interpreted as indications of weaker competition according to this approach.

[4] These phenomena have been studied by means of decomposing aggregate productivity growth into various micro-level sources. The between component of these methods is related to the reallocation effect of competition (see e.g. Foster, Haltiwanger ja Krizan, 2001). Exit and entry effects are related to the selection effect of competition. Positive between, entry and exit components can be interpreted as indications of mechanisms stimulated by dynamic competition. On the other hand, interpretability of the results of the different decomposition methods from the point of view of dynamic competition varies. In most methods a positive entry effect does not necessarily imply that new firms are more efficient than the current firms, as the theory by Boone (2001) predicts. This is because the productivity levels of the new firms are compared with the productivity levels of the incumbent firms in the past, which may be lower due to more general productivity growth attributable to disembodied technological change, for instance.

[5] The direction of the effect of increased competition on the firms' efforts to innovate varies between different situations (see Boone, 2001; Aghion, Bloom, Blundell, Griffith ja Howitt, 2002).

survival probability. This idea is emphasized, for example, in a study by Görg and Strobl (2003).[6] How much knowledge spillovers (or adoption effect) increase productivity and the probability of survival is dependent on the absorptive capacity of the entrepreneur. Differences in the effects between different companies (or establishments or entrepreneurs), e.g. across industries, seem to be essential here, too.[7]

Generally, increased competition in itself can be expected to lower profits and survival probabilities. Penetration of FOCs in Finnish regions was to an important extent a consequence of deregulation of the ownership in the 1990s. It can be interpreted as a reduction of entry cost and, as such, as an example of an increase in competition. According to the view advocated by Boone (2001) and some others, intensive competition should hit the hardest the least efficient entrepreneur in the market.[8] So, a drop in entry cost may have led to entries of efficient foreign-owned companies that have replaced the least-efficient local entrepreneurs.

As the work by Ilmakunnas and Maliranta (2004) has indicated, a significant proportion of entries of foreign-owned companies has taken place through acquisitions of local companies. Furthermore, the foreign-owned plants may have grown faster (or declined slower) than those owned by indigenous companies, due to the better competitiveness. Instead of being a mere indicator of a fall in entry cost, the penetration of FOCs in itself may have directly changed the nature of competition in the Finnish regional labor or product markets. The FOCs may have made the interactions between the local enterprises more aggressive, which is another way (in addition to a reduction of entry costs) through which the competition may have increased, as emphasized by Boone (2001). Appearance of FOCs may have changed the nature of competition in a comprehensive way. For example, it may have brought about a switch from Cournot to Bertrand competition or may have encouraged customers to compare prices and the quality of goods. Notwithstanding the mechanisms, the penetration of foreign-owned companies can be expected to have various important effects on the entrepreneurial dynamics in the region. However, the mechanisms may have an important role to play depending on whether the regional effects are general or industry-specific.

Above considerations provide us with various hypotheses that can be evaluated when linked entrepreneur-company data is used together with comprehensive data on economic activity and ownership of the companies and establishments.

> *Hypothesis 1*
> With a given efficiency level, increased competitive pressure associated with the penetration of foreign ownership will generally lower the chances of survival of local entrepreneurs (*the price effect*).

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[6] From the point of view of profits and survival it is essential to know, which one dominates, the negative price effect due to increased competition or the positive cost effect due to knowledge spillovers? In case of goods that can be easily traded across regions or countries, the price effect should be smaller. In other words, foreign penetration can be expected to increase survival in industries that are open to inter-regional or international trade, if the absorptive capacity effect dominates the presumably small negative price effect.

[7] Görg and Strobl (2003) find that the presence of multinational companies has had a positive impact on the survival probability of indigenous plants in high-technology industries in Ireland, whereas insignificant effects were found for indigenous plants in low-tech industries. A problem here is that the negative effect on the local producer price level may have been smaller in high-technology industries, usually open to global competition, which makes the interpretation of these findings difficult. In other words, in principle it is possible that the foreign-owned firms have had an equally positive effect on efficiency in both sectors, but a larger share of this gain has gone to customers in form of lower prices in the low-tech sector.

[8] In fact, this is the second out of four axioms that Boone (2001) asserts when considering appropriate ways of defining measures for competitive intensity.

Hypothesis 2
Increased competitive pressure associated with the penetration of foreign ownership can be expected to have the highest negative effect on the survival chances of the least efficient local entrepreneurs (*the selection effect*).[9]

Hypothesis 3
Increased competitive pressure associated with the penetration of foreign ownership can be expected to have the lowest negative (or even positive) effect on the survival chances of those skilled entrepreneurs that have the highest absorptive capacity or the highest efficiency in innovation, with a given efficiency level (*the adaption effect*).

It should be noted that in order to isolate the price effect on the survival probability it is important to control for the current efficiency level that may have just improved due to knowledge spillovers. Timing of the effect may also play an important role here. It seems highly likely that the price effect is more immediate than the adaption effect. On the other hand, the anticipated future productivity gains may have some positive effects on the current survival probability.

There may be another effect that works especially against hypothesis 3 (but possibly also against hypothesis 2). FOCs may want to recruit the most skilled entrepreneurs that are familiar with the local conditions (see e.g. Grossman, 1984; Jovanovic, 1994). Of course, those skilled entrepreneurs whose own businesses are not running particularly well and who have not much entrepreneurial aspirations may be particularly willing to accept good offers. Some local entrepreneurs may be good developers but bad managers. These individuals and the FOCs with superior management capability may be complements in local production. This insight is built in a competitive model by Holmes and Schmitz (1990), who consider the role of business transfers. Using a similar kind of reasoning, it can be argued that the entries of FOCs in a region tend to lead to an increased hazard of ownership transfer among good local entrepreneurs. It is worth noting that this may entail an increase in regional productivity also in the absence of technology transfer or competition effect. This is because FOCs may improve the efficiency of the use of existing technology by better management. They may also lift the average efficiency of local industries by expanding the scale of high-productivity entrepreneurial activities with larger financial resources and, while being impatient and having high required rate of returns, downsizing or shutting down their low-productivity activities.[10]

3. Data

The main data source used in the analysis is the **F**innish **L**ongitudinal **E**mployer-**E**mployee **D**ata (FLEED), which is constructed in Statistics Finland by linking various administrative registers. Basically the data cover all workers aged between 16 and 70 years. The individual-level data include information on various background characteristics of each individual, including the employer code and occupational status, i.e., whether the person is a wage-earner

[9] In fact, intensive competition may even have a positive effect on the profits of the very efficient entrepreneur. This is axiom 3 in Boone (2001). Consequently, the foreign penetration can even be expected to increase the survival probability of the most efficient entrepreneurs. A separate effect that works into the same direction is that the most efficient local entrepreneurs may become important subcontractors of the multinational companies.

[10] For empirical evidence, see (Bernard ja Jensen, 2002).

or self-employed.[11] As a consequence, it is possible to identify the entrepreneurs and to link the individual-level data to various company and plant-level data sets.[12] In this analysis the company and plant-level data of the Business Register (BR) of Statistics Finland are used as the main source for the company and industry characteristics. Most importantly, the FATS (Foreign AffiliaTes STatistics) data is used to calculate the measures for the presence of foreign-owned companies in each region. The FATS data includes information on the ultimate beneficiary owner (UBO). In addition, measures for efficiency can be obtained from the Financial Statements Statistics (FSS) data. The longitudinal nature and large coverage of these data sets allows following the life cycles of both entrepreneurs and their companies most reliably over the years 1994–2002.

The sample used in this analysis includes all individuals defined as self-employed in 1994 in the FLEED and having a direct link to a business sector company in the BR.[13] A direct link means that the personal identity code of the self-employed is the same as the company code, which only holds for those self-employed individuals who exercise their profession on their own account. This amounts to having 47 358 self-employed in 1994. If all the business sector entrepreneurs in the FLEED are included, the number of self-employed is 127 430.[14]

Due to the structure of the sample, i.e., having a stock sample of existing entrepreneurs instead of a flow sample of new entrepreneurs, we are faced with a left-truncation problem in the analysis. The problem arises because we exclude from our sample any company whose entrepreneurial spell ended before the last week of 1994. However, this problem can be easily handled if the birth year of each company is known. This allows us to treat the subsequent survival time of the entrepreneur as conditional on having already survived for a certain number of years. Information on company age is available from various data sources. First, there is a company age variable directly available from the Business Register. However, this age information classifies as births all the cases where a new company code emerges, which may also be due to some other reason than the actual start of operations. Second, age information may be obtained by following the companies in the BR or alternatively by following the plants of each company. In this case, the first year including information on the companies of the self-employed is 1982. The reliability and comparability of these age measures varies considerably. The age measure used is a combination of these different measures and aims at identifying the earliest possible time when the company code occurs in the data. [15] To the extent that we cannot identify the actual start-up date of the company correctly, we are faced with left-censoring, which is not easy to deal with in the Cox regression framework.

The companies of the self-employed are followed until the year 2002 using the information in the Business Register. Observations in 2002 are subject to right-censoring since the ending of the spell cannot be observed. A company is defined as having exited if it is missing from the BR data for at least two consecutive years. The identification of real exits is problematic when using the company-level data because the company code may change or disappear due to a change in

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[11] In the FLEED an individual is defined as self-employed on the basis of having insurance according to the Self-Employed Persons' Pension Act (YEL) or the Farmers' Pension Act (MYEL). A partner in a general partnership and a responsible partner in a limited partnership are considered as entrepreneurs in the law as well (see Laatunen ja Vidlund, 2003). The system is compulsory for those whose ownership in a limited liability company is more than 50 per cent.

[12] The matching properties of the data in entrepreneurship analysis are discussed in more detail in Maliranta & Nurmi (2004).

[13] The business sector includes total manufacturing (CDE), construction (F), wholesale and retail trade (G), hotels and restaurants (H), transport and communication (I), financial intermediation and insurance (J) and real estate and business services (K).

[14] Due to current problems in data matching, this analysis has to be done later.

[15] In practice, less than 10% of the entrepreneurial companies existing in 1994 have started before 1982.

the ownership structure. However, in future analysis information on bankruptcies can be linked to the data, which may be helpful in separating the true exits from the artificial ones.

4. Measurement of the intensity of foreign presence

Let us consider municipality *j*, whose establishments employ N_{jt} persons in year *t*. Each of these persons inhibits in a municipality, which is denoted by *k*. Functional region of (or travel-to-work area around) municipality *j* consists of all municipalities (*k*=1,2,...) that are a residence for some persons employed by municipality *j*.

We assume that the contribution of municipality *k* to the intensity of foreign presence faced by an entrepreneur, who operates in municipality *j* is dependent on the product of two factors: what is the labor share of the foreign-owned plants in municipality *k* and how closely municipality *k* is related to municipality *j* through labor markets. The former, the foreign share, is defined by $FSH_{tk} = N_{tk,FOR} / N_{tk}$, where $N_{tk,FOR}$ and N_{tk} is the number of workers employed in municipality *k* by foreign-owned and by all establishments in year *t*, respectively. The latter, the functional closeness, is measured by $CLOSE_{tjk} = N_{tjk} / N_{tj}$, where N_{tjk} is the number of persons who work at municipality *j* but live at municipality *k*. Of course, N_{jj} denotes the number of those workers that both work and live at municipality *j* and $\sum_k CLOSE_{tjk} = 1$ for any *j* and *t*. The intensity of foreign presence in municipality *j* is:

$$FOCPRES_{tj} = \sum_k FSH_{tk} \cdot CLOSE_{tjk} \tag{1}$$

Computation of this indicator requires access to linked employer-employee data which identifies the locations of both employers and employees. Obviously, this new measure for foreign presence is useful when analysing spillover effects prevailing within labor markets. Moreover, this indicator obtains support from those theoretical considerations that emphasise arm's-length relationships for technological diffusion between companies. Travel-to-work areas may be sometimes suitable for describing interactions between companies within product markets. This is likely to be the case in most service industries and also in some manufacturing industries. On the other hand, in those industries that are extensively exposed to global competition interrelationships between local companies through product market competition are much weaker. In these cases broader definitions of area might work relatively better. Of course, linked user-producer data equipped with location information would be more ideal for analysing the effects within product markets.

The computation of our indicator is illustrated by the following hypothetical example:

Let us consider municipality *j* that locates in the middle and nine other municipalities that are located at a close proximity to it. The table below indicates the number of jobs in the establishments of each municipality (30 persons work in the municipality *j* in the middle).

500	20	1000
1000	30	40
1	2	25

The following table indicates how the workers of municipality *j* are distributed according to their municipality of residence.

4	3	1
3	10	1
3	3	2

So, 10 out of 30 employees live and work at municipality *j* and the remaining 20 travel from surrounding 8 municipalities to work in municipality *j*.

The distribution of the proportions (i.e. $CLOSE_{tjk}$) is given below.

13.3 %	10.0 %	3.3 %
10.0 %	33.3 %	3.3 %
10.0 %	10.0 %	6.7 %

Next we consider the intensity of the foreign presence, which is dependent on the labor share of the foreign-owned establishments (*FSH*) in the municipalities. There are 18 jobs in the foreign-owned establishments in the municipality *j* in the middle of the table, which is 60 percent of all jobs in the municipality.

20.0 %	10.0 %	90.0 %
30.0 %	60.0 %	20.0 %
30.0 %	20.0 %	40.0 %

Calculating from these tables we find that for the municipality *j* in the middle the value of the FOCPRES variable is .38. It is clearly less than the corresponding labor share of the FOCs. The reason for this is that some of the effect originating from municipality *j* is "spread" over the neighboring municipalities.

A great advantage of this indicator is that we do not need to assume that the competitive pressure on the entrepreneurs is similar in the different parts of the same broad region. For instance, we could use a universal foreign intensity for each cell of the table that is about .51 in this example.

In order to compare the strength of this measure relative to other alternatives, or to test the robustness of our empirical findings regarding the effects of the presence of foreign ownership, we will experiment with different alternative indicators in the econometric analysis. Alternative indicators vary in respect to the definition of weights and the boarders of regions.

Our favorite candidate for a useful indicator of the intensity of foreign presence is denoted by FOCPRES. We have first computed the labor share of the foreign-owned companies for each municipality by using the comprehensive Business Register data and the FATS data. By using these figures, the FOCPRES indicator for each municipality is then computed as a weighted average of the foreign labor share in that municipality and its surrounding municipalities. For calculating FPGROUP, municipality groups are defined separately for each "central municipality" and then the aggregate labor share of the foreign-owned companies in that municipality group is calculated. In other words, now it is assumed that each job provided by a FOC has an equal weight irrespective of the location within the municipality group. The variables FPNUTS3 and FPNUTS4 are more traditional indicators. They indicate the labor share of the FOCs in the region defined by the NUTS 3 and NUTS4 classification, respectively.

Figure 1 illustrates the geographical distribution of the FOCPRES indicator in years 1994 and 2001. Furthermore, the figure indicates in which parts of Finland the change has been the

strongest. We note that the presence of the foreign ownership used to be quite focused on the southern and northwest parts. Deregulation of the foreign ownership seems to have led to a substantial increase in the foreign presence in many parts around the whole Finland. At the turn of the millennium geographical distribution of the foreign presence was quite scattered and there seems to be a lot of variation between municipalities within broader regions.

Table 1 provides descriptive statistics of the FOCPRES variable. The average value has more than doubled from 6.4% to 15.1% from 1994 to 2002. There is a lot of variation between municipalities and variation seems to have increased to some extent over time (in absolute terms). In summary, the intensity of the foreign presence seems to have varied considerably between entrepreneurs in different times and in different locations. In the next section, we will examine how the foreign ownership is reflected in the survival probabilities.

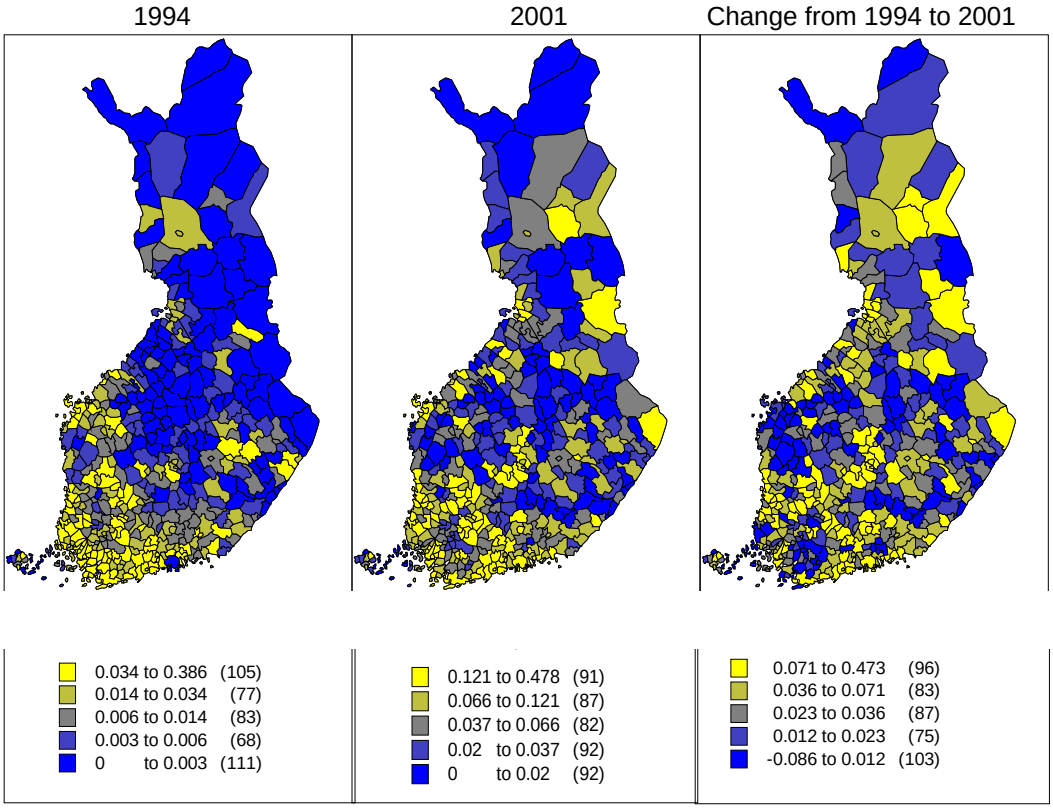

Figure 1. Regional distribution of the FOCPRES indicator

Table 1. Descriptive statistics for the FOCPRES indicator

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002
Average, % (*)	6.4	6.9	8.0	9.0	11.3	12.5	13.6	13.9	15.1
1.st quartile, % (*)	2.3	2.4	4.1	4.6	6.5	8.1	9.3	9.6	10.4
Median, % (*)	6.0	6.1	6.9	9.7	11.3	12.9	13.7	15.9	15.9
3rd quartile, % (*)	10.6	11.2	12.6	13.5	16.8	18.0	19.5	18.9	21.2
Standard deviation, % (*)	4.9	5.0	5.1	5.1	5.8	6.0	6.1	6.0	6.3
P75-P25 differential, % (*)	8.4	8.8	8.5	8.8	10.3	9.9	10.3	9.3	10.8
Number of municipalities	455	455	455	452	452	452	452	448	448
Number of employees (millions)	1.05	1.09	1.12	1.18	1.23	1.27	1.30	1.32	1.32

Note: (*) computed with employment weights.

5. Foreign presence and entrepreneurial survival

5.1. Estimation of hazards

In the survival analysis we use the Cox's (1972) semi-parametric proportional hazards model, which is a popular method in the analysis of firm survival, because it is a reasonable compromise between the non-parametric Kaplan-Meier estimator and the highly-structured parametric models. It specifies a regression model with a specific functional form but no exact form of the distribution of event times, or the baseline hazard function. This is appropriate for our purposes, as our main interest is not in the estimation of the underlying baseline hazard but in the effect of the foreign presence on entrepreneurial survival. The Cox regression model can be formally expressed as follows:

$$h(t) = h_0(t)\exp(x'\beta)$$

where the hazard rate, $h(t)$, is the conditional probability that a plant exits during the period $t + \Delta$ given that it has survived until time t, i.e., it measures the risk of failure for a plant during the next year. $h_0(t)$ is the baseline hazard function at time t, which is estimated when all of the explanatory variables are set to zero, and β is a vector of regression parameters. The model can be estimated using the partial likelihood approach suggested by Cox. A negative (positive) coefficient indicates that the risk of failure at a moment in time is reduced (increased). In the presence of left-truncation, the Cox partial likelihood estimates based on a modified definition of risk sets are consistent if the left-truncation is conditionally independent of the failure process given the covariates.

5.2. Estimating the determinants of entrepreneurial survival

A wide variety of explanatory variables are used in our empirical analysis. The focus of interest is the intensity of foreign presence that is measured using alternative indicators described in Section 4 and Table 2 below.

As the literature reviewed in Section 2 suggests, both the efficiency and the absorptive capacity of the entrepreneur can be expected to play an important role in the way the penetration of the foreign ownership affects survival. In the absence of an ideal gauge for efficiency we experiment with different alternatives. We use labor productivity measure (lnLP) that is the log of value added per person engaged. Employees are measured in full-time equivalent units, but we assume that the entrepreneur herself provides a full-time contribution. The second alternative is the log of the ratio of operating margin to sales (lnOPMARG) and the third is the log of return on total assets (lnROA). We believe these indicators may serve reasonably well as measures of efficiency especially when industry, region and other factors are carefully controlled for.

For measuring absorptive capacity we have some alternatives as well. The educational level is probably the most promising candidate. It may be argued that education in "technical fields" is particularly valuable in this respect. This may well be the case when technological knowledge is defined narrowly. On the other hand, productivity-improving knowledge, which is basically of our interest here, is comprised of a broad variety of skills.

In addition, we control for various characteristics of the self-employed, the company and the business environment. According to earlier studies on self-employment duration, background characteristics of the self-employed, including sex, age, family characteristics, house ownership, educational background and income, are found to be important determinants of survival. It is also possible to obtain information on the spouse's income. Besides the efficiency vari-

ables discussed above, company characteristics include size, measured by the log of the number of employees (lnSIZE).[16]

It is also important to control for other characteristics of the business environment in addition to foreign penetration. At the regional level, we control for the quality of the potential labor force available to entrepreneurs by including in the estimations the average age and the average education in the region. Higher average age may also approximate for a more static business environment. As indicators of macroeconomic environment, we use annual change in the real gross domestic product and regional unemployment rate. We also use various static indicators of competition. Industry structure is described by lnMES, which is defined as the log of industry median employment following Sutton (1991), concentration, measured by the Herfindahl index, and the employment share of companies with exports and/or imports. Table 2 gives the variable definitions and some summary statistics using data for 2001. Variables with the ending '94' are treated as time-invariant and their measurement is based on the 1994 values.

Table 2. Sample description

Variable	*Description*	*N*	*Mean*
Characteristics of the self-employed			
SEX94	Sex in 1994, man=1	301326	0.807
AGE941-3	Age in 1994, =1 if less than 30 (ref.), =2 if 31–45, =3 if more than 45	301326	43.772
MARRIED94	Marital status in 1994, married or cohabiting=1	301326	0.702
UNDER1894	Number of children under 18 years in 1994	296299	0.923
HOWNER94	Owns a house or an apartment=1 in 1994	301326	0.851
EDUC941-3	Number of schooling years in 1994, =1 if less than 9 (ref.), =2 if 10–12, =3 if more than 12	301326	10.522
TECH94	Technical education=1 in 1994	301326	0.004
INCOME1-3	Income, according to the 33rd and 67th percentiles of wage and entrepreneurial earnings	283078	106513.5
SPINCOME	Spouse's income, =1 if over the median (if no spouse, spouse's income=0)	298765	57148.3
Characteristics of the company			
lnSIZE	Size of the company, log of employment, using the BR	294019	-0.323
lnOPMARG	Log(ratio of operating margin to sales)	276838	-1.127
lnLP	Log(ratio of value added to the number of person engaged, in full-time equivalent units)	282491	9.420
lnROA	Log(return on total assets = (net income + financial expenses + taxes)/ assets, %)	211798	4.282
Characteristics of the business environment			
FOCPRES	Intensity of foreign presence, surrounding municipalities using person weights and the BR workers	293119	0.075
FPGROUP	Foreign penetration, using municipality groups	293119	0.110
FPNUTS3	Foreign share, using NUTS 3 level and the BR workers	293119	0.089
FPNUTS4	Foreign share, using NUTS 4 level and the BR workers	293119	0.082
REGAGE	Average age in the region (NUTS 4)	293119	42.135
REGEDUC	Average number of schooling years in the region (NUTS 4)	293119	11.036
REGUNEMP	Regional unemployment rate, % (NUTS 3)	280800	13.161
TRADEEXP	Employment in companies with exports and/or imports in relation to the total employment in the industry (3-digit SIC 1995)	295905	0.250
lnMES	Log of median size in the industry (3-digit SIC 1995)	295887	0.013
HERIND	Herfindahl index according to sales (3-digit SIC 1995)	295859	0.031
GDP	Annual change in the real gross domestic product	301326	0.039
NUTS4_	Regional dummies, 82 regions	293119	
STAN_	Industry dummies, 31 industries	296187	

Note: For categorical variables the mean is based on the continuous variable.

[16] Company size includes both the entrepreneurial and salaried labor. The average entrepreneurial company has 0.72 employees, which reflects the fact that 57.7% of the entrepreneurs do not have any hired employees.

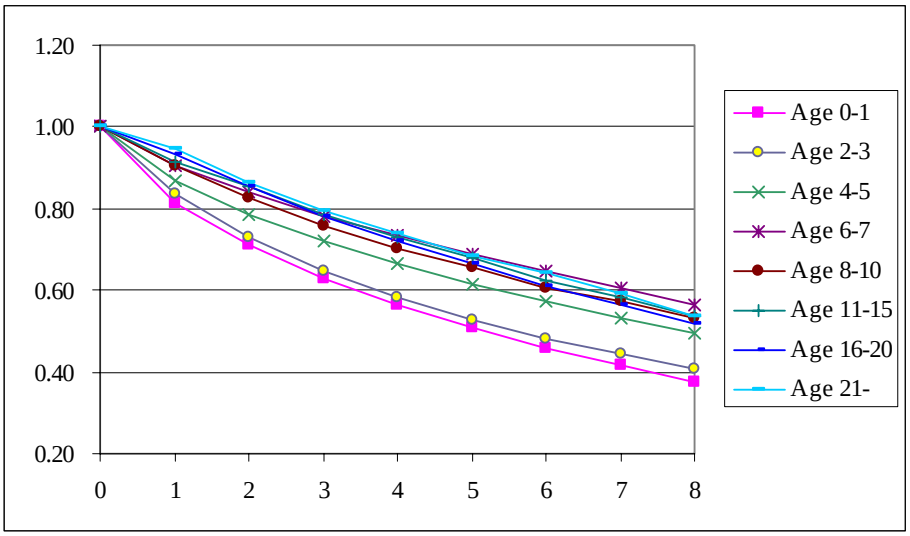

Figure 2. Cumulative rates of survival by company age category

Figure 2 illustrates the differences in survival between different-aged entrepreneurial companies after 1994 when age is defined according to year 1994. It seems that the share of continuing companies declines the fastest in the two lowest age categories, especially during the first few years. The pattern of survival for companies aged 4–5 years in 1994 also deviates from the rest. It should be noted, however, that the youngest companies are born just prior to recession or during the recession, when the business environment was quite different. Older, more experienced companies face better survival prospects, which speaks in favour of the life-cycle effect often observed in the literature (e.g Baldwin, Bian, Dupuy ja Gellatly, 2000).

Table 3 shows the estimation results for the self-employed in 1994 using the information from the BR data on the life cycle of their companies. The results reveal that the effect of the individual background characteristics on survival is very essential. According to Model (1) female entrepreneurs are exposed to a larger risk of failure than the males. More precisely, the hazard for a male entrepreneur is exp(-0.112) = 0.89 times the hazard for a female entrepreneur. A comparison with Model (3), (4) and (5) indicates here the need to control for the profitability (or efficiency) of entrepreneurial activities. When operating margin to sales ratio, labor productivity, or return on total assets is included the effect of gender on the hazard rate drops substantially. Young entrepreneurs have a high hazard rate. Being married or cohabiting or having children less than 18 years also increases the risk of failure, although the effect of children is statistically insignificant. These results may refer to the effect of a higher risk aversion among older entrepreneurs who have family. When the opportunity arrives, they may be more willing to switch to a more secure wage job. In addition, older self-employed persons are more likely to exit due to early retirement and age-related illnesses.

The risk of failure is lower for those entrepreneurs that own a house or an apartment, which may be an indication of having more personal wealth and thus better conditions for entrepreneurship.[17] High education decreases the failure risk.[18] Technical orientation of the studies does not seem to matter much. The effect of income is highly non-linear: exit rates are high at both ends of income distribution. Comparisons between the results of different models in Table 3 indicate that it is important to take into account the economic performance of an entre-

[17] Johansson (2000b) provides Finnish empirical evidence that wealth increases the probability that an individual makes a transition from wage-earning to self-employment.

[18] Kangasharju and Pekkala (2002) find that the effect of schooling strongly depends on the phase of the business cycle.

preneur's company as well. The relative hazard rates of the high-income and medium-income entrepreneurs increase, when labor productivity (Model (3)) or the operating margin ratio (Model (4)) is being controlled for. This may be related to the fact that the distinction between the incomes of the entrepreneurial individual and her company is not very clear. The spouse's income has a favourable effect on survival. The effect of company size on the conditional probability of exit corresponds to the earlier results (e.g. Mata, Portugal ja Guimaraes, 1995). To give an example, a 10% increase in size decreases the risk of failure by around 5%.

We also control for industry size, concentration and international involvement, which have expected signs. Higher optimal size in the industry increases the cost disadvantage faced by the sub-optimal companies, which may decrease their chances of survival. As emphasised by Boone (2001), higher concentration may be partly due to the existence of more aggressive interactions between companies, so it is not surprising to find that it is related to a reduced probability of survival of entrepreneurs. Some, but not very robust, evidence is found that higher international involvement in import and/or export markets makes the industry more open to competition, which deteriorates the chances of survival.[19]

Variables describing the quality of human capital in the region give some indication that the effect of highly-educated and more experienced, approximated by age, work force on the risk of failure is negative. This may give some indication that the availability of skilled workers may be important in entrepreneurial success. A decrease in the regional unemployment rate seems to increase the hazard rate. This is in line with the prediction that unemployment forces some persons to choose entrepreneurship and when the chances for finding a job increase, these entrepreneurs will shut down their businesses. Improvement in the macroeconomic conditions measured by the growth in GDP might have an opposite effect through improved demand conditions. However, according to the results, higher economic growth also increases the probability of quitting entrepreneurship.

5.3. The effects of the presence of foreign-owned companies

After commenting briefly some findings pertaining to various background factors we next turn to the main questions of this study: How does the proximity of the foreign-owned companies affect the survival of entrepreneurs and are there differences in the effects among heterogeneous local entrepreneurs?

Do foreign companies crowd out local entrepreneurs?

Models with somewhat varying controls of other factors indicate that the intensity of foreign presence is highly positive and significant, as expected. Model (2) includes the lags of foreign penetration, because the effect of foreign entries is likely to affect survival with a few years' lag. It seems that the short-run effects are positive, whereas the longer lags are negative. However, when these lags are included separately, they turn out to be insignificant. According to Model (1), which does not include a control for the efficiency, the effect of foreign-owned companies seems to be reasonably similar to those in Models (3) – (5), which include efficiency controls. Inclusion of financial indicators drops the number of observations because this information is missing for some entrepreneurs in our linked data. Some observations are dropped due to trying to take logs of negative values.[20]

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[19] It should be noted that we have controlled for general industry effects by dummies.

[20] The effect of foreign-owned firms in Model (1) does not change significantly when the estimation is carried out with the same sample as in Model (3).

Table 3. Estimation results for the self-employed existing in 1994

	(1)	(2)	(3)	(4)	(5)	(6)
SEX94	-0.112	-0.231	-0.044	-0.055	-0.052	0.017
	(0.021)***	(0.028)***	(0.023)**	(0.023)**	(0.026)**	(0.058)
AGE942	-0.252	-0.348	-0.257	-0.259	-0.275	-0.314
	(0.026)***	(0.035)***	(0.027)***	(0.028)***	(0.031)***	(0.056)***
AGE943	-0.184	-0.206	-0.182	-0.180	-0.232	-0.263
	(0.028)***	(0.037)***	(0.029)***	(0.030)***	(0.033)***	(0.070)***
MARRIED94	0.076	0.119	0.079	0.076	0.042	0.054
	(0.018)***	(0.025)***	(0.019)***	(0.020)***	(0.023)*	(0.054)
UNDER1894	0.005	-0.001	0.003	0.004	0.016	0.037
	(0.007)	(0.010)	(0.008)	(0.008)	(0.009)*	(0.020)*
HOWNER94	-0.270	-0.197	-0.270	-0.280	-0.253	-0.207
	(0.020)***	(0.028)***	(0.021)***	(0.021)***	(0.024)***	(0.052)***
EDUC942	-0.136	-0.140	-0.137	-0.133	-0.137	-0.075
	(0.016)***	(0.022)***	(0.017)***	(0.018)***	(0.020)***	(0.051)
EDUC943	-0.177	-0.173	-0.150	-0.170	-0.184	-0.025
	(0.034)***	(0.047)***	(0.036)***	(0.037)***	(0.042)***	(0.082)
TECH94	0.009	-0.030	-0.029	-0.040	0.026	0.320
	(0.115)	(0.158)	(0.124)	(0.128)	(0.146)	(0.272)
INCOME32	-0.215	-0.205	-0.083	-0.075	-0.241	0.035
	(0.019)***	(0.025)***	(0.021)***	(0.021)***	(0.024)***	(0.057)
INCOME33	0.159	0.241	0.372	0.367	0.125	0.373
	(0.020)***	(0.026)***	(0.023)***	(0.022)***	(0.026)***	(0.064)***
SPINCOME	-0.179	-0.173	-0.181	-0.177	-0.161	-0.039
	(0.016)***	(0.022)***	(0.017)***	(0.017)***	(0.020)***	(0.049)
SIZE	-0.451	-0.553	-0.345	-0.540	-0.388	-0.295
	(0.010)***	(0.014)***	(0.012)***	(0.011)***	(0.012)***	(0.030)***
REGAGE	-0.188	-0.308	-0.171	-0.210	-0.240	0.110
	(0.018)***	(0.026)***	(0.019)***	(0.020)***	(0.022)***	(0.149)
REGEDUC	-1.735	-2.835	-1.908	-1.694	-1.954	-0.866
	(0.160)***	(0.251)***	(0.170)***	(0.173)***	(0.199)***	(1.268)
REGUNEMP	-0.076	-0.110	-0.076	-0.078	-0.067	0.094
	(0.008)***	(0.011)***	(0.009)***	(0.009)***	(0.010)***	(0.029)***
TRADEEXP	0.031	0.253	0.024	-0.143	-0.087	0.014
	(0.046)	(0.074)***	(0.049)	(0.050)***	(0.056)	(0.148)
lnMES	0.398	0.486	0.350	0.304	0.328	0.154
	(0.023)***	(0.033)***	(0.025)***	(0.026)***	(0.028)***	(0.068)**
HERIND	0.414	0.292	0.504	0.470	0.602	0.513
	(0.117)***	(0.153)*	(0.124)***	(0.127)***	(0.142)***	(0.330)
GDP	3.908	2.403	2.490	4.074	5.454	-19.523
	(0.695)***	(0.944)**	(0.738)***	(0.751)***	(0.860)***	(10.439)*
FOCPRES	0.503	0.296	0.607	0.596	0.334	0.720
	(0.213)**	(0.456)	(0.224)***	(0.228)***	(0.267)	(0.684)
FOCPRES(t-1)		1.394				
		(0.607)**				
FOCPRES(t-2)		-1.119				
		(0.506)**				
lnLP			-0.267			-0.249
			(0.012)***			(0.033)***
lnOPMARG				-0.275		
				(0.011)***		
lnROA					0.001	
					(0.008)	
N of plants	43150	34386	42644	42353	35834	4239
N of observations	264597	181261	254847	251343	193416	21350
Log likelihood	-172044.2	-95656.5	-153929.1	-148633.6	-110563.0	-16533.9
LR statistic	4770.2***	3519.5***	4536.5***	4711.1***	2870.5***	586.1***

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Note: Other variables included in the models but not reported in the table include industry dummies at the 2-digit or combined 2-digit level (31 groups) and regional dummies at the NUTS4 level (82 groups).

The robustness of this measure is further tested in Table 4, where alternative definitions of foreign penetration are used for estimating our preferred model, which is Model (3). We find that the most significant effect is obtained with our preferred indicator FOCPRES. Indicator FPGROUP also shows strong effects but standard errors are much larger, which renders the effect statistically insignificant. These findings give support to the idea that it is important to take into account the geographical distances and that our way of doing this by using labor share weights seems to be effective. When the intensity of foreign presence is measured at a rough NUTS 3 level the coefficient estimates turn out be negative, and the standard errors are very large. This may have something to do with the fact that the competitive pressure faced by an entrepreneur varies between different parts of the broad areas. On the other hand, even broader regional classifications have been used in the literature to capture various spatial effects. For example, Haskel, Pereira and Slaughter (2002) distinguish 11 regions in the U.K. when they try to measure regional spillover effects of the foreign presence on productivity of domestic plants, but fail to find them. The use of more detailed regional classification does not seem to solve the problems either. Obviously, an entrepreneur in a certain NUTS 4 region may be affected to some extent by the intensity of foreign presence in neighbouring regions, which disturbs the identification of the effects in the estimations.

To summarize, we find the strongest effects of regional foreign penetration to prevail within the travel-to-work distance of each entrepreneur. These regions typically consist of four to six municipalities and their diameter is roughly 100 kilometres. Furthermore, the results show that it is useful to give less weight to the foreign presence in the periphery parts of the region around each entrepreneur.

We have also studied the robustness of our findings by adding and dropping industry and region dummies and experimenting with different classifications.[21] Not surprisingly, a general finding was that the impact of our foreign presence variables tends to be clearly stronger when controls for industry or region are excluded. Put differently, the reported results can be regarded as conservative estimates.

Table 4. A comparison of alternative indicators for the intensity of the foreign presence

INDICATOR	*FOCPRES*	*FPGROUP*	*FPNUTS4*	*FPNUTS3*
	0.607	0.488	-0.088	-0.299
	(0.224)***	(0.370)	(0.416)	(0.689)
N of observations	254847	254847	254847	254847

Note: Estimations are made by using Model (3) of Table 3.

Since the age measure for continuing entrepreneurs is not entirely reliable, we re-estimate Model (3) using only the cohort of new entrepreneurs in 1994. These are entrepreneurial companies that do not appear in the BR data during the two previous years. Table 3 shows that the coefficient estimate for the foreign presence in Model (6) with entrants only is quite close to the one with all incumbents in Model (3), but a smaller number of observations renders standard errors larger and statistical significance lower. Furthermore, this subgroup of entrepreneurs may be affected by rather different characteristics than the incumbents. To obtain more accurate estimates for a single cohort we might need to use a less comprehensive set of controls for other factors.

[21] These results are not reported in Table 3 but are available upon request from authors.

Do foreign-owned companies make competition more selective?

Models in Table 5.a, 5.b and 6 have basically the same set of different background variables as the model (1) in Table 3, but now we also include some interaction variables in order to study whether the foreign presence has varying effects among heterogeneous entrepreneurs. Only the results pertaining to this issue are reported in these tables.

In Table 5.a we use four alternative indicators for efficiency. All of these indicators, except the one measuring the rate of return to assets, have a statistically significant negative interaction effect, which gives empirical support to our second hypothesis that the foreign presence has a selection effect that favors the survival of the efficient entrepreneurs. So, generally high efficiency protects the company, but it provides a particularly effective safeguard when the presence of FOCs is intensive.

In order to tackle possible non-linear patterns, we have repeated the analysis by classifying the entrepreneurs into three groups according to their efficiency (Table 5.b). The groups are defined for each industry separately in each year so that the entrepreneur shares of the groups are one third. This approach also provides us with somewhat more easily interpretable results.

Table 5.a The role of efficiency

Efficiency measured by...	... labor productivity	...operating margin	...rate of return to assets	...income
Foreign presence	10.041	0.136	0.808	3.351
	(1.314)***	(0.282)	(0.570)	(1.254)***
Efficiency	-0.196	-0.250	0.009	0.003
	(0.016)***	(0.014)***	(0.011)	(0.011)
Interaction	-1.029	-0.377	-0.110	-0.253
	(0.142)***	(0.134)***	(0.117)	(0.111)**
N of observations	254847	251343	193416	264597

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

Table 5.b The effect of the foreign presence in different efficiency groups

Efficiency measured by...	...labor productivity	...operating margin	...rate of return to assets	...income
Foreign presence	1.599	0.566	0.763	1.063
	(0.252)***	(0.271)**	(0.310)**	(0.257)***
For low group	reference	reference	reference	reference
For middle group	-1.054	0.148	-0.344	-0.470
	(0.306)***	(0.305)	(0.359)	(0.304)
For high group	-2.618	-0.066	-0.742	-1.436
	(0.313)***	(0.307)	(0.350)**	(0.295)***
Level				
For low group	reference	reference	reference	Reference
For middle group	-0.428	-0.474	-0.319	-0.184
	(0.031)***	(0.029)***	(0.033)***	(0.028)***
For high group	-0.275	-0.582	-0.261	0.265
	(0.035)***	(0.030)***	(0.034)***	(0.029)***
N of observations	258086	257567	201799	264597

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.
Note: The number of observations differs from Table 5.a because the division to three efficiency groups is not based on logarithmic values.

The reference group is the least efficient entrepreneurs. Again we obtain evidence supporting our selection effect hypothesis with three out of four indicators. Only exception here appears to be the operating margin ratio.

We find that the presence of the FOCs has a strong negative effect on the survival probability of the low-productivity entrepreneurs. We find that a 10 percentage points larger intensity of the foreign presence implies a 1.17 (exp(1.599*10%) times larger hazard rate among the lowest third in labor productivity. In the middle third the respective number is 1.06 (exp((1.599-1.054)*10%), but in the highest third the number is 0.90. Although there seems to be a substantial amount of productivity-based selection between entrepreneurs also without the presence of the FOCs, foreign penetration seems to stimulate selection considerably in the neighbourhood.

Next we consider our third hypothesis according to which the effect of the presence of the FOCs is dependent on the absorptive capacity of the entrepreneur. The effects of foreign presence in the different groups of entrepreneurs are studied in Table 6. We have included interactions both for absorptive capacity and labor productivity, which was found to be a suitable measure for efficiency.[22]

The reference group is the entrepreneurs with low labor productivity and low absorptive capacity. We find that these entrepreneurs are very vulnerable to the presence of the FOCs in the close proximity. According to these models, increased education does not make these entrepreneurs less sensitive, but increased efficiency does. Neither have we found statistically significant evidence that technical education decreases vulnerability. However, we find that medium-aged entrepreneurs are less sensitive to the changes in the presence of the FOCs than younger ones. Whether this could be interpreted as an evidence of greater absorptive capacity is not, of course, quite clear.

In the fourth model we have taken an approach similar to the one by Görg and Strobl (2003). The entrepreneurs are split into three groups according to the technological intensity of the industry. Grouping is performed by using OECD classifications (see OECD, 2003).[23] As an exception, the manufacture of pulp, paper and paper products is transferred into a higher category due to its exceptional nature in Finland (see Virtaharju ja Åkerblom, 1993). The results of the last column show no statistically significant differences in the effects of foreign presence between high and low-tech industries. When grouping on international openness, measured by the ratio of total trade to total output plus imports, was also included, the results for technological level did not change notably and interactions with openness were also statistically insignificant indicating that the effects of foreign penetration do not depend on the trade intensity of the industry.

[22] We have estimated these models also without the controls for efficiency interaction effects (not reported here), but the results for absorptive capacity were basically the same.

[23] Since the classification by technological intensity is time-invariant, the levels for different groups are excluded from the model. If industry dummies are excluded instead, technology dummies turn out to be insignificant.

Table 6. The role of absorptive capacity

Absorptive capacity measured by...	...educational levels	...educational field	...age	...technological level of the industry
Foreign presence	1.606	1.600	2.323	1.643
	(0.284)***	(0.252)***	(0.433)***	(0.256)***
For low group	reference	reference	reference	reference
For middle group	0.008		-1.149	-0.288
	(0.264)		(0.422)***	(0.355)
For high group	-0.209	-0.218	-0.538	-1.397
	(0.523)	(2.028)	(0.419)	(2.457)
For low productivity group	reference	reference	reference	reference
For middle productivity group	-1.056	-1.055	-1.024	-1.059
	(0.306)***	(0.306)***	(0.306)***	(0.306)***
For high productivity group	-2.611	-2.618	-2.567	-2.626
	(0.314)***	(0.313)***	(0.314)***	(0.313)***
Level				
For low group	reference	reference	reference	
For middle group	-0.133		-0.180	
	(0.025)***		(0.039)***	
For high group	-0.151	-0.027	-0.159	
	(0.057)***	(0.197)	(0.041)***	
For low productivity group	reference	reference	reference	reference
For middle productivity group	-0.428	-0.428	-0.430	-0.428
	(0.031)***	(0.031)***	(0.031)***	(0.031)***
For high productivity group	-0.276	-0.275	-0.278	-0.274
	(0.035)***	(0.035)***	(0.035)***	(0.035)***
N of observations	236823	236823	236823	258086

Standard errors in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1%.

6. Conclusions

Our empirical evidence for Finland indicates that the penetration of the FOCs has a great impact on the nature of competition in the region. In particular, we find that the importance of being an efficient entrepreneur increases in a both statistically and economically significant way. The penetration of the FOCs leads to the destruction of inefficient companies of the self-employed, but may even increase survival probabilities among the most efficient ones. The latter ones might be described as “true entrepreneurs”. In other words, the FDIs can be seen as a source of “creative destruction” (or productivity-enhancing restructuring) applicable to those industries that are not easily exposed to competitive pressure through foreign trade (see Melitz, 2003).

Earlier empirical findings for Finland suggest that productivity-enhancing restructuring at the plant level has been substantially less intensive in the service sector than in manufacturing industries (Maliranta, 2003). This explains why Finland has higher positions in the international comparisons of the productivity levels in manufacturing than in services (see Mankinen, Rouvinen ja Ylä-Anttila, 2002). Our findings indicate that apart from being potentially

important for technological diffusion in the host regions the FOCs may also contribute to productivity in industries and regions by turning the economic environment more competitive in a dynamic sense. Consequently FDIs may be even more desirable in services than in manufacturing. In addition, the recent literature suggests that this may be crucial for the incentives of the local companies to innovate (Boone, 2000; Aghion ym., 2002).

In future research, this analysis can be extended in a number of ways. Firstly, after some further developments of the data, the effects of foreign presence can be estimated using a larger sample of entrepreneurs or the total population of business sector companies. Secondly, in addition to survival, various aspects of the business performance can be studied, for example, the impact of the FOCs on productivity, technological adoption, innovation and employment growth (conditional on survival) of the domestic companies. Thirdly, Finnish data provide some possibilities to study how the presence of the FOCs affects regional producer price levels. This kind of analysis would be highly useful from the point of view of assessing reliability of the findings concerning productivity spillovers, for instance. Finally, a complementary approach, which looks at the entry side of the entrepreneurship, is also left for future work.

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