ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Yalcin, Erdal; Sala, Davide

Conference Paper

The Role of Management in the Internationalization Process of a Firm

Beiträge zur Jahrestagung des Vereins für Socialpolitik 2011: Die Ordnung der Weltwirtschaft: Lektionen aus der Krise - Session: Multinational Firms, No. C5-V1

Provided in Cooperation with:
Verein für Socialpolitik / German Economic Association

Suggested Citation: Yalcin, Erdal; Sala, Davide (2011) : The Role of Management in the Internationalization Process of a Firm, Beiträge zur Jahrestagung des Vereins für Socialpolitik 2011: Die Ordnung der Weltwirtschaft: Lektionen aus der Krise - Session: Multinational Firms, No. C5-V1, ZBW - Deutsche Zentralbibliothek für Wirtschaftswissenschaften, Leibniz-Informationszentrum Wirtschaft

This Version is available at:
https://hdl.handle.net/10419/48706

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

The Role of Management in the Internationalization Process of a Firm

Davide Sala* Erdal Yalcin**

February 14, 2011

In this paper we are able to analyze firms' entry decision into the export market. In contrast to previous studies it is possible to control for the effects of management characteristics and human capital variables, besides commonly used firm characteristics. We first motivate our empirical strategy by presenting a theoretical partial equilibrium model which accounts for management characteristics as an input factor. Applying an empirical strategy suggested by Chamberlain (1980) we are able to affirm the robustness of firm productivity and fixed costs as explaining variables for export decisions. Unobserved heterogeneity turns out to be systematically related to management characteristics, in particular management knowhow. By reducing the sample only to firms which enter the export market during the considered period, the type of management promotion (internal promotion opposed to e.g. external promotion) is identified to increase the likeliness of exporting.

JEL: F21, F23, L23, L25
Key Words: Export Decision, Internationalization, Management, Productivity.

* Department of Economics, Aarhus School of Business, Aarhus University, Denmark. E-mail: dsala@asb.dk.

** **Corresponding author:** Erdal Yalcin, ifo Institute for Economic Research, International Trade Department, Poschinger Str. 5, 81679 Munich, Germany. E-mail: yalcin@ifo.de

Acknowledgement: Erdal Yalcin thanks Aarhus University for hosting him while working on this paper.

1. Introduction

Empirical observations in the 90s based on newly available microeconomic datasets initiated a strong focus on individual firm behavior. In particular, researchers attempted to identify the driving forces behind the internationalization process - herein the export behavior - of firms. These developments have been accompanied by theoretical developments (Hopenhayn, 1992; Melitz, 2003) providing a foundation for explaining firms' self-selection into domestic and foreign markets. Within this strand of literature, heterogeneity in firm embedded productivity and accruing fixed costs for exporting are crucial characteristics deciding on whether firms start to export. Recent empirical contributions (see e.g. Wagner, 2007) have confirmed the importance of productivity and further firm specific aspects which shape a firm's decision on exporting. Today, it is well established that on a narrow industry level exporters perform differently in several dimensions compared to solely domestic firms. Bernard and Jensen (1995, 1997, 2004) are able to show that exporters significantly differ from non-exporters in their productivity (value-added over employee), firm size, share of white-collar workers, level of average wages, et cetera. Therefore, the described *self-selection hypothesis* has been established solid as a rock.

Given these insights still it is a long way to go to understand how firms internationalize. Within the business literature researchers insist that internationalization is a complex process evolving over time , which has to be guided and it is pointed out that for this reason the management in charge needs to be accounted for (Dicken, 1992). Differently, a firm's management needs to be willing to be exposed to export related problems.

From a theoretical point of view the importance of a management as a specific input factor has been already discussed by Lucas (1978). On the other hand, empirical research analyzing management characteristics and export behavior is rare and predominantly confined to general firm performance analyses. Furthermore, it is simply the unavailability of commensurate data.

Since the strand of literature in international economics predominantly analyzes the export decision of domestic firms based on the mentioned firm characteristics, so far management specific aspects are missed out.

With this paper we intend to overcome the described shortcomings by first presenting a simple theoretical model in which the management plays a role for a firm's internationalization process following Lucas (1978). Additionally, we extend our model by allowing that management

knowhow becomes a discriminating characteristic between exporting and domestic firms similar to Garicano (2000), Atkeson and Kehoe (2005). Furthermore, by introducing a Geometric Brownian motion we account for the fact that firm productivity evolves with a certain extent of uncertainty. All in all our simple model includes besides the commonly used firm characteristics like productivity and fixed costs, the dimension of human capital and management ability.
Our recently composed Danish data set allows us to analyze the internationalization process of individual firms within the largest companies in the Danish manufacturing sector and control for the impact of common firm characteristics, but also for management aspects. Besides human capital variables like education level, high skill workers we are able to identify whether hired managers were previously exposed to exporting. Stylized facts suggest that e.g. domestic firms started to hire more and more export experienced managers accompanied by an increase in the share of exporting firms in our sample, in particular since 1997 (form 86.7% to 89.2%).
Given this outstanding data we suggest a three step empirical strategy derived from our theoretical model. We start with a random effects probit as in previous studies and are able to show that firm productivity and export fixed cost are decisive elements in shaping the export decision of Danish firms. Subsequently, we depart from the random effects probit model and allow for unobserved factors to be correlated with firm characteristics. At this, we follow Chamberlain (1980)'s approach entering virgin soil in the trade context as it is rather new in trade studies but turns out to be an efficient alternative to control for unobserved heterogeneity. Indeed, we are able to show that in particular management characteristics matter in a very robust way for unobserved heterogeneity. Our sample allows for the first time to include the mentioned aspects but comes with the limitation only to observe the 5000 largest firms in Denmark. As a result the number of new entries into the export market is relatively small. In order to increase the variation in market entry, we generate further sub-samples including only firms which start to export within the considered period. Our study contributes to the exiting literature twofold, first by presenting the impact of management characteristics on exporting and further by applying an innovative empirical method to identify successfully unobserved heterogeneity.

The remainder is structured as follows: Section 2 presents a theoretical partial equilibrium model from which we derive our empirical strategy in section 3. In section 4 we briefly describe the sample of Danish firms before we present our empirical results in section 5. Section 6 concludes.

2. Theoretical Model

With reference to Lucas (1978) besides the physical inputs capital k and labor l, a firm's technology contains furthermore a managerial component x. This last managerial technology is composed of two elements, namely the representative management's talent (ability) m and its knowhow s. Talent is an idiosyncratic characteristic, specific to the management whereas knowhow depends on the problems z to be solved by the executives. More precisely and similar to Garicano (2000), let Ω be the set of all possible problems z which have to be solved by the executive team and $S \subset \Omega$, the set of problems which can be solved by the management. We refer to S as the management knowhow with $S = [0, z_S]$. It is further assumed that the density function of all problems is non-increasing since problems are ordered from less to highly special knowledge and their continuous cumulative distribution is described by $F(z)$. The management knows *a priori* the distribution of F. This assumption implies that there exists a common awareness of how difficult the observed problems are.

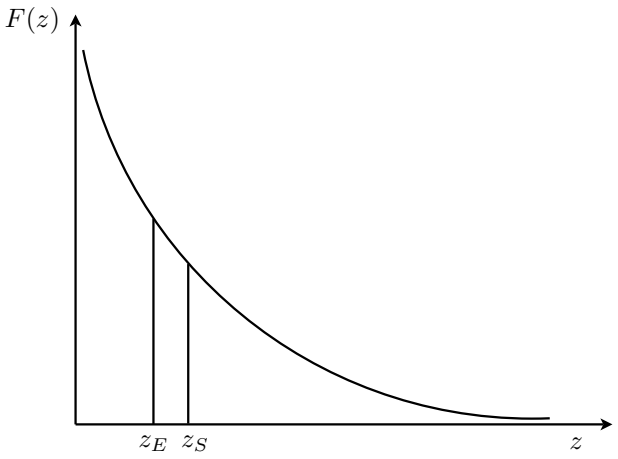


Figure 1: Non-Increasing Density Function of Problems

The firm's production technology is described by

$$y_t = \Psi_t x_t h A_t^{1-\nu} \left[g(k_t, l_t)\right]^{\nu} \tag{1}$$

$$\text{with} \quad x = m \; Pr(z \in S) \quad \text{and} \quad Pr(z \in S) = \int_0^{z_s} dF(z) = F(z_s)$$

where Pr denotes the probability that the management can solve the range of problems associated with production. Ψ is a country specific shift parameter accounting for economy wide

productivity as in Lucas (1978). We extend Atkeson and Kehoe (2005) by allowing the firm specific productivity A to evolve stochastically over time. Therefore, it is modeled by a Geometric Brownian motion with

$$\begin{aligned} dA_t &= \alpha A_t dt + \sigma A_t dw_t \\ \text{with} \quad dw_t &= \epsilon_t \sqrt{dt} \end{aligned} \tag{2}$$

where α is the periodical growth rate and σ represents the variance parameter. dw_t stands for the increment of a standard Wiener process with ϵ_t as a normally distributed random variable. Then, A_t is log-normally distributed with

$$A_t \sim \ln(A_0 + \alpha - \frac{1}{2}\sigma^2, \sigma\sqrt{t}), \tag{3}$$

where A_0 represents the firm specific productivity at t_0 (Dixit, 1993). The function g is linearly homogeneous of degree one and the parameter $\nu \in (0, 1)$ is referred to as the span of control which determines the firm's degree of diminishing returns. The span of control is introduced in order to account for the fact that a management cannot handle all existing firms. In each period labor and capital are freely mobile between plants and therefore the choice of optimal inputs is a static problem. Accordingly, the management minimizes production costs with

$$\min_{k,l} w_t l_t + r_t k_t \quad \text{s.t.} \quad y \leq \Psi_t x_t A_t^{1-\nu} [g(k_t, l_t)]^{\nu}, \tag{4}$$

where w_t is the wage rate for labor, r_t the rental rate for capital, w_{m_t} the management costs, and τ representing transportation costs. The periodical cost function of the plant results as

$$c(r_t, w_t, w_{m_t}, A_t, \Psi_t, \tau_t). \tag{5}$$

We reduce the further analysis on the impact of changes in firm specific productivity and manager knowhow described by equation (5).

The demand side is succinctly represented by the iso-elastic demand function

$$p = B y^{\mu - 1} \tag{6}$$

where B is a shift parameter und μ indexes the degree of monopoly power. For μ approaching zero the firm faces a horizontal demand function (i.e. perfectly competitive environment).

Based on the inverse demand and the cost function the firm's management maximizes periodical profits

$$d_t(r_t, w_t, w_{m_t}, A_t, \Psi_t, \tau_t) = \max_y \; B_t \; y_t^{\mu} - c(r_t, w_t, w_{m_t}, z_{s_t}, A_t, \Psi_t, \tau_t) \\ - w_{m_t} - I[i = 1]\tau_t y_t. \tag{7}$$

If the investor decides on exporting, fixed costs I_E and iceberg transport costs $\tau > 1$ arise, formally indicated by the index variable $i = 1$, else 0 with I representing an index function. Furthermore, exports necessitate that z_E problems drawn from Ω are solved, which always happens if $E \subseteq S$, where $E = [0, z_E]$ represents the set of all problems associated with exporting.

Therefore, the management with adequate knowhow will initiate exporting whenever the expected value of exporting V_E exceeds the accruing costs, which can be expressed as

$$V_E(r_t, w_t, w_{m_t}, A_t, \Psi_t, \tau_t) = \int_t^{\infty} d(r_t, w_t, w_{m_t}, A_t, \Psi_t, \tau_t) e^{-\beta t} \geq I_E \tag{8}$$
$$\text{with} \quad z_s \geq z_E \quad \text{and} \quad \beta = \rho - \alpha.$$

ρ is the opportunity cost rate for all firms and therefore, β represents the adjusted discount rate as it accounts for the firm specific growth rate which reduces opportunity costs.[1] Since A_t is log-normally distributed, the log of the expected firm values V_E are normally distributed, if V_E is multiplicative in all its elements.

[1] Depending on the behavior of periodical profits $d(\cdot)$ in A, the adjusted discount rate β may differ in its extent. For convex profits e.g. in A, the adjusted discount rate decreases to $\beta = r - (r - \rho)\lambda - \frac{1}{2}\lambda(\lambda - 1)\sigma^2$, where λ represents the degree of convexity.

3. Empirical Strategy

We propose to follow Mundlack (1978) and Chamberlain (1980), a rather novel approach in the empirical trade literature, to analyze the participation of a firm in foreign markets (i.e. a binary variable indicating exporting), and to account explicitly for unobserved heterogeneity.[2] Let $I[\cdot]$ define an indicator function returning value one if the statement in the bracket is true and let e_{ijt} be an exporting indicator for firm i, in sector j at time t and let us model the entry condition (8) with the following probit model

$$\begin{aligned} V_E(\cdot) - I_E &= \mathbf{x}_{it}\theta + \mathbf{x}_{jt}\beta + \psi_t + \psi_j + c_i + u_{ijt} \\ exp_{ijt} &= I[V_E(\cdot) - I_E > 0] \\ u_{ijt}|(\mathbf{x}_i, c_i) &\sim \text{Normal}(0,1) \end{aligned} \tag{9}$$

where $\mathbf{x}_{it}$ is a vector of time-varying firm's characteristics including a constant, $\mathbf{x}_{jt}$ denotes a vector of time-variant industry characteristics, whereas $\mathbf{x}_i$ contains for notational convenience all explanatory variables in all periods.[3] $\mathbf{x}_{it}$ includes a number of controls like firm size, human capital (l), productivity (A), proxies for some trade costs (τ), but most importantly measures of the management knowhow (S and S_E in our model) in which we are particularly interested in. $\mathbf{x}_{jt}$ will contain mainly proxies for I_E. Industry fixed effect ψ_j and time dummies ψ_t control for industries specificities and temporary shocks.

c_i is the unobserved effect, like, in our model, the talent of the manager (m) or stochastic developments of productivity due for instance to different adoption costs or learning curves, as well as plausible different entry fixed costs (I_E). The point of introducing unobserved heterogeneity is to explicitly allow unobservables to be correlated with some elements of $\mathbf{x}_{it}$, as managerial ability or management practices affect the productivity of a firm as well as the management knowhow. We therefore depart from the assumptions of a random effects probit model and, following Mundlack (1978), assume that

$$c_i = b + \bar{\mathbf{x}}_i\delta + a_i \tag{10}$$

[2] This approach is not however new in the literature, but it has been extensively used in labor economics.
[3] $\mathbf{x}_i$ contains for example $\mathbf{x}_{it}$ and $\mathbf{x}_{jt}$ for all t, the set of ψ_j and ψ_t.

where $\bar{\mathbf{x}}_i$ is the average of $\mathbf{x}_{it}$, $t = 1, ..., T$, and a_i is a random component (for example manager ability) with $a_i|\mathbf{x}_i \sim \text{Normal}(0, \sigma_a^2)$. Although this assumption is still restrictive in that it specifies, as in Chamberlain (1980), a distribution for c_i given $\mathbf{x}_i$, namely, $c_i|\mathbf{x}_i \sim \text{Normal}(b + \bar{\mathbf{x}}_i\delta, \sigma_a)$ - it at least allows for some dependence between c_i and $\mathbf{x}_i$. Furthermore, relative to a random effects probit model, this approach has the advantage to allow us to relate firm's characteristics, and in particular the management to unobserved heterogeneity. Therefore, the parameter δ is equally interesting as θ: the latter is informative how the management and other dimensions of a firm affect the propensity to export, while the former is informative how the management and other characteristics of a firm relate to unobserved heterogeneity.

The probit we are estimating is therefore

$$P(exp_{ijt} = 1|\mathbf{x}_i) = \Phi\left(\frac{b + \mathbf{x}_{it}\theta + \mathbf{x}_{jt}\beta + \bar{\mathbf{x}}_i\delta + \psi_t + \psi_j + a_i}{(1 + \sigma_a^2)^{1/2}}\right) \tag{11}$$

where Φ denotes the cumulative distribution function of a standard normal density. Note that, only the effects of time-varying elements in $\mathbf{x}_{it}$ can be estimated, otherwise undistinguishable from c_i.[4] Likewise, time dummies ψ_t as well as industry-dummies ψ_j, which do not vary across i, are omitted from $\bar{x}_i$. Adding $\bar{\mathbf{x}}_i$ as a set of controls for unobserved heterogeneity is very intuitive; it allows to estimate the response probability keeping the time average fixed.

It is worth highlighting that the Chamberlain approach is just a generalization of the random effects probit model in (9) with the addition of $\bar{\mathbf{x}}_i$ to each time period: c_i has been integrated out and a test for the random effects probit model is easily obtained as a test of $H_0 : \delta = \mathbf{0}$. In case of non-rejection of the null, the omission of $\bar{\mathbf{x}}_i$ would be unimportant and a random effects probit model would then be an appropriate empirical model. The relevance of this is that management characteristics are empirically rarely observable and such test can shed some light on how serious is this omission.

[4] $\mathbf{x}_{it}$ should not longer contain a constant term, as that would be indistinguishable from b. See Wooldridge (2005), pag. 488.

4. Data

In this paper we use a data set by Smith et. al. (2008), which comprises the largest 5000 Danish firms, as defined by total asset, in the period from 1995 and 2003. In a first step registers of Statistics Denmark are used to merge firm specific information with the considered companies' employee specific data, including information on CEOs background characteristics. Additionally, these administrative registers are merged with account data from the private Danish data register KOB (Kobmandsstandens Oplysningsbureau), which includes information on the members of the board of directors. Following Wagner (2008)´s guidelines, especially for the sake of international comparability, we consider only manufacturing firms and we exclude those in the top one percent of the labor productivity distribution and with less than 20 employees.[5] Due to the too-low number of observations, we drop the oil producing sector and metal recycling industry. Finally, we eliminate firms with inconsistent figures showing either negative total or foreign turnover, export revenue greater than total revenue, negative physical capital, or a year of foundation subsequent to when the firm is first observed, ending up with more than seven thousand firms over the whole sample, about 800 per year.[6]

A positive export turnover defines our export status, whereas from the year of foundation of a company we deduct the age of a firm, used in Atkeson and Kehoe (2005) to proxy organizational capital. Based on the county of the firm, we approximate the distance of each firm to an international transportation point (harbor, airport, major rail-station), and capture part of the logistic transport costs. By the two digits industry code, we construct the share of Danish firms already exporting to some destinations (i.e. firms that have positive export turnover) within the same defined industry. In this way, we attempt to include in the analysis a measure for the fixed cost of exporting. In fact, in Krautheim (2007), the return of networking among domestic exporters is to reduce I_E in our model and it is clearly related to the size of such network, as indicated by the fraction of exporting companies.

[5] Labour productivity is defined as value added per employee. We do not trim the data for the bottom 1 percent of the labor productivity distribution because these firms are in our Danish sample automatically excluded by threshold of 20 employees.

[6] It is common in Denmark to end up with a scarce number of observations as soon as the industry definition narrows down. Two digits is the narrowest industry level we can go with our sample to retain a good number of observations, but for the two industries dropped.

The matched employer-employee nature of data set allows us to identify managers (CEOs) on the basis of annual salaries where the employee with the highest salary is declared as the chief executive organizer. Our procedure is in line with several US studies (see e.g. Bell, 2005) as opposed to the definition of managers based on the occupational code, also available, but not as reliable, as already put forward by Smith et. al. (2008). The two strategies would anyway yield highly correlated definitions. Once a manager is identified, the years of education or the degree of eduction as well as the nationality and the tenure can be determined.

CEOs are usually tiered and companies can be lead by one person or a group. Therefore, the narrow definition of CEO includes the single person with the highest wage (CEO-1). To account for team-leadership, we introduce a broader definition of CEOs including vice presidents identified as the top five in the firm specific wage distribution (CEO-5). In this case, the education refers to the person with the longest education or the highest degree, the tenure to the longest tenure in the group, while nationality indicates whether at least one in the board is foreigner. Being able to follow people along the years and workplaces, we track whether new people are promoted internally into the CEO-1 position (internal 1) or into the CEO-5 group (internal 5). Alternatively, promotion can occur externally, hiring people from other companies to occupy CEO-1 or CEO-5 offices (external 1, external 5). We further investigate whether externally promoted people have exporting experience (external+exp). Exporting experience is defined as having ever held, even abroad, positions within exporting companies. To be able to consider the degree of experience, we further refine our definition of exporting experience and restrict it to positions held in firms earning at least 25 or 50 per cent of their revenue on foreign markets (exp25, exp50). These sets of dummy variables are meant to account for manger knowhow.

Information at workplace is further aggregated to construct rather precise measure of human capital at the firm level, like the share of employees with a university degree, a high school degree or vocational education as well as the proportion of white-collar workers. Likewise, we construct the number of employees - our measure of the size of a company - rather than relying on the figures self reported by each company, as we think it gives a more reliable and precise measure of size.

Table 1: Domestic and Exporting Danish Firms

	Number of Domestic Firms	Number of Exporters	Total Number of Firms
1995	11%	89%	808
1996	11.5%	88.5%	824
1997	13.3%	86.7%	828
1998	12.8%	87.2%	828
1999	12.8%	87.2%	882
2000	12.1%	87.9%	842
2001	9.8%	90.2%	753
2002	11.3%	88.7%	736
2003	10.8%	89.2%	656
Over all Years	11.8%	88.2%	7157

Table 1 contains the shares of Danish manufacturing companies which are serving solely the domestic market or are involved into international trade. As the available data is restricted to the 5000 largest companies by total asset, the share of exporting firms within the sample is vast bigger than the share of purely domestic firms. However, it is to emphasize that besides the distinctiveness of the sample it is also the relative large openness of Denmark, with 80% of all firms being involved in international trade which determines the observed firm distribution.

Table 2: Sub-Samples of Permanently Observed and New Born Firms

	Sub-Sample: ***Always Exporter***		
	Number of Firms Always Exporter	Number of Firms Always Domestic	Number of Firms Permanently in a Market
Over all Years	5827	485	6312
% of all Firms	81.4%	6.8%	88.2%
	Sub-Sample: ***New Exporter***		
	Start as Export	Start as Domestic	New Born Firms
Over all Years	487	358	845
% of all Firms	6.8%	5%	11.8%

The first part of table 2 presents the shares of firms which are already serving the domestic market or exporting since the first available year in our sample. These exporters are referred to as *always exporter* and show that for a high number of observations there is no change in their export status over time. The lower part of table 2 shows the share of companies which are founded either for the domestic market or for exporting during the observed time span.

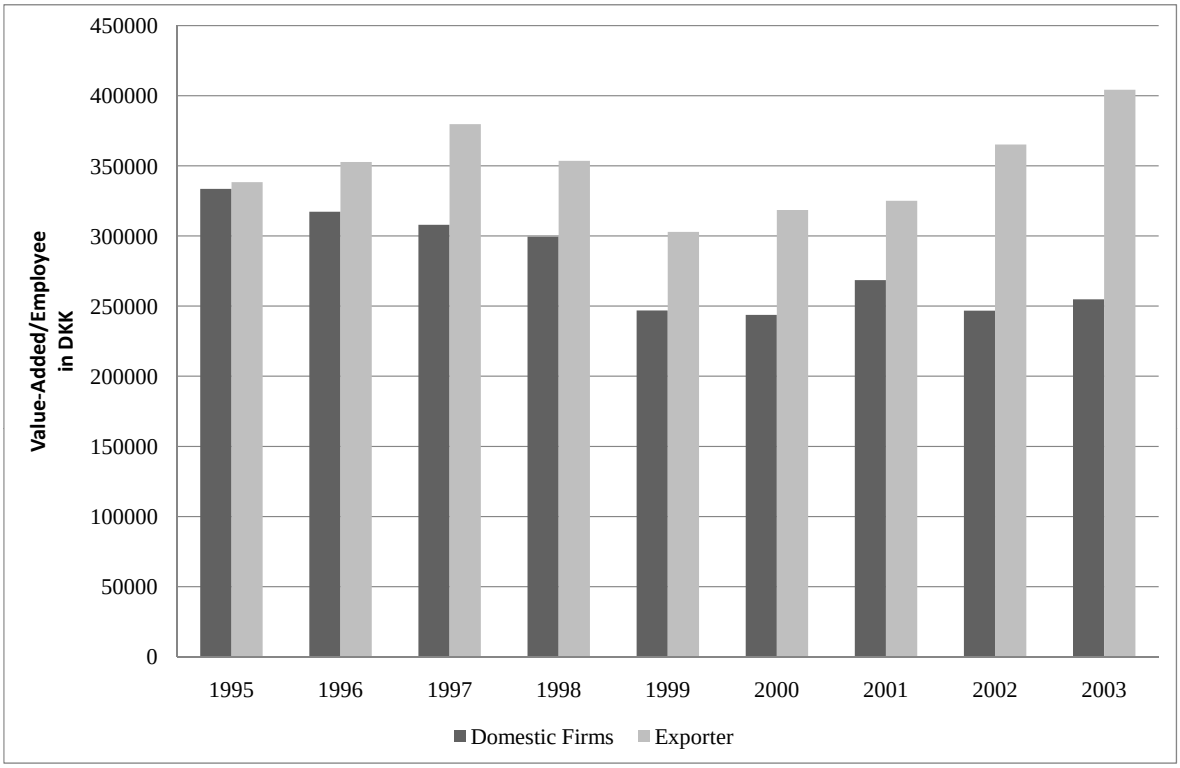


Figure 2: Productivity Pattern of Danish Firms

In line with the general empirical findings in the related literature (see e.g. Bernard and Wagner, 2001) the average productivity of Danish exporters - measured as value-added over employees - turns out to outperform the domestic firms' productivity. Importantly, besides their dominance Danish exporters have widened their lead since the end of the 90s whereas domestic companies' productivity stagnated. One reason for this growing disparity is the decreasing trend in the share of solely domestic firms depicted in table 1 and the rising trend in Denmark's internationalization since 1997. Appendix B and C present a more detailed picture of productivity developments both over time and across different sub-sectors. One further striking aspect is the different extent of productivity heterogeneity within sub-sectors measured by the standard deviation.

Besides the commonly used time-variant industry characteristics the underlying sample provides furthermore information about how a new manager within the top 5 management is promoted. Table 3 presents the distributions of registered internal promotions for domestic firms and exporters between 1995 and 2003. According to these figures, exporting companies exhibit on average a higher share of internal promotions relative to domestic companies pointing on a higher dynamics in the management of exporters. One possible reason for this result might again reflect

the overhang of exporting firms in the underlying sample, since a larger number of observation increases the likeliness of a management reshuffle. However, more important is the fact that although the share of domestic Danish firms averagely decreased over time (see table 1) internal promotions within this group skyrocketed. A possible reason may be the tightened competition in the considered time span forcing domestic firms to reshape their management more often.

Table 3: Firms with Internally Promoted Manager

Internal Promotion for Top 5 Management Domestic Firms				Internal Promotion for Top 5 Management Exporting Firms		
Year	Yes	No		Year	Yes	No
1995	18%	82%		1995	36%	64%
1996	23%	77%		1996	39%	61%
1997	21%	79%		1997	41%	59%
1998	24%	76%		1998	41%	59%
1999	33%	67%		1999	46%	54%
2000	31%	69%		2000	47%	53%
2001	21%	79%		2001	47%	53%
2002	27%	73%		2002	47%	53%
2003	42%	58%		2003	52%	48%
Over all Years	26%	74%		Over all Years	43%	57%

Note: Shares a calculated on the basis of all firms in the sample which conducted an internal promotion for a top 5 management position. If the newly appointed manager has been recruited from within the enterprise, the promotion is considered to be internal.

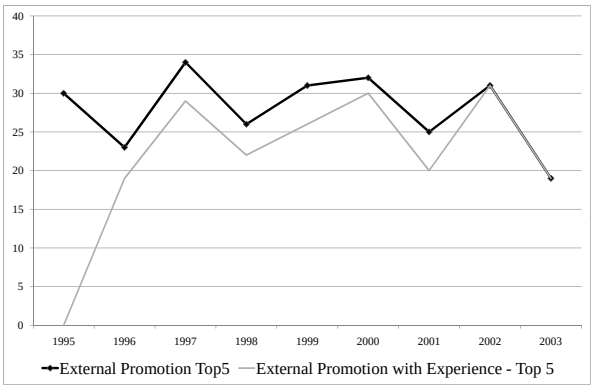
Table 4 presents the shares of external promotions within domestic and exporting companies. Similar to internal promotions, exporters exhibit a higher share of recruitment on average - 24% of exporters hired an external manager opposed to 17% of domestic firms - pointing on the stronger dynamics in exporting companies' recruiting behavior. However, in the last years the share of external promotions within domestic firms significantly increased, partly passing the share of exporting companies. This phenomenon might reflect two aspects. Firstly, again the tightened competition for domestic firms necessitated a stronger management reshuffle. Secondly, and in the focus of our empirical analysis, the increasing share of external manager promotions in domestic companies enforced a surge in the internationalization process of Danish firms decreasing the share of solely domestic firms.

Table 4: Firms with Externally Promoted Manager

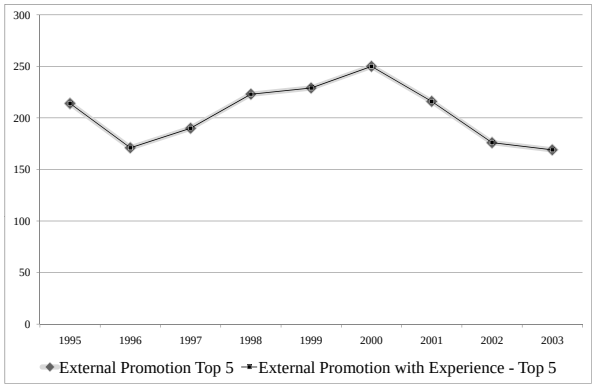
External Promotion for Top 5 Management Domestic Firms				External Promotion for Top 5 Management Exporting Firms		
Year	Yes	No		Year	Yes	No
1995	17%	83%		1995	24%	76%
1996	12%	88%		1996	18%	82%
1997	18%	82%		1997	21%	79%
1998	14%	86%		1998	24%	76%
1999	16%	84%		1999	25%	75%
2000	19%	81%		2000	29%	71%
2001	20%	80%		2001	28%	72%
2002	26%	74%		2002	24%	76%
2003	19%	81%		2003	25%	75%
Over all Years	17%	83%		Over all Years	24%	76%

Note: Shares a calculated on the basis of all firms in the sample which conducted an external promotion for a top 5 management position. If the newly appointed manager has been recruited from outside the enterprise, the promotion is considered to be external.

Additionally, figure 3 demonstrates two important aspects. Within the group of exporting companies all newly hired managers exhibit export experience since they previously worked for an exporting enterprise. In contrast, domestic firms hired managers without export experience in the first observed years but steadily increased the share of export experienced manager and finally hired only executives coming from internationally acting firms. This patterns support the hypothesis that the increasing share of an export experienced management promotion may be one additional reason for the enhanced internationalization of Danish enterprises.



(a) External promotions within domestic companies



(b) External promotions within exporting companies

Figure 3: External Promotion of Experienced Manager

Note: The black lines reflect the absolute number of observed external promotions whereas the gray line additionally controls for whether the recently hired manager stems from an exporting company.

5. Results

Being among the first to use Danish data to explore entry into foreign markets, we propose in the first step, to restrict our focus on firm characteristics typically considered by most of the previous studies (Roberts and Tybout, 1997; Bernard and Wagner 1997). We start with a random effects probit model accounting only for firm characteristics as firm size (employment), productivity (value added over employee), human capital (share of white collar, high skill share, high school share), distance and finally fixed costs of exporting, where we use the network variable as a proxy.

As in Bernard and Wagner (2001), all variables in the first two columns of table 5 are one period lagged to avoid simultaneity issues in light of the "learning by exporting" effects. In contrast, in column 3 and column 4, only productivity is lagged, because we believe the scope for simultaneity for human capital is very limited, given the substantial time necessary for a firm to fill in a newly posted vacancy.
Interestingly, the two sets of regression point to different results. While productivity is significant - as commonly found in the literature - when also all other variables are lagged, only human capital - here measured by the share of employee in the firm with university and high school degree and the proportion of white-collar workers - remain significant when only productivity is lagged.

Finally, in column 5 and 6, we depart from the random effects probit model and allow unobservable factors to be correlated with a firm's characteristics, as explained in equation (10). The vector $\bar{\mathbf{x}}_\mathbf{i}$ includes all time-varying variables included in the regression. Only the variables resulting significant are listed with the asterisk in the row denoted with δ, whereas the coefficients are omitted as we are not interested in interpreting them. It emerges that those human capital factors that were explaining export decision in the random effects probit model are now related to unobserved heterogeneity among firms, but can not explain any longer the decision to become an exporter. Instead, the share of high skilled labor becomes significant.

It is to emphasize that the first three columns in table 5 represent a common result in the related literature (see e.g. Bernard and Wagner, 2001) but turns out to change dramatically once controlled for unobserved factors, as in our case.

Table 5: Probability of Exporting. No Managerial Effects.

	(1)	(2)	(3)	(4)	(5)	(6)
Dep. Var	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}
Sample	all	all	all	all	all	all
uni share			1.86**	1.80*	-0.81	-0.55
			(0.94)	(1.03)	(0.71)	(0.82)
high school share			1.37	0.98	-0.64	-0.33
			(1.03)	(1.15)	(0.66)	(0.75)
vocational share			0.19	-0.23	-0.94**	-0.90
			(0.64)	(0.73)	(0.48)	(0.55)
high skill share			0.001	-0.0002	0.003**	0.004**
			(0.003)	(0.003)	(0.001)	(0.001)
white collar share			0.01**	0.01**	0.002	0.003
			(0.006)	(0.006)	(0.003)	(0.003)
size			0.008	0.007	0.001	0.001
			(0.01)	(0.01)	(0.008)	(0.009)
distance				0.0001		0.0009
				(0.0027)		(0.0014)
L productivity	0.0005*	0.0005*	0.0003	0.0002	0.0002	0.0002
	(0.00026)	(0.00027)	(0.00024)	(0.00025)	(0.0001)	(0.0001)
L firm age		-0.008		-0.006		0.006
		(0.005)		(0.005)		(0.055)
L uni share	2.99***	2.39**				
	(0.96)	(1.05)				
L high school share	2.64**	1.11				
	(1.05)	(1.1)				
L vocational share	1.06	-0.001				
	(0.65)	(0.75)				
L high skill share	0.0001	-0.003				
	(0.003)	(0.003)				
L white collar share	0.01**	0.01**				
	(0.006)	(0.006)				
L size	0.007	0.009				
	(0.01)	(0.01)				
L network		1.71		1.89*		0.62
		(1.07)		(1.05)		(0.51)
L distance		-0.0002				
		(0.002)				
δ					uni share**	size*
					high school share**	white color share***
					vocational share**	network***
					white color share***	
time dummies	YES	YES	YES	YES	YES	YES
industry dummies	YES	YES	YES	YES	YES	YES
N	5176	4724	5224	4771	5224	4771
Wald χ^2	172.42	163.28	171.41	164.78	206.61	213.85
Prob > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Coefficients represent the change in the probability of exporting due to an increase in the independent variables' standard deviation. In case of a dummy variable the probability is estimated for a change from 0 to 1. size and productivity are measured in 1000 units. δ stands for significant unobserved effects (see equation 10). L indicates lagged variables. *,**,*** indicate significance at the 10%, 5%, 1% levels, respectively.

Table 6: Probability of Exporting. With Managerial Effects.

	(1)	(2)	(3)	(4)	(5)
Dep. Var	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}
Sample	all	all	all	all	all
internal 5	0.01	0.01	0.01	0.007	0.009
	(0.03)	(0.03)	(0.03)	(0.038)	(0.037)
external 5 + exp	0.04	0.03	0.06		
	(0.04)	(0.04)	(0.04)		
external 5 + exp25				-0.03	
				(0.04)	
external 5 + exp50					-0.01
					(0.04)
manager 1 foreigner	-0.10	-0.1	-0.10	-0.1	-0.10
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
manager 1 education	-0.002	-0.002	-0.002	-0.001	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
share female manager	0.07	0.08	0.07	0.08	0.07
	(0.24)	(0.24)	(0.24)	(0.25)	(0.24)
tenure		-0.04			
		(0.04)			
manager 1 young			-0.14		
			(0.09)		
productivity	0.0007***	0.0006***	0.0006***	0.0007***	0.0007***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
firm age	0.07	0.07*	0.07	0.06	0.05
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
uni share	-0.03	-0.0007	-0.03	-0.06	-0.06
	(0.76)	(0.76)	(0.76)	(0.78)	(0.76)
high school share	0.68	0.69	0.60	0.68	0.63
	(0.63)	(0.63)	(0.63)	(0.63)	(0.62)
vocational share	0.07	0.09	0.06	0.05	0.04
	(0.45)	(0.45)	(0.45)	(0.44)	(0.44)
high skill share	0.0009	0.001	0.0009	0.0009	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
white collar share	0.002	0.002	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
size	0.007	0.006	0.006	0.007	0.007
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
network	3.77***	3.76***	3.81***	3.76***	3.71***
	(0.69)	(0.69)	(0.69)	(0.69)	(0.69)
distance	0.001	0.001	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
δ	internal 5***	internal 5***	internal 5***	internal 5***	internal 5***
	ext.+exp***	ext.+exp***	ext.+exp***	ext.+exp25***	ext.+exp50***
	man. foreigner**	man. foreigner*	man. foreigner*	man. foreigner*	man. foreigner*
	man. edu.**	man. edu.**	man. edu.**	man. edu.*	man. edu.**
	w. col. share**	w. col. share**	w. col. share**	w. col. share**	w. col. share**
	network***	network***	network***	network***	network***
			firm age*		
time dummies	YES	YES	YES	YES	YES
industry dummies	YES	YES	YES	YES	YES
N	5803	5803	5803	5803	5803
Wald χ^2	283.73	288.55	284.90	292.24	293.92
Prob $>$ χ^2	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Coefficients represent the change in the probability of exporting due to an increase in the independent variables' standard deviation. In case of a dummy variable the probability is estimated for a change from 0 to 1. size and productivity are measured in 1000 units. δ stands for significant unobserved effects (see equation 10). *,**,*** indicate significance at the 10%, 5%, 1% levels, respectively.

Table 6 and 7 go to the heart of the analysis and include the managerial characteristics of the firm. Regardless of whether the regressors are contemporaneous or lagged, it is striking how - on the one hand - none of the variables regarding the management can explain the internationalization process of a firm, which is rather related to the productivity and the fixed cost of exporting, as captured by the network variable.

Table 7: Probability of Exporting. With Lagged Managerial Effects.

	(1)	(2)	(3)	(4)	(5)
Dep. Var	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{t+1}
Sample	all	all	all	all	all
internal 5					0.05
					(0.04)
external 5 + exp					-0.01
					(0.05)
manager 1 foreigner					0.02
					(0.13)
manager 1 education					0.0003
					(0.002)
share female manager					-0.03
					(0.34)
productivity					0.0007***
					(0.0001)
firm age					0.05
					(0.05)
uni share					0.61
					(0.91)
high school share					0.80
					(0.75)
vocational share					0.31
					(0.50)
high skill share					0.0002
					(0.002)
white collar share					0.001
					(0.004)
size					0.009
					(0.008)
network					1.86***
					(0.59)
distance					0.001
					(0.001)
L internal 5	0.04	0.04	0.04	0.03	
	(0.04)	(0.04)	(0.04)	(0.04)	
L external 5 + exp	-0.02	-0.03	-0.00		
	(0.05)	(0.05)	(0.05)		
L external 5 + exp25				-0.08*	
				(0.05)	
L manager 1 foreigner	0.05	0.05	0.05	0.04	
	(0.13)	(0.13)	(0.13)	(0.14)	
L manager 1 education	0.001	0.001	0.001	0.001	
	(0.002)	(0.002)	(0.002)	(0.002)	
L share female manager	0.04	0.04	0.04	0.05	
	(0.33)	(0.33)	(0.33)	(0.33)	
L tenure		-0.05			
		(0.05)			
L manager 1 young			-0.14		
			(0.10)		
L productivity	0.0003*	0.0002	0.0002	0.0003*	
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	

L firm age	0.06	0.07	0.06	0.06	
	(0.05)	(0.05)	(0.05)	(0.05)	
L uni share	0.22	0.23	0.24	0.26	
	(0.92)	(0.93)	(0.92)	(0.92)	
L high school share	0.043	0.07	0.05	0.08	
	(0.79)	(0.79)	(0.80)	(0.80)	
L vocational share	-0.70	-0.67	-0.67	-0.67	
	(0.52)	(0.52)	(0.52)	(0.52)	
L high skill share	0.0005	0.0005	0.0004	0.0007	
	(0.001)	(0.001)	(0.001)	(0.001)	
L white collar share	-0.001	-0.001	-0.001	-0.001	
	(0.004)	(0.004)	(0.004)	(0.004)	
L size	0.002	0.002	0.001	0.003	
	(0.008)	(0.008)	(0.008)	0.008)	
L network	0.99*	0.98*	1.02*	0.97*	
	(0.54)	(0.54)	(0.54)	(0.54)	
L distance	0.001	0.001	0.001	0.001	
	(0.001)	(0.001)	(0.001)	(0.001)	
δ	internal 5** ext.+exp*** w. col. share*** network***	internal 5** ext.+ exp*** w. col. share*** network***	internal 5** ext.+exp*** w. col. share*** man. young* network***	internal 5** ext.+exp25*** w. col. share*** network***	internal 5** ext.+exp*** w. col. share** network***
time dummies	YES	YES	YES	YES	YES
industry dummies	YES	YES	YES	YES	YES
N	4274	4274	4274	4274	4717
Wald χ^2	231.00	237.58	238.21	243.64	236.87
Prob $>$ χ^2	0.0000	0.0000	0.0000	0.0000	0.0000

Note: Coefficients represent the change in the probability of exporting due to an increase in the independent variables' standard deviation. In case of a dummy variable the probability is estimated for a change from 0 to 1. size and productivity are measured in 1000 units. δ stands for significant unobserved effects (see equation 10). L indicates lagged variables. *,**,*** indicate significance at the 10%, 5%, 1% levels, respectively.

While this conclusion is in line with the recent trade literature on heterogenous firms, it does not seem to be firm, as the significance level in table 7 drops to 10%, and becomes insignificant in table 8, col. 1.

In table 8 we further take the lag of only those regressors suspicious of simultaneity, namely productivity and the management variables. Indeed, exporting firms may as well experience productivity gains from learning effects by trading, or decide to hire or promote managers with specific know-how to face the exporting-challenges. Frictional labor market seems to us - generally - less an argument for the manager category, and time to fill a vacancy is no issue for internal promotions. Similarly to table 5, it is again human capital, here captured by the proportion of workers with a high school degree (high skill share variable), that stands out to be marginally significant (at 10%).

Concerning the unobserved heterogeneity, management characteristics, particularly exporting experience and internal promotion, matter in a very robust way, regardless of the specification used. Interestingly, compared to table 5, within the δ variables only the proportion of white collar workers among all other variables inherent to human capital remains significant, once it is accounted for managerial characteristics.

Table 8: Probability of Exporting in Various Subsamples.

	(1)	(2)	(3)	(4)
Dep. Var	exp_{ijt}	exp_{ijt}	exp_{ijt}	exp_{ijt}
Sample	all	new exporter	new exporter	always exporter
internal 5		0.16		-0.04
		(0.11)		(0.03)
external 5 + exp		0.09		-0.01
		(0.14)		(0.04)
manager 1 foreigner		-0.36		-0.04
		(0.24)		(0.08)
manager 1 education		-0.0006		-0.004*
		(0.007)		(0.002)
share female manager		0.87		-0.10
		(0.66)		(0.26)
productivity		0.0007*		0.0006**
		(0.0004)		(0.0002)
firm age		0.32***		-0.05
		(0.10)		(0.06)
uni share	-0.55	-0.31	-0.74	-0.09
	(0.81)	(1.47)	(1.64)	(0.82)
high school share	-0.26	2.58	1.14	0.18
	(0.70)	(1.78)	(1.8)	(0.61)
vocational share	-0.65	0.89	0.25	-0.11
	(0.527)	(1.19)	(1.31)	(0.44)
high skill share	0.003*	0.002	0.002	0.001
	(0.001)	(0.004)	(0.004)	(0.001)
white collar share	0.003	-0.002	-0.008	0.004*
	(0.003)	(0.007)	(0.01)	(0.002)
size	0.001	0.01	0.004	0.02**
	(0.009)	(0.01)	(0.02)	(0.01)
network	0.77	8.23***		2.59***
	(0.53)	(1.68)		(0.69)
distance	0.001	-0.003	-0.003*	0.001
	(0.001)	(0.002)	(0.002)	(0.001)
L internal 5	0.05		0.36***	
	(0.04)		(0.12)	
L external 5 + exp	0.001		0.03	
	(0.05)		(0.14)	
L manager 1 foreigner	0.06		0.95***	
	(0.13)		(0.33)	
L manager 1 education	0.001		0.002	
	(0.002)		(0.007)	
L share female manager	0.29		-0.28	
	(0.34)		(0.79)	
L productivity	0.0002		0.00007	
	(0.0001)		(0.0003)	
L firm age	0.062		0.32***	
	(0.054)		(0.12)	
L network			1.95	
			(1.23)	
δ	internal 5**			internal 5***
	ext.+exp***	ext.+exp**	ext.+exp**	ext.+exp***
	w. col. share**	man. foreigner***		man. edu.***
		firm age***	firm age***	size*
		high school share***	high school share***	
	network***	high skill share**	high skill share**	network***
time dummies	YES	YES	YES	YES
industry dummies	YES	YES	YES	YES
N	4771	698	576	4842
Wald χ^2	230.18	-	-	183.31
Prob $> \chi^2$	0.0000	-	-	0.0000

Note: Coefficients represent the change in the probability of exporting due to an increase in the independent variables' standard deviation. In case of a dummy variable the probability is estimated for a change from 0 to 1. size and productivity are measured in 1000 units. δ stands for significant unobserved effects (see equation 10). L indicates lagged variables. *,**,*** indicate significance at the 10%, 5%, 1% levels, respectively.

Table 8: continued

	(5)	(6)	(7)
Dep. Var	exp_{ijt}	exp_{ijt}	exp_{ijt}
Sample	always exporter	non-exporter t-1	non-exporter t-1
internal 5		-0.25	
		(0.19)	
external 5 + exp		0.02	
		(0.18)	
manager 1 foreigner		0.47	
		(0.4)	
manager 1 education		-0.003	
		(0.007)	
share female manager		0.48	
		(0.97)	
productivity		0.001***	
		(0.0005)	
firm age		0.01	
		(0.08)	
uni share	-1.38	1.42	1.55
	(0.98)	(2.02)	(1.81)
high school share	-0.38	0.87	0.085
	(0.73)	(1.48)	(1.41)
vocational share	-0.75	0.66	-0.49
	(0.56)	(1.09)	(1.00)
high skill share	0.003*	0.00	0.001
	(0.002)	(0.006)	(0.006)
white collar share	0.005	-0.005	-0.002
	(0.003)	(0.009)	(0.009)
size	0.01	0.05*	0.01
	(0.009)	(0.03)	(0.03)
network		6.89***	
		(1.47)	
distance	0.001	-0.001	-0.0008
	(0.002)	(0.002)	(0.002)
L internal 5	-0.04		0.38**
	(0.05)		(0.18)
L external 5 + exp	-0.07		-0.19
	(0.06)		(0.17)
L manager 1 foreigner	-0.20		0.72*
	(0.12)		(0.40)
L manager 1 education	0.0002		-0.0009
	(0.003)		(0.006)
L share female manager	0.64		1.04
	(0.45)		(0.86)
L productivity	0.0002		0.00007
	(0.0002)		(0.0003)
L firm age	-0.051		-0.021
	(0.07)		(0.08)
L network	0.95		-3.49**
	(0.61)		(1.61)
δ	internal 5**		internal 5*
	ext.+exp***	ext.+exp**	ext.+exp**
	size*	high skill share**	
	w. col. share**		
	network***		network**
time dummies	YES	YES	YES
industry dummies	YES	YES	YES
N	3969	546	531
Wald χ^2	187.27	-	-
Prob $>$ χ^2	0.0000	-	-

Note: Coefficients represent the change in the probability of exporting due to an increase in the independent variables' standard deviation. In case of a dummy variable the probability is estimated for a change from 0 to 1. size and productivity are measured in 1000 units. δ stands for significant unobserved effects (see equation 10). L indicates lagged variables. *,**,*** indicate significance at the 10%, 5%, 1% levels, respectively.

This result does not come entirely at surprise for us, as we are considering in these regressions all pooled observations, and we would expect heterogeneity to be maximum in this sample. If this conjecture is right, we should also find that management can not explain heterogeneity equally well on narrower, but more homogenous sub-samples. What it is surprising, is that neither management characteristics, even experimenting with different degree of export-intensities (not-reported), nor other variables like human capital or productivity seem related to the exporting behavior of firms. In this respect, some peculiarity of the Danish economy and of our sample may play a role.

The Danish economy is a small and open economy, with, on average, more than 80% of firms exporting in each year, leaving us with fairly low variation in our dependent variable in each year. Moreover, the proportion of firms already exporting since the first period in our sample and continuing to export till they eventually die is as high as 88% in our sample - what we refer to as "*always exporter*" firm - indicating a strong persistence of the export status.[7] Therefore, for a high proportion of observations, the export status is unchanged in spite of any eventual promotion or productivity dynamic, translating in a low weight assigned by ML methods to these variables. On the contrary, a firm which is not established on the export market, yet with the goal of entry, it has to put in place accordingly a managerial strategy, plausibly involving productivity improvements and manager promotions, known in the literature as "*conscious self-selection*" *hypothesis* (see Alvarez and Lopez, 2005). Therefore, by focusing on firms that start exporting during our sample period, we should be able to better relate possible changes in the export status to some of the promotional or productivity dynamics.

To verify these conjectures, we split our sample into narrower sub-samples, at the cost of losing - unfortunately - many observations. First, we split the sample between "new exporter" (about 12% of the sample) and "always-exporter". While for the group of "always-exporter", figures are similar to those for the whole sample, for the "new exporter", internal promotion, the nationality of the manager as well as firm-age - i.e. organizational capital (see Atkeson and Kehoe, 2005) - are positive and significant at 1% level, whereas the proxy for transportation cost at 10% level, when we control for the simultaneity of some regressors taking one period lag (tab. 8, column 3). Second, we pool all firms that one year before were serving only the domestic market, and therefore will eventually enter into a foreign market within at least a year. We label it the "non-exporter"

[7] In future research, it is worth extending the analysis to a dynamic probit model.

firm, almost 10% of our whole sample. One important difference with the "new exporter" group is that firms that made the transition from domestic to exporter are no longer in the pooled-sample after a year from the transition, in absence of any other changes and even if the transition occurred in the sampled period. The internal promotion and the nationality of the manager explain the exporting decision in this group (see col. 7), while firm age and distance are no longer significant at conventional levels. Network becomes significant at 5% level, with a negative sign. Given our little information, one should be cautious to interpret this sign as necessarily wrong, although it is against our prior of network effects. In fact, the network club in practice may have some barriers or costs to entry, weighting the marginal benefit from further membership, possibly low in a country with already a substantial share of exporters, against the cost of sharing information and potential foreign customers.

Again, these results are not sensitive to different degree of export-intensities. Simultaneity - at least for productivity appears to be an issue and may explain the sensitivity to the lag structure (compare for instance col. 2 with col. 3, and col. 6 with col. 7).

It is therefore highly likely that the "always-exporter" group, the most substantial group among all, is driving the results obtained with the whole sample, confirming our claim that results reflect both the openness of the Danish economy and the highly persistent export behavior in our sample, with many firms already exporting at the time the data are first available.

As expected, unobserved heterogeneity is systematically related to the manager know-how (external+exp) and if we consider at one end of the spectrum the "non-exporter" group, as the least heterogenous, and, at the other extreme, the "always-exporter" group, as the most heterogenous, a few variables other than manager know-how and promotions explain unobserved effects, while the list is far more comprehensive, including human capital, the education of managers and fixed costs, as heterogeneity increases along the spectrum.

From column 5 and 7 together, we conclude there exist some weak evidence that internal promotions are conducive to firm-internationalization, pointing - to use a military expression - "*to rise from the ranks*" effect, as an effective process to learn the potentials of the company and lead it through the complex internationalization process, definitively deserving further investigation. Complement inputs along this process are external promotions which aim at acquiring specific expertise, as suggested by management know-how being systematically related to unobserved firm-heterogeneity in the whole sample as well as across all sub-samples.

6. Conclusion

In this paper we are able to confirm the well established effects of productivity and trade fixed costs on the export decision of firms, based on commonly used random effects probit models (see e.g. Wagner 2001). However, given the availability of commensurate firm level data from Denmark furthermore, we are able to go beyond the existing trade literature by including management characteristics into the empirical analysis. In particular we are able to identify a new management's knowhow and experience level since we can control whether a recently hired manager stems from an exporting company. Furthermore, it is possible to control for how a manager is promoted which can be internal or external.

Our small theoretical model suggests an increase in the likeliness of exporting, the more experienced a newly hired manager turns out to be and the higher his talent (ability) is. This intuitive result does not show up in our random effects probit estimations if we include all manufacturing firms. Differently, a direct effect of management characteristics on the complex internationalization process of firms does not show up. One reason for this unexpected result is probably the peculiarity of the small Danish economy. Since more than 80% of all firms in the sample are exporting, the variation in our dependent variable turns out to be fairly low. Indeed, if we reduce the sample to only those firms which start to export during the observed time span, internal promotion of a manager and his nationality turn out to be influential for the internationalization process.

We further contribute to the existing literature by following Mundlack (1978) and Chamberlain (1980) and allowing unobservable factors to be correlated with some firm characteristics. Indeed, it turns out that management variables are systematically related to unobserved heterogeneity, in particular management knowhow (external promotion of experienced manager).

Future research within this framework will take place in several dimensions. An increase in the number of observations beyond the 5000 largest Danish firms would increase the size of non-exporting firms and probably the variance in our choice variabel (export status). Such a larger sample will improve the qualitative results and might significantly change the impact of management characteristics. The introduction of export destinations is a further possible improvement which we are working on. Finally, a cross sectional analysis seems possible, since several European countries are working on generating similar data sets.

References

[1] **Alvarez, L., Lopez, R.**, 2005. *Exporting and performance: evidence from Chilean plants.* Canadian Journal of Economics, Vol. 38, No. 4 , 1384-1400.

[2] **Atkeson, A., Kehoe, P. J.**, 2005. *Modeling and Measuring Organizational Capital.* Journal of Political Economy, Vol. 113, No.5, 1026-1053.

[3] **Bell, L.**, 2005. *Women-Led Firms and the Gender Wage Gap in Top Executive Jobs.* IZA Discussion Paper, No 1689.

[4] **Bernard, A. B., and J. B. Bradford**, 1995. *Exporters, Jobs, and Wages in U.S. Manufacturing.* Brookings Papers on Economc Activity, Microeconomics, 67-119.

[5] **Bernard, A. B., and J. B. Bradford**, 1997. *Exporters, Skill-Upgrading, and the Wage Gap.* Journal of International Economics, Vol. 47, No. 1, 1-25.

[6] **Bernard, A. B., and J. B. Bradford**, 2004. *Why Some Firms Export.* The Review of Economics and Statistics, Vol. 86, No. 2, 561-569.

[7] **Bernard, A., Wagner, J.**, 2001. *Export entry and exit by German firms.* Review of World Economics (Weltwirtschaftliches Archiv), Springer, Vol. 137, No.1, 105-123.

[8] **Chamberlain, G.**, 1980. *Analysis of Covariance with Qualitative Data.* Review of Economic Studies, No. 47, 225-238.

[9] **Dicken, P.** 1992. *Global Shift: The Internationalization of Economic Activity.* Paul Chapman, London.

[10] **Dixit, Avinash K.,** 1993. *The art of smooth pasting.* Chur, Switzerland: Harwood academic publishers.

[11] **Hopenhayn, H.**, 1992. *Entry, Exit, and Firm Dynamics in Long Run Equilibrium.* Econometrica, No. 60, 1127-1150.

[12] **Garicano, L.**, 2000. *Hierarchies and the Organization of Knowledge in Production.* Journal of Political Economy, Vol 108, No.5, 874-904.

[13] **Lucas, R. E. Jr.**, 1978. *On the size distribution of business firms.* Bell Journal of Economics, 508-523.

[14] **Mundlack, Y.**, 1978. *On the Pooling of Time Series and Cross Section Data.* Econometrica, No. 46, 69-85.

[15] **Krautheim, S.**, 2007. *Gravity and Information: Heterogenous Firms, Exporter Networks and the "Distance Puzzle"*. EUI Working Paper 2007/51.

[16] **Roberts, M. and J. Tybout**, 1997. *The Decision to Export in Colombia: An Empirical Model of Entry with Sunk Costs.* American Economic Review, Vol. 87, No. 4, 545-564.

[17] **Smith, N., Smith, V., Verner, M.**, 2008. *Gender differences in promotion into top-management jobs.* Aarhus Business School Working Paper 08-21.

[18] **Wagner, J.**, 2007. *Exports and Productivity: A Survey of the Evidence from Firm-level Data.* The World Economy, Vol. 30, No. 1, 60-82.

[19] **Wagner, J.**, 2008. *Understanding Cross-Country Differences in Exporter Premia: Comparable Evidence for 14 Countries.* Review of World Economics (Weltwirtschaftliches Archiv), Springer, Vol. 144, No.4, 596-635.

[20] **Wooldridge, J. M.**, 2005. *Econometric Analysis of Cross Section and Panel Data*, The MIT Press.

A. Internationalization in Manufacturing

Table 9: Export Status of Danish Firms

Sub-Sectors	1995			1996			1997			1998		
within Manufacturing	0	1	Total	0	1	Total	0	1	Total	0	1	Total
1	18	109	127	16	114	130	20	116	136	18	113	131
2	4	51	55	6	47	53	8	41	49	7	44	51
3	15	62	77	18	61	79	19	55	74	20	56	76
5	2	39	41	2	42	44	3	48	51	2	45	47
6	1	46	47	1	52	53	3	54	57	5	49	54
7	8	28	36	9	31	40	10	28	38	13	27	40
8	2	23	25	1	22	23	3	18	21	3	22	25
9	18	67	85	16	72	88	15	66	81	17	60	77
10	6	129	135	9	120	129	9	127	136	6	133	139
11	8	8	8	8	1	9	10	1	12	13	0	0
12	4	31	35	3	31	34	3	29	32	2	32	34
13	1	24	25	2	24	26	4	22	26	3	25	28
14	2	34	36	2	36	38	3	31	34	2	30	32
15	2	13	15	2	14	16	1	17	18	16	16	0
16	12	12	1	13	14	2	11	13	1	12	13	0
17	6	43	49	7	42	49	6	46	52	6	46	52
Total	89	719	808	95	729	824	110	718	828	106	722	828

1999			2000			2001			2002			2003		
0	1	Total	0	1	Total	0	1	Total	0	1	Total	0	1	Total
22	126	148	20	126	146	18	120	138	12	117	129	11	108	119
5	45	50	5	47	52	5	42	47	4	40	44	2	35	37
39	51	90	37	55	92	14	64	78	38	44	82	31	38	69
4	50	54	1	43	44	2	44	46	1	40	41	1	39	40
2	52	54	1	51	52	1	46	47	1	47	48	0	40	40
9	31	40	11	26	37	11	24	35	12	25	37	11	25	36
0	24	24	1	28	29		21	21	0	21	21	0	19	19
14	72	86	12	62	74	11	54	65	6	55	61	4	48	52
6	143	149	6	134	140	7	127	134	6	127	133	7	110	117
1	8	9	0	8	8	0	6	6	0	5	5	0	5	5
1	31	32	2	27	29	1	25	26	1	21	22	1	20	21
4	27	31	1	26	27	0	19	19	0	23	23	0	17	17
2	32	34	1	35	36	1	32	33	1	31	32	2	28	30
1	15	16	1	13	14	1	12	13	0	14	14	0	12	12
0	15	15	0	18	18	0	11	11	0	12	12	0	11	11
3	47	50	3	41	44	2	32	34	1	31	32	1	30	31
113	769	882	102	740	842	74	679	753	83	653	736	71	585	656

Note: This table presents the number of exporting and non-exporting firms within the Danish manufacturing sector. 17 different sub-sectors are considered between 1995 - 2003. 0 indicates domestic firms whereas 1 stands for exporters. Due to data protection policies, we don't specify the considered sub-sectors.

B. Firm Productivity

Table 10: Average Firm Productivity in the Manufacturing Sector

		1995	1996	1997	1998	1999	2000	2001	2002	2003	Total
1	Mean	397495	400096	420916	409735	308959	332079	324807	379589	412590	374179
	St.-Dev.	255049	261412	303435	278198	213497	244172	216243	243395	238682	253950
2	Mean	365600	386796	408905	412947	334963	346664	359376	372641	431523	378385
	St.-Dev.	228990	209377	205502	205255	186357	231427	198884	178405	182851	205521
3	Mean	230024	236499	250578	230909	185531	171722	184311	244525	218275	215441
	St.-Dev.	246371	254973	257885	255032	214251	196884	245794	257438	246810	241489
5	Mean	471565	422070	466874	485332	412135	462632	462338	449623	472399	455234
	St.-Dev.	335260	330587	333049	330183	270951	258023	321288	348748	330539	315481
6	Mean	350527	405839	366700	359566	278762	318864	319696	327280	391724	345886
	St.-Dev.	236803	222488	216699	223843	166287	163324	181664	162295	147829	197060
7	Mean	416325	351893	436595	348340	362918	389319	377734	365846	438535	386588
	St.-Dev.	272135	242816	266721	275194	231117	190634	169014	209161	262779	238360
8	Mean	364279	385749	375893	300686	345229	300662	292223	345410	404392	343599
	St.-Dev.	225717	203924	195688	216528	200761	210705	155766	155118	146872	194767
9	Mean	308064	341497	370329	312207	291358	325612	299104	358576	363432	328310
	St.-Dev.	160374	173205	232568	184288	157400	128092	147676	166872	148246	171625
10	Mean	341967	351645	354607	335364	291116	295538	319955	352774	393180	335740
	St.-Dev.	193470	205570	199569	192738	140188	173541	169583	184845	163550	182939
11	Mean	262578	307266	268849	338809	368115	479540	515338	370336	455229	361402
	St.-Dev.	158068	186660	173768	201091	258296	225388	319780	337531	349424	237743
12	Mean	305539	260066	298187	260008	212830	231420	281789	312598	348912	275362
	St.-Dev.	191664	224902	227267	193399	180723	212860	220547	206839	192149	206692
13	Mean	244444	269186	294806	334001	267138	321686	328445	376893	446975	313519
	St.-Dev.	157287	166950	187752	226779	190281	230418	260218	231458	303323	218548
14	Mean	278285	374743	403213	331352	294630	289437	310713	354208	405475	336920
	St.-Dev.	219550	234870	278698	215394	196074	169375	203989	274548	234155	228729
15	Mean	283269	270182	356162	315602	329174	296047	323860	346357	396379	322833
	St.-Dev.	154438	160663	207624	205151	162432	145146	172938	158737	80331	166439
16	Mean	308391	316641	311515	301248	244858	343960	440483	370177	418812	334942
	St.-Dev.	188757	273086	195497	225281	188138	278659	178644	182113	154214	216667
17	Mean	317869	333628	368929	349610	314346	288836	311805	369048	411195	338095
	St.-Dev.	168421	192756	224263	222370	127296	156226	155917	184407	235284	189149
Total	Mean	337878	348643	370161	346574	295686	309427	319556	351866	388016	339418
	St.-Dev.	229348	233629	251539	240818	196475	210873	214236	223864	225024	227043

Note: Productivity is measured as value-added over total number of employees (in DKK). The first number provides the mean productivity for the specific sub-sector within the manufacturing sector whereas the second number refers to the standard deviation. Due to data protection policies, we don't specify the considered sub-sectors.

C. Productivity Patterns of Exporters and Domestic Firms

Table 11: Productivity Patterns of Danish Firms

		1995			1996			1997		
		0	1	Total	0	1	Total	0	1	Total
1	Mean	348192	405636	397495	431727	395657	400096	375743	428705	420916
	St.-Dev	268930	253052	255049	321087	253308	261412	349574	295769	303435
2	Mean	409905	362125	365600	326989	394431	386796	410996	408496	408905
	St.-Dev	105898	236197	228990	225055	208628	209377	235615	202389	205502
3	Mean	259849	222808	230024	233676	237332	236499	203833	266726	250578
	St.-Dev	273672	241171	246371	256976	256518	254973	201727	274418	257885
5	Mean	310391	479830	471565	257293	429916	422070	358860	473625	466874
	St.-Dev	385856	336095	335260	363868	331665	330587	277123	337554	333049
6	Mean	406082	349319	350527	32400	413020	405839	351225	367560	366700
	St.-Dev		239273	236803		218368	222488	292540	215343	216699
7	Mean	547754	378774	416325	482533	313966	351893	532096	402487	436595
	St.-Dev	389251	223916	272135	287548	219071	242816	324161	240576	266721
8	Mean	313215	368719	364279	189111	394687	385749	159095	412026	375893
	St.-Dev	39148	235059	225717		204060	203924	140080	181842	195688
9	Mean	320565	304705	308064	369272	335325	341497	256589	396179	370329
	St.-Dev	159343	161679	160374	220464	162109	173205	181722	236205	232568
10	Mean	327140	342657	341967	311574	354650	351645	281307	359801	354607
	St.-Dev	268445	190681	193470	176469	207921	205570	211271	198564	199569
11	Mean		262578	262578		307266	307266	199816	276520	268849
	St.-Dev	158068	158068			186660	186660		182504	173768
12	Mean	197999	319415	305539	87070	276808	260066	245038	303685	298187
	St.-Dev	147743	194189	191664	150682	225484	224902	217976	231206	227267
13	Mean	18456	253860	244444	183919	276292	269186	299093	294026	294806
	St.-Dev		153303	157287	154916	169020	166950	226628	186075	187752
14	Mean	391943	271599	278285	405102	373057	374743	426702	400940	403213
	St.-Dev	99484	223595	219550	57378	241178	234870	447090	268428	278698
15	Mean	158939	302396	283269	311973	264212	270182	127795	369595	356162
	St.-Dev	213499	145103	154438	58459	170920	160663		205793	207624
16	Mean	308391	308391	2691		340791	316641	12369	365906	311515
	St.-Dev		188757	188757		268226	273086	15116	157125	195497
17	Mean	367619	310928	317869	172636	360460	333628	221193	388199	368929
	St.-Dev	249678	156824	168421	156869	186373	192756	167857	224899	224263
Total	Mean	333608	338407	337878	317279	352730	348643	307962	379690	370161
	St.-Dev	249569	226902	229348	254819	230599	233629	265642	248127	251539
		1998			1999			2000		
		0	1	Total	0	1	Total	0	1	Total
1	Mean	386447	413444	409735	376742	297124	308959	419667	318176	332079
	St.-Dev	313292	273557	278198	250463	205218	213497	318070	228821	244172
2	Mean	330475	426067	412947	320703	336547	334963	265942	355251	346664
	St.-Dev	193209	206145	205255	100160	194262	186357	184906	235846	231427
3	Mean	173386	251454	230909	112481	241393	185531	94220	223859	171722
	St.-Dev	174073	276753	255032	170239	228773	214251	134579	215324	196884
5	Mean	723304	474755	485332	534746	402326	412135	539485	460845	462632
	St.-Dev	295304	330614	330183	176030	276016	270951		260800	258023
6	Mean	355023	360030	359566	224839	280836	278762	403990	317195	318864
	St.-Dev	218085	226626	223843	272300	164813	166287		164501	163324
7	Mean	448110	300303	348340	291521	383646	362918	402599	383700	389319
	St.-Dev	374343	203831	275194	222617	232918	231117	150315	207806	190634
8	Mean	285627	302740	300686		345229	345229	41397	309921	300662
	St.-Dev	246161	218573	216528		200761	200761		208476	210705
9	Mean	240214	332605	312207	207711	307622	291358	276390	335139	325612
	St.-Dev	174343	183271	184288	131070	157691	157400	131134	126354	128092
10	Mean	306942	336646	335364	341635	288997	291116	223283	298773	295538
	St.-Dev	189103	193504	192738	152699	139821	140188	190853	172799	173541
11	Mean	202700	350151	338809	297833	376900	368115		479540	479540

	St.-Dev		205644	201091	274689	258296			225388	225388
12	Mean	189947	264387	260008	201	219689	212830	30470	246305	231420
	St.-Dev	268394	192759	193399		179427	180723	42953	213043	212860
13	Mean	256699	343278	334001	314995	260048	267138	74187	331205	321686
	St.-Dev	225131	229776	226779	183871	193575	190281	229503	230418	
14	Mean	202231	339960	331352	392977	288484	294630	381286	286813	289437
	St.-Dev	285998	213418	215394	35577	200553	196074		171104	169375
15	Mean		315602	315602	317226	329971	329174	297829	295910	296047
	St.-Dev		205151	205151		168101	162432		151071	145146
16	Mean		326352	301248		244858	244858		343960	343960
	St.-Dev		215471	225281		188138	188138		278659	278659
17	Mean	235748	364461	349610	260978	317752	314346	254680	291335	288836
	St.-Dev	148593	227231	222370	84335	129438	127296	116293	159584	156226
Total	Mean	299416	353498	346574	246839	302863	295686	243699	318486	309427
	St.-Dev	256986	237753	240818	214182	192846	196475	230682	206528	210873
			2001			2002			2003	
		0	1	Total	0	1	Total	0	1	Total
1	Mean	310819	326905	324807	363596	381230	379590	391816	414705	412590
	St.-Dev	234235	214388	216243	242027	244511	243395	273081	236235	238682
2	Mean	307333	365572	359376	403017	369603	372641	410780	432709	431523
	St.-Dev	179075	202189	198884	116518	184240	178405	118928	186972	182851
3	Mean	117634	198897	184311	151806	324600	244525	110335	306330	218275
	St.-Dev	154424	260222	245794	210336	269474	257438	157419	272276	246810
5	Mean	554341	458156	462338	14303	460506	449623	128963	481205	472399
	St.-Dev	766886	306494	321288		346068	348748		330072	330539
6	Mean	443430	317006	319696	453612	324592	327280		391724	391724
	St.-Dev		182722	181664		162967	162296		147829	147829
7	Mean	364252	383913	377734	321843	386968	365846	380611	464022	438535
	St.-Dev	188326	163342	169014	125631	238654	209161	202207	285397	262779
8	Mean		292223	292223		345411	345411		404392	404392
	St.-Dev		155766	155766		155119	155119		146872	146872
9	Mean	255126	308063	299104	269379	368306	358576	212954	375971	363432
	St.-Dev	135304	149657	147676	156824	166382	166873	134175	143564	148246
10	Mean	243915	324146	319955	303498	355102	352774	416077	391723	393180
	St.-Dev	163993	169518	169583	169324	185839	184846	159609	164403	163550
11	Mean		515338	515338		370337	370337		455229	455229
	St.-Dev		319780	319780		337531	337531		349424	349424
12	Mean	56419	290803	281789	313734	312544	312598	351582	348779	348912
	St.-Dev		220152	220547		211946	206839		197139	192149
13	Mean		328445	328445		376893	376893		446975	446975
	St.-Dev		260218	260218		231459	231459		303323	303323
14	Mean	324092	310295	310713	59033	363731	354209	189335	420913	405475
	St.-Dev		207238	203989		273662	274548	261347	229461	234155
15	Mean	5199	350415	323860		346357	346357		396379	396379
	St.-Dev		150419	172938		158737	158737		80331	80331
16	Mean		440483	440483		370177	370177		418812	418812
	St.-Dev		178644	178644		182113	182113		154214	154214
17	Mean	318208	311405	311805	595364	361748	369048	732380	400488	411195
	St.-Dev	61425	160480	155917		182695	184408		231499	235284
Total	Mean	268555	325115	319556	246738	365228	351866	254854	404177	388016
	St.-Dev	217199	213336	214236	212825	221839	223864	230358	219121	225024

Note: Productivity is measured as value-added over total number of employees (in DKK). The first number provides the mean productivity for the specific sub-sector within the manufacturing sector whereas the second number refers to the standard deviation. Due to data protection policies, we don't specify the considered sub-sectors.

D. External Promotion of Top 5 CEOs

Table 12: External Promotion of Management - Top 5

	Domestic			Exporter			Total		
	0	1	total	0	1	total			
1995	147	30	177	687	214	901	834	244	1,078
1996	165	23	188	764	171	935	929	194	1,123
1997	160	34	194	715	190	905	875	224	1,099
1998	157	26	183	709	223	932	866	249	1,115
1999	158	31	189	672	229	901	830	260	1,090
2000	138	32	170	600	250	850	738	282	1,020
2001	101	25	126	564	216	780	665	241	906
2002	88	31	119	568	176	744	656	207	863
2003	80	19	99	495	169	664	575	188	763
Total	1,194	251	1445	5774	1838	7612	6,968	2,089	9,057

Note: If one of the top 5 management members (in terms of highest income) is promoted externally, a firm is considered as an external promoter. Whether the hired manager has export experience is not controlled for.

Table 13: External Promotion of a Manager. With and Without Export Experience

		Domestic			Exporter			Total		
		0	1	Total	0	1	Total	0	1	Total
experience = 0	1995	147	30	177	687		687	834	30	864
	1996	165	4	169	717		717	882	4	886
	1997	155	5	160	659		659	814	5	819
	1998	150	4	154	642		642	792	4	796
	1999	147	5	152	589		589	736	5	741
	2000	129	2	131	517		517	646	2	648
	2001	93	5	98	484		484	577	5	582
	2002	78	0	78	474		474	552	0	552
	2003	74	0	74	410		410	484	0	484
	Total	1138	55	1193	5179		5179	6,317	55	6,372
experience = 1	1995	0	0	0	0	214	214	0	214	214
	1996	0	19	19	47	171	218	47	190	237
	1997	5	29	34	56	190	246	61	219	280
	1998	7	22	29	67	223	290	74	245	319
	1999	11	26	37	83	229	312	94	255	349
	2000	9	30	39	83	250	333	92	280	372
	2001	8	20	28	80	216	296	88	236	324
	2002	10	31	41	94	176	270	104	207	311
	2003	6	19	25	85	169	254	91	188	279
	Total	56	196	252	595	1838	2433	651	2,034	2,685

Note: The table accounts for whether a firm (only domestic or exporter) has promoted a person for a position within the top 5 management group externally. Furthermore, it is distinguished between a new manager who was previously employed at an exporting company (experience=1) and a person who comes from a non-exporting enterprise (experience=0).