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# Chief Executive Officer Attributes and Trade

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**Abstract:** *Many articles in international trade literature have shown that firm productivity is a robust determinant of firms' export and import activities. Further, the literature has also found that, despite being statistically significant, the magnitude of impact of firm productivity on exports/imports is not large, and there are many firms which are productive enough to be able to export their goods but do not and also many firms which are not productive enough to export but do. This paper posits that, amongst many determinants for export activity other than firm productivity, Chief Executive Officer (CEO) attributes is one of them. Using a large unique firm-level data set, this study examines the effects of CEO attributes and other firm characteristics on firms' export and import activities. It is found that CEO education abroad matters, and its impact is even higher than other factors. CEOs' age and gender have little association with exports/imports.*

**Keywords:** CEO attributes, Trade

**JEL Classification:** F14

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# 1. Introduction

Since the seminal contribution of a heterogeneous firms trade model by Melitz (2004), there is a growing literature that shows empirical regularities of the productivity sorting on trade activities predicted by the model, using firm-level data of many countries. Only the most productive firms engage in international trade activities, whereas the least-productive firms are active only in the domestic market. Although the regularities are found to be robust by many studies, the previous studies also show that, although statistically significant, the impact of productivity is relatively small in its magnitude on firms' export/import decision. Whereas there are many high-productivity firms that do not engage in international trade activities, there are also many low-productivity firms that are active in international trade. What are the factors other than productivity that determine firms' internationalization? Amongst many potential factors, this paper argues that Chief Executive Officer (CEO) attributes matter for export/import decisions. One of the CEO attributes this paper focuses on is experience in foreign countries in the form of studying abroad. More specifically, it hypothesises that firms run by CEOs who have degrees from schools in foreign countries tend to be engaged in trade activities. Using a unique firm-level dataset, this paper investigates the impact of CEO attributes, such as gender and age, but especially focusing on CEOs education in foreign countries.

**Literature**

Numerous studies empirically confirm the productivity sorting predicted by Melitz (2004): Eaton, Kortum, Kramarz (2011) for French firms, Greenaway and Kneller (2004) for United Kingdom firms, Kimura and Kiyota (2006) for Japanese firms, Mayer and Ottaviano (2007) for Belgian firms amongst others. However, the existing literature also finds that the effect of productivity on firms' trade activities is very small. Bernard and Jensen (2004), using United States plant-level data, found that a 100% increase in total factor productivity (TFP) raises the probability of export by only 1.7 percentage points. Using data from Germany, Bernard and Wagner (2001) found similar effects of small magnitude of labour productivity on firms' export activities.

Some studies show trade finance matters for exports (Spatareanu and Javorcik, 2009; Demir and Javorcik, 2018; Demir and Javorcik, 2020). In other words, good access to financial markets is an important factor for firms' internationalisation, especially for exporting firms because they need to bear the costs from the shipment of their goods until payment, which usually is with usance (typically 60–180 days after the shipment). Some other studies found that CEO attributes also determine firms' trade activities. For example, using Japanese firm-level data, Sato and Todo (2014) found that SMEs run by a risk-tolerant, forward-looking president are more likely to be internationalised. Sala and Yalcin (2015), using firm-level data from Belgium, showed that the managers' export experience in previous jobs matters for export activities. This paper adds new evidence to the existing literature of the effect of CEO attributes on firms' trade activity. It is also related to the literature of the language effect of the gravity model. Numerous existing studies showed that language matters for trade, using trade data at country/product level. This paper indicates a positive impact of the language effect, which is one of foreign-educated CEOs' communication skills with foreign partners.

## 2. Data

### 2.1. Data source

We use firm-level data compiled by Tokyo Shoko Research (TSR) Limited, one of the largest credit rating companies in Japan, which records data on both listed and non-listed companies. The dataset covers approximately 1.4 million firms for each year from 2012 to 2019.[1] The dataset covers approximately 60% of all firms, even those with a single worker, in Japan. The data provide information on firm characteristics such as paid-up capital, number of employees, year of establishment, address, and firm performance such as sales, profits, and export/import activities. Importantly for the purpose of this paper, it includes information on CEO attributes such as gender, date of birth, and graduated school. This paper attempts to investigate the effect of the attributes mentioned above by exploiting the panel

[1] We have yearly data from 2006 to 2019, but export/import information is available only from 2012.

structure of the data, which span from 2012 to 2019. Amongst several estimation equations, we exploit the information on the change of CEOs and the change of export/import status.

### 2.2. Descriptive statistics

There are approximately 1.4 to 1.5 million firms recorded for each year, as Table 1 shows. The number of recorded firms has increased gradually from 2012 to 2019, despite the overall declining number of firms in Japan, because TSR collects information from a larger number of firms over time. Out of about 1.4 million firms, approximately 1.3% exported their goods. The ratio slightly increased to approximately 1.6% in 2019. The ratio of importing firms is higher at 2.4% in 2012 and slightly increased to 2.6% in 2019. These ratios are lower than those found in the Japanese government statistics such as the basic survey of corporate activities, mainly because TSR data include very small firms.

As mentioned above, the dataset includes the information on CEOs' schools, the variable of main interest in this study. This is unique and valuable information, which is not available in other firm-level datasets in Japan. However, for 59.6% of approximately 1.4 million firms per year, the information on schools is missing. It can be imagined that CEOs of large firms tend to report the information on their education, or the information is publicly available. To check this, we have regressed the availability of information about CEOs' schools on the size of firms, namely, the number of employees and sales values. In Table 2, the firm size variables, i.e. the number of employees and the sales values, show statistically significant coefficient estimates with positive signs, indicating that information on CEO education tends to be available for larger firms. Analytical studies below take this reporting bias into consideration.

## Table 1: Number of Firms, Exporting Firms, Importing Firms

| Year | Firms | Exporting firms | Ratio of exporting firms | Importing firms | Ratio of importing firms |
|---|---|---|---|---|---|
| 2012 | 1,395,009 | 18,570 | 0.0133 | 33,828 | 0.024 |
| 2013 | 1,456,276 | 19,430 | 0.0133 | 35,288 | 0.024 |
| 2014 | 1,480,625 | 20,069 | 0.0136 | 36,348 | 0.025 |
| 2015 | 1,493,076 | 20,971 | 0.0140 | 37,204 | 0.025 |
| 2016 | 1,499,283 | 21,835 | 0.0146 | 37,863 | 0.025 |
| 2017 | 1,498,964 | 22,550 | 0.0150 | 38,365 | 0.026 |
| 2018 | 1,516,663 | 23,427 | 0.0154 | 39,289 | 0.026 |
| 2019 | 1,521,675 | 24,050 | 0.0158 | 40,270 | 0.026 |

Source: Authors' computation from Tokyo Shoko Research dataset.

## Table 2: Reporting Bias

**School information reporting bias**

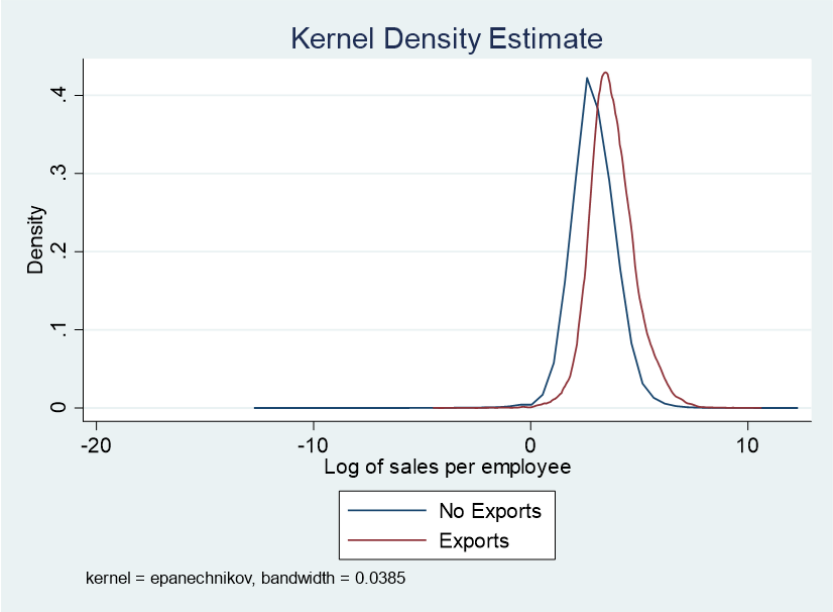
| | (1) | (2) |
|---|---|---|
| | schoolinfo_sales | schoolinfo_employees |
| VARIABLES | CEO school information being available | CEO school information being available |
| Log of sales values | 0.0731*** | |
| | (7.36e-05) | |
| Log of number of employees | | 0.0895*** |
| | | (0.000111) |
| Year fixed effects | ✓ | ✓ |
| Observations | 11,523,963 | 11,186,111 |
| R-squared | 0.081 | 0.057 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer.
Source: Authors' estimation from Tokyo Shoko Research dataset.

Figure 1 shows the distribution of firm productivity by export status of our dataset. Consistent with the existing literature, exporting firms tend to be more productive, but notably there is a substantial overlap in firm productivity between export firms and no-export firms. The Kolmogorov-Smirnov test shown in Table 3 indicates a statistically significant difference between the two distributions. The case for imports is in Figure 2 and Table 4, which is very similar to that of exports. As mentioned in the introduction, this paper aims to investigate the reasons of this overlap, focusing on CEOs' attributes.

**Figure 1: Distribution of Firm Productivity by Export Status**




Source: Authors' elaboration using Tokyo Shoko Research dataset.

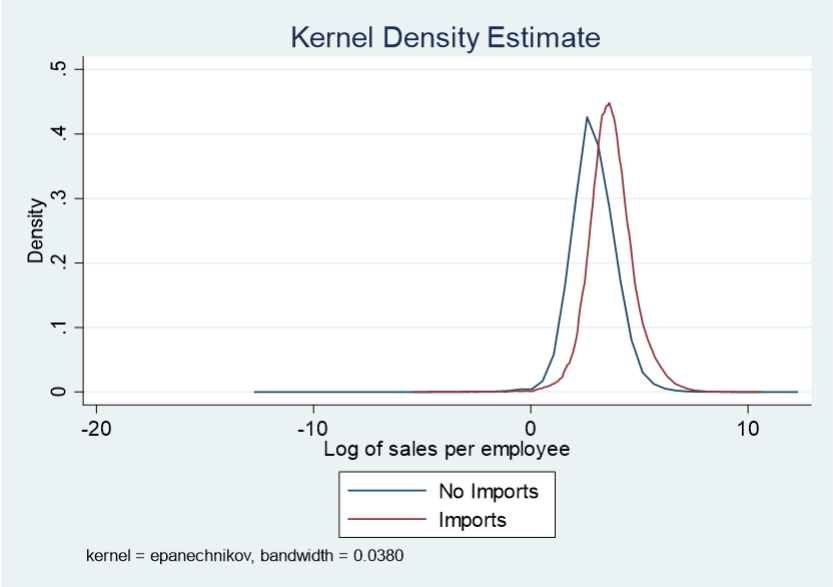
**Table 3: Kolmogorov-Smirnov Test – Exports**

Two-sample Kolmogorov-Smirnov test for equality of distribution functions

| Smaller group | D | P-value |
|---|---|---|
| 0: | 0.3288 | 0.000 |
| 1: | -0.0000 | 1.000 |
| Combined K-S: | 0.3288 | 0.000 |

Source: Authors' computation using Tokyo Shoko Research dataset.

**Figure 2: Distribution of Firm Productivity by Import Status**




Source: Authors' computation using Tokyo Shoko Research dataset.

**Table 4: Kolmogorov-Smirnov Test – Imports**

Two-sample Kolmogorov-Smirnov test for equality of distribution functions

| Smaller group | D | P-value |
|---|---|---|
| 0: | 0.3320 | 0.000 |
| 1: | -0.0000 | 1.000 |
| Combined K-S: | 0.3320 | 0.000 |

Source: Authors' computation using Tokyo Shoko Research dataset.

Table 5 and Table 6 show firm characteristics and CEO attributes by export and import status, respectively. As the much larger mean values for number of employees and sales value show, export (import) firms tend to be much larger than no-export (no-import) firms. Export (import) firms also tend to be more productive than no-export (no-import) firms. In terms of firm age, export firms tend to be older, which is intuitive because surviving firms tend to be more productive and thus export their goods. On the other hand, there is no difference in firm age in the case of imports. CEO age is slightly younger for export (import) firms. Japanese firms are run overwhelmingly by male CEOs at 96%. There is almost no difference in CEO gender between export (import) and no-export (no-import) firms. As to CEO education in foreign countries, 2.2% of export (import) firms are run by foreign

university graduate CEOs, whereas the ratio is 0.4% for no-export firms and 0.3% for no-import firms.

Turning to CEOs' foreign university or domestic school education and firm characteristics, as shown in Table 7, out of approximately 4.8 million observations for which CEO school information is available, about 21,000 are run by foreign university graduate CEOs. Approximately 73% of firms run by foreign university graduate CEOs are in urban areas, whereas the ratio for firms run by domestic school graduate CEOs in urban areas is about 43%. We define Saitama, Chiba, Tokyo, Kanagawa, Aichi, Kyoto, Osaka, and Hyogo as urban areas.[2] Estimation analysis in Table 8 confirms this tendency. Table 9 shows the mean values for firm characteristics and attributes by CEOs' education. Firms run by foreign graduate CEOs are much larger in terms of number of employees and sales values. This tendency is statistically significant, as shown in Table 10. Foreign university graduate CEOs are younger than domestic school graduate CEOs. There is no difference in the gender ratio.

[2] As there is no standard definition for urban areas in Japan, we define the urban areas as follows. We chose prefectures which are within the major economic areas of Tokyo, Osaka, and Nagoya and have high population density.

## Table 5: Firm Characteristics and CEO Attributes by Export Status

| Export status | Number of employees | Sales value | Sales value per employee | Firm age | CEO's age | CEO gender male | Foreign university graduate CEOs |
|---|---|---|---|---|---|---|---|
| 1 | 226.64 | 20,825.48 | 86.92 | 42.51 | 60.47 | 0.97 | 0.02 |
| 0 | 31.67 | 1,534.48 | 35.76 | 37.02 | 62.15 | 0.95 | 0.00 |

Note: Unit - Million yen for Sales value and Sales value per employee

CEO = Chief Executive Officer.

Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 6: Firm Characteristics and CEO Attributes by Import Status

| Import status | Number of employees | Sales value | Sales value per employee | Firm age | CEO's age | CEO gender male | Foreign university graduate CEOs |
|---|---|---|---|---|---|---|---|
| 1 | 114.36 | 10,726.33 | 78.06 | 37.05 | 59.82 | 0.96 | 0.02 |
| 0 | 33.34 | 1,653.28 | 35.26 | 37.18 | 62.21 | 0.96 | 0.00 |

Note: Unit - Million yen for Sales value and Sales value per employee

CEO = Chief Executive Officer.

Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 7: Location of Firms by Domestic- or Foreign-Educated CEOs

**Location of firms by domestic or foreign educated CEOs**

| | Total number of firms | Located in urban areas | Share of urban areas |
|---|---|---|---|
| Foreign university graduate CEO firm | 20,615 | 15,090 | 73.20% |
| Domestic school graduate CEO firm | 4,763,649 | 2,037,776 | 42.78% |

CEO = Chief Executive Officer.

Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 8: Estimation – Foreign Graduate CEOs and Firm Location

| Foreign graduate CEOs and location | |
|---|---|
| VARIABLES | Foreign university graduate CEOs |
| Firm location being urban | 0.00533*** |
| | (6.05e-05) |
| Year fixed effects | ✓ |
| Observations | 4,784,264 |
| R-squared | 0.002 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer.
Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 9: Mean Value of Firm and CEO Attributes by Foreign University Graduate

| | Number of employees | Sales value | Sales value per employee | Firm age | CEO's age | CEO gender male |
|---|---|---|---|---|---|---|
| Foreign university graduate CEO firm | 214.77 | 16,480.69 | 70.55 | 37.59 | 55.80 | 0.93 |
| Domestic school graduate CEO firm | 23.17 | 1,080.90 | 31.00 | 31.74 | 60.96 | 0.92 |

Note: Unit - Million yen for Sales value and Sales value per employee

CEO = Chief Executive Officer.
Source: Authors' computation using Tokyo Shoko Research dataset.

**Table 10: Estimation – Foreign Graduate CEOs and Firm Size**

**Foreign graduate CEOs and firm size**

| | (1) | (2) |
|---|---|---|
| VARIABLES | Foreign university graduate CEOs | Foreign university graduate CEOs |
| Log of sales values | 0.00141*** | |
| | (1.62e-05) | |
| Log of number of employees | | 0.00183*** |
| | | (2.22e-05) |
| Year fixed effects | ✓ | ✓ |
| Observations | 4,712,106 | 4,696,804 |
| R-squared | 0.002 | 0.001 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer.
Source: Authors' computation using Tokyo Shoko Research dataset.

# 3. Estimation Analyses

## 3.1. Export/Import status as dependent variable (Panel data)

The benchmark estimation equation we employ is:

$$\begin{aligned} Export/Import_{ft} &= \beta_0 + \beta_1 ForeignUniversityGraduateCEOs_{ft} \\ &+ \beta_2 CEO\ school\ information\ available_{ft} + \beta_3 CEO's\ age_{ft} \\ &+ \beta_4 CEO's\ gender_{ft} + \beta_5 Firm\ size, productivity_{ft} \\ &+ \beta_6 Firm\ age_{ft} + u_f + u_t + \varepsilon_{ft}, \end{aligned}$$

where the subscript $f$ and $t$ represents firm and year respectively. $Export_{ft}$ is a binary variable which takes 1 if the firm $f$ exported their goods in the year $t$; otherwise, 0. $ForeignUniverstiyGraduateCEOs_{ft}$ is a binary variable which takes 1 if the CEO of firm $f$ in the year $t$ is the one with a foreign university graduate degree; otherwise, 0. $CEO\ school\ information\ available_{ft}$ is a binary variable which takes 1 if the school information for CEOs are available, and otherwise 0, to address the reporting bias argued above. $CEO's\ age$ and $Firm\ age$ are self-explanatory. $CEO's\ gender$ is a binary variable which takes 1 if CEO is male and 0 if female. For $Firm\ size, productivity$, we use number of employees, sales value, and sales value per employee. $u_f$ is firm fixed effects and $u_t$ is year fixed effects. $\varepsilon_{ft}$ is i.i.d. error. To this benchmark estimation, we add

several more variables, which will be explained below. Table 11 and Table 12, respectively, show the descriptive statistics and the correlation coefficient matrix for all the variables. Approximately 1% of firms are exporters and 1.8% are importers.[3] Approximately 0.2% of firms are run by foreign-university graduate CEOs. Although numbers of correlation coefficients are not large, foreign university graduate CEOs have positive correlation with exporters, importers, number of employees, sales values, and firm age.

**Table 11: Descriptive Statistics**

| Variable | Observations | Mean | Standard Deviation | Min | Max |
|---|---|---|---|---|---|
| Export status | 15,824,768 | 0.0103 | 0.1009 | 0 | 1 |
| Export status in the previous year | 13,878,077 | 0.0098 | 0.0983 | 0 | 1 |
| Start exporting | 15,824,768 | 0.0016 | 0.0401 | 0 | 1 |
| Import status | 15,824,768 | 0.0177 | 0.1318 | 0 | 1 |
| Import status in the previous year | 13,878,077 | 0.0167 | 0.1283 | 0 | 1 |
| Start importing | 15,824,768 | 0.0026 | 0.0508 | 0 | 1 |
| Foreign university graduate CEOs | 15,824,768 | 0.0019 | 0.0432 | 0 | 1 |
| CEO changed to foreign univ. graduate | 15,824,768 | 0.0001 | 0.0110 | 0 | 1 |
| CEO gender male being 1, female being 0 | 15,802,752 | 0.9296 | 0.2558 | 0 | 1 |
| CEO's age | 12,430,055 | 60.4455 | 11.4387 | 0 | 131 |
| CEO school information being available | 15,824,768 | 0.4672 | 0.4989 | 0 | 1 |
| Number of employees | 15,651,980 | 24.5374 | 380.9620 | 0 | 254,177 |
| Sales value (1 million yen) | 15,666,357 | 1237.2600 | 64950.3000 | -3.948 | 1.00E+08 |
| Firm age | 13,862,926 | 34.1063 | 17.4501 | 0 | 150 |
| Small and Medium Sized Enterprises | 15,824,768 | 0.9853 | 0.1203 | 0 | 1 |
| Credit score | 15,793,474 | 46.6188 | 5.9270 | 0 | 92 |

CEO = Chief Executive Officer.
Source: Authors' computation using Tokyo Shoko Research dataset.

[3] The number of firms and the exporters/importers ratios are slightly different from those in Table 1 because those firms, which do not report the necessary information for the categorization of SMEs, i.e. industry codes, number of employees or paid-up capitals, are deleted from the sample.

## Table 12: Correlation Coefficients Between Covariates

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) | (16) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (1) Export status | 1.00 | | | | | | | | | | | | | | | |
| (2) Export status in the previous year | 0.90 | 1.00 | | | | | | | | | | | | | | |
| (3) Start exporting | 0.40 | -0.01 | 1.00 | | | | | | | | | | | | | |
| (4) Import status | 0.38 | 0.35 | 0.15 | 1.00 | | | | | | | | | | | | |
| (5) Import status in the previous year | 0.36 | 0.38 | 0.02 | 0.91 | 1.00 | | | | | | | | | | | |
| (6) Start importing | 0.14 | 0.01 | 0.32 | 0.39 | -0.01 | 1.00 | | | | | | | | | | |
| (7) Foreign university graduate CEOs | 0.04 | 0.04 | 0.01 | 0.05 | 0.04 | 0.02 | 1.00 | | | | | | | | | |
| (8) CEO changed to foreign univ. graduate | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.26 | 1.00 | | | | | | | | |
| (9) CEO gender male being 1, female being 0 | 0.01 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | -0.00 | 0.00 | 1.00 | | | | | | | |
| (10) CEO's age | -0.00 | -0.00 | -0.00 | -0.01 | -0.01 | -0.01 | -0.02 | -0.01 | -0.05 | 1.00 | | | | | | |
| (11) CEO school information being available | 0.06 | 0.05 | 0.02 | 0.07 | 0.06 | 0.03 | 0.04 | 0.01 | 0.08 | 0.12 | 1.00 | | | | | |
| (12) Number of employees | 0.06 | 0.05 | 0.02 | 0.03 | 0.03 | 0.01 | 0.02 | 0.01 | 0.01 | 0.00 | 0.03 | 1.00 | | | | |
| (13) Sales value (1 million yen) | 0.05 | 0.05 | 0.02 | 0.03 | 0.03 | 0.01 | 0.01 | 0.01 | 0.01 | 0.00 | 0.02 | 0.46 | 1.00 | | | |
| (14) Firm age | 0.04 | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.22 | 0.21 | 0.05 | 0.04 | 1.00 | | |
| (15) Small and Medium Sized Enterprises | -0.09 | -0.08 | -0.03 | -0.05 | -0.05 | -0.02 | -0.02 | -0.01 | -0.01 | -0.02 | -0.06 | -0.23 | -0.16 | -0.09 | 1.00 | |
| (16) Credit score | 0.11 | 0.10 | 0.04 | 0.09 | 0.08 | 0.03 | 0.03 | 0.01 | 0.05 | -0.01 | 0.23 | 0.11 | 0.08 | 0.25 | -0.24 | 1.00 |

CEO = Chief Executive Officer.
Source: Authors' computation using Tokyo Shoko Research dataset.

The estimation results are in Table 13 for exports. Column (1) is a simple regression. The variable of our interest, $ForeignUniverstiyGraduateCEOs_{ft}$, shows a statistically significant coefficient estimate with positive sign. CEO age shows a positive significant coefficient estimate, although with a very small magnitude. Gender is insignificant.[4] Log of sales value shows statistically significant positive coefficient, which is consistent with the existing literature. Firm age is positive significant. In column (2), we add $CEO\ school\ information\ available_{ft}$ . The positive significant coefficient estimates mean that firms for which CEOs' school information are available tend to export their goods. In column (3), we include year fixed effects. The inclusion of year fixed effects does not change the coefficient estimate for $ForeignUniverstiyGraduateCEOs_{ft}$, indicating that there is not much variation over time. In column (4), we include firm fixed effects, but not year fixed effects. This estimation essentially captures the effect of the *change* of CEOs from a domestic school CEO to a foreign university graduate CEO. The coefficient estimate for $ForeignUniverstiyGraduateCEOs_{ft}$ is highly statistically significant with positive sign, but the magnitude of the coefficient estimate decreased substantially compared with the estimation without firm fixed effects (column [1]). When including both year fixed effects and firm fixed effects as in column (5), the coefficient estimate for $ForeignUniverstiyGraduateCEOs_{ft}$ remains highly statistically significant. In column (6), the lagged dependent variable is included as an explanatory variable to control prior status of exports/imports. The lagged dependent variable shows highly statistically significant coefficient estimate with positive sign.
$ForeignUniverstiyGraduateCEOs_{ft}$ remains statistically significant, although with a smaller magnitude. In column (7), we included SME dummy and the cross dummy of foreign-university-graduate CEOs and SMEs, expecting that the effect of CEOs education abroad matters more for SMEs than for large firms because CEOs of SMEs are more involved in firms' export/import decisions than those of

[4] This result might be Japan-specific, where only a very small proportion of firms are run by female CEOs as shown above. This contrasts with the case of China, where 24.6% of manufacturing firms are run by female CEOs (see Tang and Zhang, 2021).

large firms. But, contrary to our expectation, both variables show statistically insignificant coefficients. In column (8), we included the credit score variable, i.e. credit grading by TSR to control overall management quality of firms. Contrary to our expectation, it shows a statistically significant coefficient with a negative sign. As the credit score is computed from other firm attributes, such as sales values and firm age, it most probably suffers from high multicollinearity. In sum, we conclude that firms with foreign university graduate CEOs are likely to be exporters, and a *change* from a domestic school graduate CEO to a foreign university graduate CEO is also positively associated with export status. $Firm\ age$ becomes statistically insignificant when firm fixed effects are included. It is notable that the sign of CEOs' age changes to *negative* when controlling both firm and year fixed effects (column [5]), indicating that firms run by older CEOs are more likely to export their goods, but a change to a younger CEO has a positive association with exports. The estimation results for imports are in Table 14. They are very similar to the case of exports. The estimation results using number of employees or sales value per employee, instead of sales value, for $Firm\ size, productivity_{ft}$ are in the appendix. The results are very similar to those in Table 13 and Table 14.

## Table 13: Estimation Results:

## Export Status Panel Estimation with Sales Value

| VARIABLES | (1)<br>result1<br>Export status | (2)<br>result2<br>Export status | (3)<br>result3<br>Export status | (4)<br>result4<br>Export status | (5)<br>result5<br>Export status | (6)<br>result6<br>Export status | (7)<br>result7<br>Export status | (8)<br>result8<br>Export status |
|---|---|---|---|---|---|---|---|---|
| Export status in the previous year | | | | | | 0.756*** | 0.756*** | 0.756*** |
| | | | | | | (0.000223) | (0.000223) | (0.000223) |
| Foreign university graduate CEOs | 0.0674*** | 0.0659*** | 0.0642*** | 0.0423*** | 0.0332*** | 0.00494*** | 0.00554** | 0.00555** |
| | (0.000670) | (0.000670) | (0.000667) | (0.00117) | (0.00116) | (0.000819) | (0.00199) | (0.00201) |
| Log of sales values | 0.00917*** | 0.00888*** | 0.00881*** | -0.000333*** | 0.00245*** | 0.00104*** | 0.00104*** | 0.00107*** |
| | (2.10e-05) | (2.14e-05) | (2.13e-05) | (6.24e-05) | (6.27e-05) | (4.59e-05) | (4.60e-05) | (4.91e-05) |
| Firm age | -4.16e-06+ | -2.29e-05*** | 6.57e-05*** | -5.91e-05 | -1.12e-05 | -3.63e-06 | -3.61e-06 | -4.73e-06 |
| | (2.15e-06) | (2.16e-06) | (2.18e-06) | (3.75e-05) | (3.71e-05) | (2.69e-05) | (2.69e-05) | (2.71e-05) |
| CEO school information being available | | 0.00490*** | 0.00644*** | -0.00204*** | 0.00423*** | 0.00121*** | 0.00121*** | 0.00123*** |
| | | (7.27e-05) | (7.25e-05) | (0.000152) | (0.000151) | (0.000108) | (0.000108) | (0.000108) |
| CEO's age | 9.61e-05*** | 7.32e-05*** | -1.37e-05*** | 0.000409*** | -0.000254*** | -5.95e-05*** | -5.96e-05*** | -5.92e-05*** |
| | (3.07e-06) | (3.08e-06) | (3.08e-06) | (4.75e-06) | (5.03e-06) | (3.56e-06) | (3.56e-06) | (3.56e-06) |
| CEO gender male being 1, female being 0 | -8.28e-05 | -0.000745*** | -0.000797*** | -0.00214*** | -0.00168*** | -0.000122 | -0.000122 | -0.000122 |
| | (0.000147) | (0.000147) | (0.000146) | (0.000310) | (0.000307) | (0.000219) | (0.000219) | (0.000219) |
| Small and Medium Sized Enterprises | | | | | | | -0.00102* | -0.00104* |
| | | | | | | | (0.000434) | (0.000435) |
| Cross dummy of Foreign-university-graduate CEOs and SMI | | | | | | | -0.000691 | -0.000706 |
| | | | | | | | (0.00212) | (0.00213) |
| Credit score | | | | | | | | -1.83e-05* |
| | | | | | | | | (8.17e-06) |
| Year fixed effects | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,761,049 | 10,761,049 | 10,761,049 | 10,668,070 | 10,668,070 | 9,479,573 | 9,479,573 | 9,467,720 |
| R-squared | 0.020 | 0.021 | 0.030 | 0.605 | 0.613 | 0.854 | 0.854 | 0.855 |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium sized enterprise.

Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 14: Estimation Results – Import Status Panel Estimation with Sales Value

| VARIABLES | (1) result1 Import status | (2) result2 Import status | (3) result3 Import status | (4) result4 Import status | (5) result5 Import status | (6) result6 Import status | (7) result7 Import status | (8) result8 Import status |
|---|---|---|---|---|---|---|---|---|
| Import status in the previous year | | | | | | 0.753*** | 0.753*** | 0.753*** |
| | | | | | | (0.000219) | (0.000219) | (0.000219) |
| Foreign university graduate CEOs | 0.111*** | 0.107*** | 0.105*** | 0.0571*** | 0.0432*** | 0.00906*** | 0.00680** | 0.00645** |
| | (0.000861) | (0.000861) | (0.000855) | (0.00146) | (0.00144) | (0.000998) | (0.00243) | (0.00245) |
| Log of sales values | 0.0121*** | 0.0115*** | 0.0114*** | -0.000673*** | 0.00369*** | 0.00137*** | 0.00137*** | 0.00146*** |
| | (2.70e-05) | (2.75e-05) | (2.74e-05) | (7.76e-05) | (7.76e-05) | (5.60e-05) | (5.60e-05) | (5.98e-05) |
| Firm age | -0.000329*** | -0.000371*** | -0.000235*** | -5.20e-05 | 1.99e-05 | -7.23e-07 | -7.27e-07 | -2.34e-06 |
| | (2.76e-06) | (2.78e-06) | (2.79e-06) | (4.66e-05) | (4.59e-05) | (3.28e-05) | (3.28e-05) | (3.31e-05) |
| CEO school information being available | | 0.0110*** | 0.0134*** | -0.00334*** | 0.00623*** | 0.00191*** | 0.00191*** | 0.00193*** |
| | | (9.34e-05) | (9.29e-05) | (0.000189) | (0.000187) | (0.000132) | (0.000132) | (0.000132) |
| CEO's age | 0.000127*** | 7.54e-05*** | -5.83e-05*** | 0.000810*** | -0.000193*** | -5.85e-05*** | -5.85e-05*** | -5.77e-05*** |
| | (3.94e-06) | (3.96e-06) | (3.95e-06) | (5.90e-06) | (6.22e-06) | (4.34e-06) | (4.34e-06) | (4.34e-06) |
| CEO gender male being 1, female being 0 | -0.00373*** | -0.00522*** | -0.00530*** | -0.00168*** | -0.000977* | -5.18e-05 | -5.24e-05 | -3.40e-05 |
| | (0.000188) | (0.000189) | (0.000187) | (0.000386) | (0.000380) | (0.000267) | (0.000267) | (0.000267) |
| Small and Medium Sized Enterprises | | | | | | | -0.000804 | -0.000809 |
| | | | | | | | (0.000529) | (0.000531) |
| Cross dummy of Foreign-university-graduate CEOs and SMI | | | | | | | 0.00264 | 0.00288 |
| | | | | | | | (0.00258) | (0.00260) |
| Credit score | | | | | | | | -4.29e-05*** |
| | | | | | | | | (9.97e-06) |
| Year fixed effects | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,761,049 | 10,761,049 | 10,761,049 | 10,668,070 | 10,668,070 | 9,479,573 | 9,479,573 | 9,467,720 |
| R-squared | 0.020 | 0.022 | 0.036 | 0.630 | 0.641 | 0.868 | 0.868 | 0.868 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium sized enterprise.
Note: Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, p<0.1
Source: Authors' computation using Tokyo Shoko Research dataset.

### 3.2. Change from 2012 to 2019 (Cross-sectional analysis)

Although the above panel data analysis has the virtue of enabling us to control firm fixed effects and thus to single out the effect of a change of CEO, it might not perfectly capture the effect of a change from a domestic CEO to a foreign CEO, because $ForeignUniverstiyGraduateCEOs_{ft}$ may change from 0 to 0, or 0 to 1, or 1 to 0, or 1 to 1. In order to more precisely capture the effect of a change from a domestic school graduate CEO to a foreign university graduate CEO, this subsection takes changes from the initial year of 2012 to the last year of 2019 and converts the data into a cross-sectional set. It also enables us to include the variable that captures a change of CEOs itself (regardless of CEOs educational background), which may affect firms' export/import activities.[5] The estimation equation is now:

$$
\begin{aligned}
&Start\ Export/Import_f \\
&\quad = \beta_0 + \beta_1 CEOchange\_ForeignStudy_f + \beta_2 CEOchange_f \\
&\quad + \beta_3 Firm\ age_{f,2012} \\
&\quad + \beta_4 CEO\ school\ information\ available_{f,2012} + \widetilde{\beta_5}\tilde{X}_{f,2012} \\
&\quad + \widetilde{\beta_6}\tilde{X}_{f,change} + u_i + u_l + \varepsilon_f,
\end{aligned}
$$

where $Start\ Export/Import_f$ takes 1 if the firm's export (import) status was 0 in 2012 but changed to 1 in 2019. $CEOchange\_ForeignStudy_f$ takes 1 if the firm's CEO changed from a domestic school graduate CEO in 2102 to a foreign university graduate CEO in 2019.[6] To better identify the effect of this change, we also include $CEOchange_f$, which takes 1 if there was a change of C13EO from 2012 to 2019, irrespective of the place of their education; otherwise, it takes the value 0. Similar to the above benchmark estimation, we include $CEO\ school\ information\ available$, which takes 1 if CEO's school information is available in the year 2102; otherwise, 0. $\tilde{X}_{f,2012}$ is a firm size/productivity variable, i.e. number of employees, sales value, and sales value per employee.

[5] Hong et al. (2020) found that a change of CEOs increases business transactions (sales and purchase) with new partner firms.

[6] From 2012 to 2019, 82.3% of firms have no CEO change, whereas 14.76% have only once and 2.35% changed CEOs twice. Thus, a predominantly large share of firms did not change their CEOs or changed only once.

$Firm\ age_{f,2012}$ is the age of the firm in 2012. $\tilde{X}_{f,change}$ is the change of firm and CEO variables from 2012 to 2019, i.e. Log of number of employees change, Log of sales value change, Log of sales value per employee change, and CEO's age change. $u_i$ and $u_l$ are industry fixed effects and firm location fixed effects, respectively. $\varepsilon_f$ is an i.i.d. error. Table 15 shows the estimation results. In this estimation, we limit the data to firms which did not export their goods in 2012 and CEOs in 2012 are non-foreign-educated. When some of those firms exported in 2019, the variable $Start\ Export/Import_f$ takes 1. If a firm remains as non-exporter in 2019, it takes 0. We estimate the model by linear probability model, followed by Probit model. Table 15 shows the results of the linear probability model. The variable of our main interest, $CEOchange\_ForeignStudy_f$ shows statistically significant coefficient estimate with positive sign. The coefficient estimate for $CEOchange_f$ is also positive significant. On top of a positive impact of $CEOchange_f$, i.e. a simple change of CEO on $Start\ Export/Import_f$, a change from a domestic school graduate CEO to a foreign university graduate CEO further accelerated the start of export/import. Interestingly, such additional effect is stronger as we can see in the numbers of coefficient estimates. The coefficient estimate for $CEOchange_f$ is statistically significant but small, such as at around 0.003 or 0.004, whereas the coefficient estimate of $CEOchange\_ForeignStudy_f$ is around 0.22 for starting exports, indicating that a change from a domestic school graduate CEO to a foreign educated CEO raises the probability of starting of exports by 22 percentage points. The case for imports also shows statistically significant coefficients, but with slightly attenuated magnitude. The results of other variables are similar to those in the above benchmark estimation. The same equation is estimated by probit model as a robustness check. Table 16 shows the results. The results are qualitatively the same with those of the linear probability model of Table 15, although statistical significance of the coefficient estimate of $CEOchange\_ForeignStudy_f$ for imports are attenuated.

As a robustness check, we estimated the same equation excluding those firms which were presumably handed over to family members, because an incumbent CEO may have a vision to expand his/her business abroad and for that purpose

he/she may send his/her off-springs to study abroad. In this case, the experience of studying abroad is not a cause for the firm's export/import. The results are in Appendix Table A5. The results do not change qualitatively.[7]

In the above definition of start export/import in Table 15 and Table 16, we keep only those firms that did not export in 2012, discarding the information of the other firms. It may be worth investigating the effect of no-exporter to exporter vis-à-vis all the other firms, namely no-exporter to no-exporter, exporter to exporter, exporter to no exporter, because no-exporter to exporter should entail a substantial gearing-up vis-à-vis all the other cases, which is essentially 'business as usual'. We call this the 'broad' definition, whereas we call the previous one the 'narrow' definition. The estimation results are in Table 17, which are qualitatively similar to those in Table 15, whereas quantitatively the coefficient estimates for the 'broad' definition are smaller than those of the 'narrow' definition. This is probably because the 'broad' definition includes exporter-exporter firms, which are more likely to be run by foreign-university graduate CEOs, in the reference category. The estimation with Probit model is in Table 18, which is also similar to those in Table 16. The average marginal effects are computed in Table A6. The numbers are similar to those in the linear model.

[7] We show the results for exports in the appendix Table A5. The case for imports, which is available upon request, is also qualitatively the same.

## 4. Concluding Remarks and Discussion

This paper attempts to provide micro-data-based evidence of the effect of firm CEO attributes and firm characteristics on firms' internationalisation using a unique and large firm-level dataset. These issues have been little studied, but are very important, given that productivity has been found by the existing literature to be only a very small part of determinants for firms' internationalisation. It is found that CEO education abroad matters, and its impact is even higher than other factors, such as productivity, that have been deemed to be the major determinant of export/import activities. A change to a younger CEO shows mixed results, whereas CEO gender has little association with exports/imports. These results suggest an important role of CEOs' attributes; more specifically, their education abroad. Whereas many governments, typically the Japanese government, have been shrinking the subsidies for studies abroad, this study's results suggest that governments should not reduce budgets for scholarship for studies abroad but rather expand them.

## Table 15: Start Export / Import, Cross-sectional Data with Narrow Definition

| VARIABLES | (1) export_result1 Start exporting | (2) export_result2 Start exporting | (3) export_result3 Start exporting | (4) import_result1 Start importing | (5) import_result2 Start importing | (6) import_result3 Start importing |
|---|---|---|---|---|---|---|
| CEO changed to foreign univ. graduate | 0.219*** | 0.219*** | 0.221*** | 0.0635*** | 0.0632*** | 0.0657*** |
| | (0.0135) | (0.0135) | (0.0135) | (0.0155) | (0.0155) | (0.0155) |
| CEO changed | 0.00314*** | 0.00285*** | 0.00478*** | 0.00257*** | 0.00202*** | 0.00441*** |
| | (0.000453) | (0.000453) | (0.000451) | (0.000520) | (0.000520) | (0.000518) |
| Firm age | -5.76e-05*** | -3.87e-05*** | 1.33e-05+ | -0.000161*** | -0.000141*** | -7.31e-05*** |
| | (7.15e-06) | (7.07e-06) | (6.94e-06) | (8.21e-06) | (8.12e-06) | (7.97e-06) |
| CEO school information being available in 2012 | 0.000906*** | 0.000517* | 0.00164*** | 0.00104*** | 0.000433+ | 0.00180*** |
| | (0.000226) | (0.000227) | (0.000225) | (0.000259) | (0.000260) | (0.000258) |
| CEO age change (0 in case of no CEO change) | 7.16e-05*** | 6.34e-05*** | 8.90e-05*** | 3.80e-05+ | 2.51e-05 | 5.63e-05** |
| | (1.84e-05) | (1.84e-05) | (1.84e-05) | (2.12e-05) | (2.12e-05) | (2.12e-05) |
| Log of number of employees in 2012 | 0.00487*** | | | 0.00595*** | | |
| | (0.000108) | | | (0.000124) | | |
| Log of number of employees change (ln(n_emp2019/n_emp2012)) | 0.00416*** | | | 0.00499*** | | |
| | (0.000211) | | | (0.000242) | | |
| Log of sales value (1 million yen) in 2012 | | 0.00377*** | | | 0.00487*** | |
| | | (7.92e-05) | | | (9.09e-05) | |
| Log of sales value change (ln(sales2019/sales2012)) | | 0.00295*** | | | 0.00369*** | |
| | | (0.000161) | | | (0.000185) | |
| Log of sales per employee in 2012 | | | 0.00358*** | | | 0.00509*** |
| | | | (0.000127) | | | (0.000146) |
| Log of sales per employee change (ln(salesemp2019/salesemp2012)) | | | 0.00264*** | | | 0.00363*** |
| | | | (0.000162) | | | (0.000186) |
| 2012 SME | -0.0112*** | -0.0128*** | -0.0233*** | 0.000705 | -0.000521 | -0.0138*** |
| | (0.00117) | (0.00115) | (0.00113) | (0.00134) | (0.00132) | (0.00130) |
| Cross dummy of CEO changed to foreign univ. graduate and SME | -0.193*** | -0.194*** | -0.193*** | -0.00749 | -0.00823 | -0.00670 |
| | (0.0141) | (0.0141) | (0.0141) | (0.0162) | (0.0161) | (0.0162) |
| Four-digit industry fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Firm location prefecture fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 564,389 | 564,388 | 564,388 | 564,389 | 564,388 | 564,388 |
| R-squared | 0.035 | 0.036 | 0.033 | 0.039 | 0.040 | 0.037 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium sized enterprise.
Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 16: Start export / Import – Cross-sectional Data – Narrow Definition – Probit Model

| VARIABLES | (1)<br>export_result1<br>Start exporting | (2)<br>export_result2<br>Start exporting | (3)<br>export_result3<br>Start exporting | (4)<br>import_result1<br>Start importing | (5)<br>import_result2<br>Start importing | (6)<br>import_result3<br>Start importing |
|---|---|---|---|---|---|---|
| CEO changed to foreign univ. graduate | 1.227*** | 1.268*** | 1.303*** | 0.528 | 0.561+ | 0.622+ |
| | (0.302) | (0.300) | (0.290) | (0.340) | (0.338) | (0.326) |
| CEO changed | 0.106*** | 0.0567* | 0.201*** | 0.0706** | 0.0120 | 0.159*** |
| | (0.0268) | (0.0273) | (0.0261) | (0.0248) | (0.0254) | (0.0243) |
| Firm age | -0.00446*** | -0.00394*** | -0.000128 | -0.00797*** | -0.00774*** | -0.00385*** |
| | (0.000468) | (0.000466) | (0.000436) | (0.000424) | (0.000424) | (0.000399) |
| CEO school information being available in 2012 | 0.152*** | 0.129*** | 0.190*** | 0.112*** | 0.0832*** | 0.145*** |
| | (0.0194) | (0.0198) | (0.0192) | (0.0163) | (0.0166) | (0.0161) |
| CEO age change (0 in case of no CEO change) | 0.00186+ | 0.000746 | 0.00324** | 0.000287 | -0.000983 | 0.00157 |
| | (0.00112) | (0.00114) | (0.00109) | (0.00103) | (0.00105) | (0.00101) |
| Log of number of employees in 2012 | 0.239*** | | | 0.236*** | | |
| | (0.00649) | | | (0.00580) | | |
| Log of number of employees change (ln(n_emp2019/n_emp2012)) | 0.258*** | | | 0.225*** | | |
| | (0.0161) | | | (0.0137) | | |
| Log of sales value (1 million yen) in 2012 | | 0.213*** | | | 0.220*** | |
| | | (0.00523) | | | (0.00467) | |
| Log of sales value change (ln(sales2019/sales2012)) | | 0.269*** | | | 0.227*** | |
| | | (0.0136) | | | (0.0116) | |
| Log of sales per employee in 2012 | | | 0.246*** | | | 0.258*** |
| | | | (0.00874) | | | (0.00764) |
| Log of sales per employee change (ln(salesemp2019/salesemp2012)) | | | 0.219*** | | | 0.211*** |
| | | | (0.0130) | | | (0.0111) |
| 2012 SME | 0.0330 | 0.0872+ | -0.531*** | 0.279*** | 0.352*** | -0.292*** |
| | (0.0484) | (0.0484) | (0.0454) | (0.0494) | (0.0493) | (0.0467) |
| Cross dummy of CEO changed to foreign univ. graduate and SME | -0.817* | -0.910** | -0.813** | 0.0770 | -0.0155 | 0.0566 |
| | (0.327) | (0.325) | (0.315) | (0.357) | (0.355) | (0.343) |
| Firm location (prefecture) fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Industry fixed effects (ISIC 2 digit) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 549,159 | 549,158 | 549,158 | 558,215 | 558,214 | 558,214 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium sized enterprise.
Source: Authors' computation using Tokyo Shoko Research dataset.

## Table 17: Estimation Results - Start Exports/Imports - Cross-sectional Data - Broad Definition

| VARIABLES | (1) export_result1 Start exporting | (2) export_result2 Start exporting | (3) export_result3 Start exporting | (4) import_result1 Start importing | (5) import_result2 Start importing | (6) import_result3 Start importing |
|---|---|---|---|---|---|---|
| CEO changed to foreign univ. graduate | 0.0996*** | 0.0997*** | 0.102*** | 0.0344** | 0.0344** | 0.0370** |
| | (0.0112) | (0.0112) | (0.0112) | (0.0123) | (0.0123) | (0.0123) |
| CEO changed | 0.00281*** | 0.00246*** | 0.00461*** | 0.00325*** | 0.00271*** | 0.00508*** |
| | (0.000484) | (0.000484) | (0.000482) | (0.000531) | (0.000531) | (0.000528) |
| Firm age | -8.09e-05*** | -5.96e-05*** | -1.84e-06 | -0.000140*** | -0.000120*** | -5.24e-05*** |
| | (7.65e-06) | (7.56e-06) | (7.41e-06) | (8.39e-06) | (8.30e-06) | (8.13e-06) |
| CEO school information being available in 2012 | 0.00116*** | 0.000727** | 0.00195*** | 0.00101*** | 0.000430 | 0.00177*** |
| | (0.000245) | (0.000246) | (0.000244) | (0.000269) | (0.000270) | (0.000268) |
| CEO age change (0 in case of no CEO change) | 6.22e-05** | 5.32e-05** | 8.23e-05*** | 5.88e-05** | 4.62e-05* | 7.82e-05*** |
| | (1.97e-05) | (1.97e-05) | (1.98e-05) | (2.17e-05) | (2.17e-05) | (2.17e-05) |
| Log of number of employees in 2012 | 0.00530*** | | | 0.00577*** | | |
| | (0.000115) | | | (0.000126) | | |
| Log of number of employees change (ln(n_emp2019/n_emp2012)) | 0.00476*** | | | 0.00489*** | | |
| | (0.000227) | | | (0.000249) | | |
| Log of sales value (1 million yen) in 2012 | | 0.00410*** | | | 0.00468*** | |
| | | (8.42e-05) | | | (9.24e-05) | |
| Log of sales value change (ln(sales2019/sales2012)) | | 0.00348*** | | | 0.00367*** | |
| | | (0.000174) | | | (0.000191) | |
| Log of sales per employee in 2012 | | | 0.00402*** | | | 0.00492*** |
| | | | (0.000136) | | | (0.000149) |
| Log of sales per employee change (ln(salesemp2019/salesemp2012)) | | | 0.00304*** | | | 0.00357*** |
| | | | (0.000175) | | | (0.000191) |
| 2012 SME | -0.00231* | -0.00379*** | -0.0156*** | 0.00240+ | 0.00148 | -0.0118*** |
| | (0.00115) | (0.00113) | (0.00110) | (0.00126) | (0.00124) | (0.00121) |
| Cross dummy of CEO changed to foreign univ. graduate and SME | -0.0770*** | -0.0781*** | -0.0769*** | 0.00251 | 0.00130 | 0.00254 |
| | (0.0118) | (0.0118) | (0.0118) | (0.0129) | (0.0129) | (0.0130) |
| Four-digit industry fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Firm location prefecture fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 587,376 | 587,375 | 587,375 | 587,376 | 587,375 | 587,375 |
| R-squared | 0.031 | 0.032 | 0.029 | 0.030 | 0.031 | 0.028 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium sized enterprise.
Source: Authors' computation using Tokyo Shoko Research dataset

## Table 18: Estimation Results - Start Exports/Imports - Cross-sectional Data - Broad Definition - Probit

| VARIABLES | (1) result1 Start exporting | (2) result2 Start exporting | (3) result3 Start exporting | (4) result1 Start importing | (5) result2 Start importing | (6) result3 Start importing |
|---|---|---|---|---|---|---|
| CEO changed to foreign univ. graduate | 0.608** | 0.650** | 0.750*** | 0.236 | 0.264 | 0.365 |
| | (0.233) | (0.232) | (0.227) | (0.268) | (0.266) | (0.260) |
| CEO changed | 0.0785** | 0.0332 | 0.165*** | 0.0833*** | 0.0342 | 0.163*** |
| | (0.0243) | (0.0247) | (0.0237) | (0.0226) | (0.0231) | (0.0222) |
| Firm age | -0.00494*** | -0.00436*** | -0.000781* | -0.00653*** | -0.00619*** | -0.00266*** |
| | (0.000416) | (0.000414) | (0.000387) | (0.000388) | (0.000386) | (0.000364) |
| CEO school information being available in 2012 | 0.154*** | 0.131*** | 0.189*** | 0.108*** | 0.0818*** | 0.138*** |
| | (0.0178) | (0.0181) | (0.0176) | (0.0155) | (0.0157) | (0.0153) |
| CEO age change (0 in case of no CEO change) | 0.00110 | 7.94e-05 | 0.00238* | 0.000770 | -0.000295 | 0.00192* |
| | (0.00102) | (0.00104) | (0.000998) | (0.000944) | (0.000964) | (0.000929) |
| Log of number of employees in 2012 | 0.222*** | | | 0.211*** | | |
| | (0.00581) | | | (0.00537) | | |
| Log of number of employees change (ln(n_emp2019/n_emp2012)) | 0.252*** | | | 0.205*** | | |
| | (0.0146) | | | (0.0129) | | |
| Log of sales value (1 million yen) in 2012 | | 0.196*** | | | 0.192*** | |
| | | (0.00462) | | | (0.00426) | |
| Log of sales value change (ln(sales2019/sales2012)) | | 0.260*** | | | 0.206*** | |
| | | (0.0121) | | | (0.0107) | |
| Log of sales per employee in 2012 | | | 0.228*** | | | 0.228*** |
| | | | (0.00775) | | | (0.00706) |
| Log of sales per employee change (ln(salesemp2019/salesemp2012)) | | | 0.208*** | | | 0.190*** |
| | | | (0.0117) | | | (0.0104) |
| 2012 SME | 0.262*** | 0.318*** | -0.243*** | 0.322*** | 0.386*** | -0.165*** |
| | (0.0419) | (0.0417) | (0.0391) | (0.0413) | (0.0411) | (0.0387) |
| Cross dummy of CEO changed to foreign univ. graduate and SME | -0.313 | -0.419+ | -0.397 | 0.142 | 0.0554 | 0.0705 |
| | (0.256) | (0.255) | (0.250) | (0.285) | (0.283) | (0.277) |
| Four-digit industry fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Firm location prefecture fixed effects | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 572,076 | 572,075 | 572,075 | 581,179 | 581,178 | 581,178 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium sized enterprise.
Source: Authors' computation using Tokyo Shoko Research dataset.

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# Appendix

## Table A1: Estimation Results – Export Status Panel Estimation with Number of Employees

| VARIABLES | (1)<br>result1<br>Export status | (2)<br>result2<br>Export status | (3)<br>result3<br>Export status | (4)<br>result4<br>Export status | (5)<br>result5<br>Export status | (6)<br>result6<br>Export status | (7)<br>result7<br>Export status | (8)<br>result8<br>Export status |
|---|---|---|---|---|---|---|---|---|
| Export status in the previous year | | | | | | 0.756*** | 0.756*** | 0.756*** |
| | | | | | | (0.000222) | (0.000222) | (0.000222) |
| Foreign university graduate CEOs | 0.0701*** | 0.0678*** | 0.0662*** | 0.0410*** | 0.0319*** | 0.00459*** | 0.00513** | 0.00514* |
| | (0.000668) | (0.000668) | (0.000665) | (0.00116) | (0.00115) | (0.000811) | (0.00199) | (0.00201) |
| Log of number of employees | 0.00948*** | 0.00900*** | 0.00873*** | 0.000934*** | 0.00220*** | 0.00104*** | 0.00103*** | 0.000988*** |
| | (2.81e-05) | (2.85e-05) | (2.84e-05) | (8.59e-05) | (8.52e-05) | (6.12e-05) | (6.14e-05) | (6.20e-05) |
| Firm age | 4.59e-05*** | 1.68e-05*** | 0.000109*** | -6.00e-05 | -9.14e-06 | -3.81e-06 | -3.79e-06 | -5.39e-06 |
| | (2.16e-06) | (2.18e-06) | (2.20e-06) | (3.75e-05) | (3.71e-05) | (2.69e-05) | (2.69e-05) | (2.71e-05) |
| CEO school information being available | | 0.00723*** | 0.00881*** | -0.00224*** | 0.00427*** | 0.00124*** | 0.00124*** | 0.00124*** |
| | | (7.27e-05) | (7.25e-05) | (0.000152) | (0.000151) | (0.000108) | (0.000108) | (0.000108) |
| CEO's age | 9.13e-06** | -2.07e-05*** | -0.000109*** | 0.000418*** | -0.000258*** | -6.10e-05*** | -6.11e-05*** | -6.16e-05*** |
| | (3.07e-06) | (3.08e-06) | (3.08e-06) | (4.74e-06) | (5.04e-06) | (3.56e-06) | (3.56e-06) | (3.56e-06) |
| CEO gender male being 1, female being 0 | 0.00181*** | 0.000754*** | 0.000728*** | -0.00221*** | -0.00159*** | -6.45e-05 | -6.42e-05 | -7.81e-05 |
| | (0.000147) | (0.000148) | (0.000147) | (0.000311) | (0.000308) | (0.000219) | (0.000219) | (0.000219) |
| Small and Medium Sized Enterprises | | | | | | | -0.000403 | -0.000431 |
| | | | | | | | (0.000438) | (0.000439) |
| Cross dummy of Foreign-university-graduate CEOs and SME | | | | | | | -0.000632 | -0.000619 |
| | | | | | | | (0.00212) | (0.00213) |
| Credit score | | | | | | | | 2.63e-05*** |
| | | | | | | | | (7.69e-06) |
| Year fixed effects | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,808,416 | 10,808,416 | 10,808,416 | 10,716,693 | 10,716,693 | 9,527,373 | 9,527,373 | 9,515,356 |
| R-squared | 0.013 | 0.014 | 0.023 | 0.607 | 0.614 | 0.855 | 0.855 | 0.855 |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium-sized enterprise.

Source: Authors.

## Table A2: Estimation Results – Export Status Panel Estimation with Sales Value per Employee

| VARIABLES | (1)<br>result1<br>Export status | (2)<br>result2<br>Export status | (3)<br>result3<br>Export status | (4)<br>result4<br>Export status | (5)<br>result5<br>Export status | (6)<br>result6<br>Export status | (7)<br>result7<br>Export status | (8)<br>result8<br>Export status |
|---|---|---|---|---|---|---|---|---|
| Export status in the previous year | | | | | | 0.756*** | 0.756*** | 0.756*** |
| | | | | | | (0.000223) | (0.000223) | (0.000223) |
| Foreign university graduate CEOs | 0.0745*** | 0.0715*** | 0.0696*** | 0.0428*** | 0.0335*** | 0.00505*** | 0.00594** | 0.00596** |
| | (0.000676) | (0.000676) | (0.000673) | (0.00118) | (0.00117) | (0.000822) | (0.00202) | (0.00204) |
| Log of sales per employee | 0.00985*** | 0.00935*** | 0.00956*** | -0.000794*** | 0.00122*** | 0.000446*** | 0.000449*** | 0.000419*** |
| | (3.38e-05) | (3.40e-05) | (3.39e-05) | (6.11e-05) | (6.10e-05) | (4.39e-05) | (4.39e-05) | (4.52e-05) |
| Firm age | 0.000196*** | 0.000152*** | 0.000241*** | -5.94e-05 | -8.13e-06 | -2.76e-06 | -2.73e-06 | -4.40e-06 |
| | (2.09e-06) | (2.12e-06) | (2.13e-06) | (3.75e-05) | (3.72e-05) | (2.70e-05) | (2.70e-05) | (2.72e-05) |
| CEO school information being available | | 0.00857*** | 0.0101*** | -0.00209*** | 0.00441*** | 0.00128*** | 0.00128*** | 0.00127*** |
| | | (7.23e-05) | (7.21e-05) | (0.000152) | (0.000152) | (0.000108) | (0.000108) | (0.000108) |
| CEO's age | 1.95e-06 | -3.23e-05*** | -0.000119*** | 0.000407*** | -0.000258*** | -6.12e-05*** | -6.12e-05*** | -6.18e-05*** |
| | (3.08e-06) | (3.09e-06) | (3.09e-06) | (4.76e-06) | (5.04e-06) | (3.57e-06) | (3.57e-06) | (3.57e-06) |
| CEO gender male being 1, female being 0 | 0.00187*** | 0.000588*** | 0.000472** | -0.00212*** | -0.00157*** | -6.14e-05 | -6.13e-05 | -7.51e-05 |
| | (0.000148) | (0.000148) | (0.000147) | (0.000311) | (0.000308) | (0.000220) | (0.000220) | (0.000220) |
| Small and Medium Sized Enterprises | | | | | | | -0.00132** | -0.00132** |
| | | | | | | | (0.000442) | (0.000443) |
| Cross dummy of Foreign-university-graduate CEOs and SME | | | | | | | -0.00103 | -0.00104 |
| | | | | | | | (0.00215) | (0.00216) |
| Credit score | | | | | | | | 2.57e-05** |
| | | | | | | | | (7.91e-06) |
| Year fixed effects | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,709,099 | 10,709,099 | 10,709,099 | 10,617,056 | 10,617,056 | 9,444,249 | 9,444,249 | 9,432,481 |
| R-squared | 0.011 | 0.012 | 0.022 | 0.606 | 0.613 | 0.854 | 0.854 | 0.855 |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium-sized enterprise.

Source: Authors.

## Table A3: Estimation Results – Import Status Panel Estimation with Number of Employees

| VARIABLES | (1)<br>result1<br>Import status | (2)<br>result2<br>Import status | (3)<br>result3<br>Import status | (4)<br>result4<br>Import status | (5)<br>result5<br>Import status | (6)<br>result6<br>Import status | (7)<br>result7<br>Import status | (8)<br>result8<br>Import status |
|---|---|---|---|---|---|---|---|---|
| Import status in the previous year | | | | | | 0.753*** | 0.753*** | 0.753*** |
| | | | | | | (0.000218) | (0.000218) | (0.000218) |
| Foreign university graduate CEOs | 0.117*** | 0.112*** | 0.110*** | 0.0566*** | 0.0427*** | 0.00972*** | 0.00915*** | 0.00886*** |
| | (0.000861) | (0.000860) | (0.000854) | (0.00145) | (0.00142) | (0.000990) | (0.00243) | (0.00245) |
| Log of number of employees | 0.0108*** | 0.00980*** | 0.00938*** | 0.00143*** | 0.00345*** | 0.00162*** | 0.00161*** | 0.00159*** |
| | (3.62e-05) | (3.67e-05) | (3.65e-05) | (0.000107) | (0.000105) | (7.46e-05) | (7.49e-05) | (7.57e-05) |
| Firm age | -0.000226*** | -0.000286*** | -0.000142*** | -4.94e-05 | 2.71e-05 | 2.81e-06 | 2.81e-06 | 6.26e-07 |
| | (2.79e-06) | (2.81e-06) | (2.82e-06) | (4.66e-05) | (4.59e-05) | (3.29e-05) | (3.29e-05) | (3.31e-05) |
| CEO school information being available | | 0.0148*** | 0.0173*** | -0.00370*** | 0.00626*** | 0.00189*** | 0.00189*** | 0.00189*** |
| | | (9.35e-05) | (9.31e-05) | (0.000189) | (0.000187) | (0.000132) | (0.000132) | (0.000132) |
| CEO's age | -9.46e-06* | -7.06e-05*** | -0.000207*** | 0.000825*** | -0.000199*** | -6.05e-05*** | -6.05e-05*** | -6.09e-05*** |
| | (3.95e-06) | (3.97e-06) | (3.96e-06) | (5.90e-06) | (6.23e-06) | (4.34e-06) | (4.34e-06) | (4.35e-06) |
| CEO gender male being 1, female being 0 | -0.000793*** | -0.00296*** | -0.00301*** | -0.00177*** | -0.000818* | 3.32e-05 | 3.32e-05 | 3.55e-05 |
| | (0.000190) | (0.000190) | (0.000189) | (0.000386) | (0.000381) | (0.000268) | (0.000268) | (0.000268) |
| Small and Medium Sized Enterprises | | | | | | | -0.000457 | -0.000464 |
| | | | | | | | (0.000534) | (0.000536) |
| Cross dummy of Foreign-university-graduate CEOs and SME | | | | | | | 0.000660 | 0.000923 |
| | | | | | | | (0.00258) | (0.00260) |
| Credit score | | | | | | | | 1.66e-05+ |
| | | | | | | | | (9.39e-06) |
| Year fixed effects | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,808,416 | 10,808,416 | 10,808,416 | 10,716,693 | 10,716,693 | 9,527,373 | 9,527,373 | 9,515,356 |
| R-squared | 0.010 | 0.012 | 0.027 | 0.631 | 0.643 | 0.868 | 0.868 | 0.869 |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium-sized enterprise.

Source: Authors.

## Table A4: Estimation Results – Import Status Panel Estimation with Sales Value per Employee

| VARIABLES | (1)<br>result1<br>Import status | (2)<br>result2<br>Import status | (3)<br>result3<br>Import status | (4)<br>result4<br>Import status | (5)<br>result5<br>Import status | (6)<br>result6<br>Import status | (7)<br>result7<br>Import status | (8)<br>result8<br>Import status |
|---|---|---|---|---|---|---|---|---|
| Import status in the previous year | | | | | | 0.753*** | 0.753*** | 0.753*** |
| | | | | | | (0.000219) | (0.000219) | (0.000219) |
| Foreign university graduate CEOs | 0.120*** | 0.114*** | 0.112*** | 0.0573*** | 0.0434*** | 0.00925*** | 0.00813*** | 0.00778** |
| | (0.000867) | (0.000867) | (0.000860) | (0.00146) | (0.00144) | (0.00100) | (0.00246) | (0.00248) |
| Log of sales per employee | 0.0157*** | 0.0148*** | 0.0151*** | -0.00136*** | 0.00179*** | 0.000462*** | 0.000464*** | 0.000436*** |
| | (4.34e-05) | (4.36e-05) | (4.33e-05) | (7.60e-05) | (7.55e-05) | (5.35e-05) | (5.35e-05) | (5.51e-05) |
| Firm age | -8.36e-05*** | -0.000161*** | -2.45e-05*** | -5.28e-05 | 2.43e-05 | 3.25e-07 | 3.31e-07 | -2.08e-06 |
| | (2.68e-06) | (2.72e-06) | (2.73e-06) | (4.67e-05) | (4.60e-05) | (3.29e-05) | (3.29e-05) | (3.31e-05) |
| CEO school information being available | | 0.0150*** | 0.0173*** | -0.00343*** | 0.00649*** | 0.00198*** | 0.00198*** | 0.00197*** |
| | | (9.27e-05) | (9.22e-05) | (0.000190) | (0.000188) | (0.000132) | (0.000132) | (0.000132) |
| CEO's age | 2.95e-05*** | -3.05e-05*** | -0.000163*** | 0.000807*** | -0.000199*** | -6.08e-05*** | -6.08e-05*** | -6.14e-05*** |
| | (3.95e-06) | (3.96e-06) | (3.95e-06) | (5.91e-06) | (6.23e-06) | (4.34e-06) | (4.34e-06) | (4.35e-06) |
| CEO gender male being 1, female being 0 | -0.00172*** | -0.00396*** | -0.00414*** | -0.00170*** | -0.000839* | 2.38e-05 | 2.33e-05 | 2.37e-05 |
| | (0.000189) | (0.000190) | (0.000188) | (0.000387) | (0.000381) | (0.000268) | (0.000268) | (0.000268) |
| Small and Medium Sized Enterprises | | | | | | | -0.00137* | -0.00135* |
| | | | | | | | (0.000538) | (0.000540) |
| Cross dummy of Foreign-university-graduate CEOs and SME | | | | | | | 0.00130 | 0.00155 |
| | | | | | | | (0.00262) | (0.00264) |
| Credit score | | | | | | | | 2.33e-05* |
| | | | | | | | | (9.64e-06) |
| Year fixed effects | | | ✓ | | ✓ | ✓ | ✓ | ✓ |
| Firm fixed effects | | | | ✓ | ✓ | ✓ | ✓ | ✓ |
| Observations | 10,709,099 | 10,709,099 | 10,709,099 | 10,617,056 | 10,617,056 | 9,444,249 | 9,444,249 | 9,432,481 |
| R-squared | 0.014 | 0.016 | 0.032 | 0.630 | 0.641 | 0.868 | 0.868 | 0.868 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium-sized enterprise.

Source: Authors.

## Table A5: Estimation Results – Start Exports with Firm Attributes

| VARIABLES | (1)<br>result1<br>Start exporting | (2)<br>result2<br>Start exporting | (3)<br>result3<br>Start exporting |
|---|---|---|---|
| CEO changed to foreign univ. graduate | 0.341*** | 0.341*** | 0.345*** |
| | (0.0175) | (0.0174) | (0.0175) |
| CEO changed | 0.00450*** | 0.00410*** | 0.00652*** |
| | (0.000544) | (0.000544) | (0.000541) |
| Firm age | -6.03e-05*** | -4.06e-05*** | 9.06e-06 |
| | (7.33e-06) | (7.25e-06) | (7.12e-06) |
| CEO school information being available in 2012 | 0.000987*** | 0.000622** | 0.00171*** |
| | (0.000231) | (0.000232) | (0.000231) |
| CEO age change (0 in case of no CEO change) | 9.29e-05** | 8.65e-05** | 0.000109*** |
| | (2.89e-05) | (2.89e-05) | (2.89e-05) |
| Log of number of employees in 2012 | 0.00474*** | | |
| | (0.000111) | | |
| Log of number of employees change (ln(n_emp2019/n_emp2012)) | 0.00398*** | | |
| | (0.000218) | | |
| Log of sales value (1 million yen) in 2012 | | 0.00365*** | |
| | | (8.15e-05) | |
| Log of sales value change (ln(sales2019/sales2012)) | | 0.00290*** | |
| | | (0.000166) | |
| Log of sales per employee in 2012 | | | 0.00342*** |
| | | | (0.000130) |
| Log of sales per employee change (ln(salesemp2019/salesemp2012)) | | | 0.00263*** |
| | | | (0.000166) |
| 2012 SME | -0.0115*** | -0.0133*** | -0.0233*** |
| | (0.00119) | (0.00117) | (0.00115) |
| Cross dummy of CEO changed to foreign univ. graduate and SME | -0.302*** | -0.304*** | -0.304*** |
| | (0.0182) | (0.0182) | (0.0182) |
| Four-digit industry fixed effects | ✓ | ✓ | ✓ |
| Firm location prefecture fixed effects | ✓ | ✓ | ✓ |
| Observations | 516,319 | 516,318 | 516,318 |
| R-squared | 0.035 | 0.036 | 0.033 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.1

CEO = Chief Executive Officer, SME = small and medium-sized enterprise.

Source: Authors.

# Table A6: Probit Estimation – Average Marginal Effects

**Probit model: Average marginal effects**

| VARIABLES | (1) Narrow definition Start exporting | (2) Narrow definition Start importing | (3) Broad definition Start exporting | (4) Broad definition Start importing |
|---|---|---|---|---|
| CEO changed to foreign univ. graduate | 1.076*** | 0.614** | 0.750*** | 0.365 |
| | (0.268) | (0.291) | (0.227) | (0.260) |
| CEO changed | 0.190*** | 0.179*** | 0.165*** | 0.163*** |
| | (0.0241) | (0.0228) | (0.0237) | (0.0222) |
| Cross dummy of CEO changed to foreign univ. graduate and SME | -0.636** | -0.0189 | -0.397 | 0.0705 |
| | (0.290) | (0.308) | (0.250) | (0.277) |
| Firm age | -0.000221 | -0.00318*** | -0.000781** | -0.00266*** |
| | (0.000397) | (0.000377) | (0.000387) | (0.000364) |
| CEO school information being available in 2012 | 0.202*** | 0.156*** | 0.189*** | 0.138*** |
| | (0.0178) | (0.0156) | (0.0176) | (0.0153) |
| CEO age change (0 in case of no CEO change) | 0.00310*** | 0.00237** | 0.00238** | 0.00192** |
| | (0.00101) | (0.000952) | (0.000998) | (0.000929) |
| Log of sales per employee in 2012 | 0.257*** | 0.264*** | 0.228*** | 0.228*** |
| | (0.00794) | (0.00731) | (0.00775) | (0.00706) |
| Log of sales per employee change (ln(salesemp2019/salesemp2012)) | 0.225*** | 0.214*** | 0.208*** | 0.190*** |
| | (0.0119) | (0.0107) | (0.0117) | (0.0104) |
| 2012 SME | -0.501*** | -0.299*** | -0.243*** | -0.165*** |
| | (0.0416) | (0.0409) | (0.0391) | (0.0387) |
| Firm location (prefecture) fixed effects | ✓ | ✓ | ✓ | ✓ |
| Industry fixed effects (ISIC 2 digit) | ✓ | ✓ | ✓ | ✓ |
| Observations | 561,608 | 563,370 | 572,075 | 581,178 |

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

CEO = Chief Executive Officer, ISIC = International Standard industry Classification, SME = small and medium-sized enterprise.

Source: Authors.