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Abstract

Chandler's work is well known. He has amply demonstrated that large firms played a huge role in the economic take-off and development of countries such as Germany and especially the USA. In this paper his thesis is extended to the whole world, by considering various countries, economically integrated regions, their exports and economic achievement. The largest firms in the world are examined in this context. Chandler's thesis is thus confirmed with this analysis and some quantitative evidence is provided in that respect. In particular, Korea's position is quite strong in the region of East Asia following Japan's leadership. This paper also demonstrates that SMEs role in economic development without the presence of large firms would be rather limited. Last but not least, integration seems to take place even without the existence of formal agreements due to the presence of large firms.

Key words: Largest 2000 firms; national exports; Chandler; regression.

Introduction

Recently, an intense research has been taking place as published in the relevant literature regarding the role of SMEs in the economic development of various countries (see for example Audretsch (2003); Jones and Tilley (2003); Harvie and Boon (2005)). The conclusion is that this role is of paramount importance. Nonetheless, although it is the trend to talk about SMEs, we should not forget that the counterpart of SMEs, namely the large firms (LFs) are still there and still thriving! Chandler (1977, 1990) with his monumental work has given ample evidence about the leading role of these LFs in shaping the economies of leading countries, such as the USA and Germany. At least two main characteristics describe Chandler's analysis: first, emphasis is put on the role of large firms when explaining economic development; and second, an industrial or sectoral cum firm analysis stresses the importance of organizational and technical innovations in creating comparative advantages for a nation such as the USA or Germany. More recently, Sanidas (2005a, 2005b) has also given evidence to this role and one of his main conclusions is that both SMEs and LFs are necessary for the healthy economic development of all countries. In particular, LFs are usually the leaders in their sectors and hence they become leaders of national economic growth (Sanidas, 2005b).

The Chadlerian hypothesis certainly is much more than the hypothesis of the leading role of LFs. It is about strategy and structure, diversification, and firm resources and capabilities. Furthermore recent evidence of the overall Chandler's thesis can be found in some recent publications such as Whittington *et al* (1999); these authors applied Chandler's original model to France, Germany, and the UK for the period 1950 to 1993 and conclude that this model "is remarkably robust to both change over

time and differences across countries" (ibid, p. 519). For France, Smith (1998, p. 46) has further supported Chandler's ideas and concluded that " many of the largest French firms were behaving like the leading industrial firms elsewhere, developing cutting-edge technology, investing in state-of-the-art production facilities, and putting professional managers in charge of operations" by 1913.

As Sanidas (2005a, 2005b) extensively synthesised, the advent of the organizational innovation of the JIT cum QC system in Japan together with this country's development of focal firms created a new tendency for LFs to become smaller and seeking outsourcing more actively. Although mass production and vertical integration have led to the increase in size of many firms in several countries, the trend is now reversed and the size of firms decreases (Langlois, 2004). Nonetheless, the reality is that we still have very large[1] firms and several countries can now be proud of having some of their LFs listed in the largest 2000 firms of our globe (Forbes, 2005). Monopolies and oligopolies still exist everywhere in the world and they cannot be eliminated or even reduced. The most recent example of indeed a global *de facto* monopoly is Microsoft.

Do LFs promote exports? As Verwaal and Donkers (2002, p. 603) say: "There is general consensus in the literature that firm size is positively related to the firm's propensity to export. However the empirical findings on the relationship between firm size and export intensity, defined as the ratio of exports to total sales, have been mixed". These authors mention three main reasons for the explanation of why size positively affects exports (both propensity and intensity): transaction costs and hence

[1] We will avoid using the word multinational firms due to different connotations of this term sometimes; for example theoretically we can have large firms and yet not being multinational.

economies of scale; risk perception; and availability of resources. Bonaccorsi (1992) arrived at the same conclusion regarding the propensity to export but not intensity. The same author also suggested that smaller firms will grow in the domestic market first before they start exporting. Calof (1994, p. 367) examined 14072 Canadian manufacturers and concluded that "firm size is positively related to all dimensions of export behaviour". A similar conclusion was reached by other researchers for different countries and regions: Wagner (1995), Gourlay and Seaton (2004), Basile et al (2003), Liu and Shu (2003). Mittelstaedt et al (2003) concluded that the minimum size of firms in terms of labour is 20 employees for these firms to start exporting. These firms constitute about 67% of all manufacturing firms in the USA.

One of the purposes of the present paper is to extend Chandler's thesis to as many countries as possible by considering more particularly the nexus between LFs and exports. We don't have to assume that LFs export more than SMEs. The mere difference in size necessarily leads to more exports by LFs in absolute terms, hence their importance in this paper. On the other hand, SMEs also contribute to exports mainly through their role as outsourced firms by LFs. Overall, we could make the safe assumption that the higher the sales of LFs the higher the sales of SMEs, *ceteris paribus*. In other words we can use the LFs sales as a proxy for SMEs sales.

Another important role of LFs as multinationals is that they can be the catalyst for an informal regional integration. For example, it is well known that Japanese multinational large firms have been very active in South East Asia and their network of outsourcing part of their local production in this area plus China has generated an informal integration which is not negligible at all (Peng, 2000). American

multinational LFs have been the catalysts of almost a global integration and more particularly of European or Pacific. As many of these American or Japanese or Korean firms produce final consumer goods, the impact is even greater on cultural and societal aspects.

Finally another role that LFs play is their generation of comparative advantages in terms of product specialization. This is possible in free markets because LFs always seek new avenues for profit and through the existing global market forces they discover which products fit best their technical, organizational capabilities and available resources. Thus as we will see in the last section each country through its LFs has the tendency to specialize in some industries more that in others. This is more of an empirical nature exercise and the so called revealed comparative advantages will be shown in that section.

In brief, section two will introduce the quantitative model, and section three will discuss the results and formulate conclusions.

The hypothesis, the model, and the data

We want to test the following hypothesis: exports on a country basis can be easily predicted by looking at two factors only: the total sales of each country's largest firms (as published by Forbes, see internet site) and the country's particular position in the regional or world economic integration.

Consequently the model used is the following:

$$X = f\,(LFD, RI) \qquad (1)$$

where X stands for total exports; LFD stands for large firms, and RI for regional integration. The latter is meant in the broad sense, as it can take any form. LFD is the direct effect of the largest firms and RI is the indirect effect of these firms (and other firms) due to regional integration. The direct effect is mainly straight exports from LFs. The indirect effect mostly measures the effect of LFs on the national economy and their networks in the region, hence its influence on regional integration. Both direct and indirect impacts will be measured by using the data (Forbes, 2006) on sales by the largest companies in the world (see below). Note that other variables such as exchange rate differentials are not included here; nonetheless, their effect is deemed to be relatively small or even negligible[2]. In more detail, model (1) can be extended to model (2).

X= f(totsal, euro14, easteur, canmex, chijako, chihok, isola, ports, smes, constant) (2)

Here X is the average total exports over the period 1993 to 2003 as already mentioned. The variables "totsal" and "smes" represent the direct LFD effect of model (1) above. The "totsal" is total sales[3] by all firms included in the Forbes list of the 2000 largest corporations in the world. The "smes" is the total number of SMEs per population as at 2000[4]. Only four countries have an exceptionally high number of SMEs: Italy, Japan, Spain, and Belgium. This outstanding SMEs impact is included under the umbrella of LFD here because a large proportion of SMEs sales is due to the outsourcing process of large firms (especially in Japan through the JIT system). The remaining seven variables represent the RI component of our exports model (1) above. Thus, the "euro14" represents the effect of European integration for the 14 countries

[2] Probably exchange rate differentials are sometimes for some countries (e.g. Australia) quite significant, but the aim in this paper was to keep the model as simple as possible.
[3] The number of LFs for each country was also included in equation (2) instead of "totsal", and the results were almost as good.
[4] The data are extracted from the internet sites of the EU and OECD.

that made EU until recently (Luxembourg is not included in the regression). Note that the date of entry of each one of the 14 countries was taken into account for the calculation of the values of “euro14” (see the notes of Appendix 1 for further details).

The “canmex” represents the effect of NAFTA integration on Canada and Mexico. These two countries’ exports to the USA constitute about 85% and 90% of their total exports; on the contrary the USA’s exports to Canada are only about 25% and to Mexico about 14%, hence the USA was not included in the “canmex” variable. The “chijako” (China, Japan, and Korea) and “chihok” (China, Hong Kong) represent a *de facto* integration between the concerned countries. In the last 10 years this integration has been accelerated (for example, the ratios of exports from Korea to China were about 7% in 1993 and 18% in 2003). The “isola” is the effect of isolation on several countries either in terms of distance or in terms of not belonging to any formal integrated group. Thus, Greece, Portugal, Spain, and Finland are the most remoted countries in the EU whose centre is Germany (regarding the significance of this centre see Sanidas, 2006 forthcoming). Also, Australia, New Zealand, India, Pakistan, Israel, Turkey, Egypt, Chile, Peru, and South Africa are countries that do not belong to any formal regional integration and have also been isolated for other reasons (eg. political for South Africa, introversion for India, and so on).

The “ports” indicate the privileged position that Singapore, Hong Kong, and Belgium have in their immediate regions. Thus these natural ports are informally integrated in these regions and trade is accordingly increased. Finally, the “easteur” includes the former Eastern European communist countries Czech Republic, Hungary, and Poland. Their late inclusion in the western European community has created disadvantages for

their integration. Note that the effect of the ASEAN group as represented by Malaysia, Thailand, Indonesia, Singapore, and Philippines was not found to be significant in the regression (see below), probably because only Malaysia, Singapore, and Thailand seem to take advantage of this integration, and not Philippines, or Indonesia.

An important remark will close this section. It becomes apparent that only those countries which are represented by LFs as per Forbes publication will be analysed here. Hence a plausible question arises: are the countries excluded from the present analysis also important exporters? A perusal of each and every country's total exports in each continent reveals what we expected: the countries that have embodied the 2000 Forbes largest firms in the world are also the largest exporters in the world. This result confirms the thesis of this paper that the LFs' sales per country can be a good proxy for national exports. The quantitative study below will further confirm this assertion.

The source of data for the sales of firms for each country is Forbes 2000 largest firm publication (Forbes, 2006). The source of data for the exports for the examined countries is World Bank (2005); the average for the period 1993 to 2003 is used in the regression. Appendix 1 shows all the data used in this paper; some further comments are in the notes of this Appendix.

Results and discussion

Table 1 shows the results of the OLS regressions based on equation (2) above.

Table 1 Regression results

Variable	Coefficient	t-statistic	Stepwise R^2	Change in stepwise R^2	Adjusted R^2	Significance in F change
TOTSAL	0.0715	40.6	Step 1: 0.675	0.675	0.667	0
EURO14	0.3923	26.4	Step 2: 0.855	0.18	.848	0
EASTEUR	-25.9	-2.8	Step 9: 0.992	0.002	0.99	0.009
CANMEX	0.8193	9.7	Step 5: 0.961	0.03	0.956	0
CHJAKO	62.1	5.6	Step 8: 0.99	0.009	0.987	0
CHIHOK	0.5712	5.9	Step 3: 0.897	0.041	0.889	0
ISOLA	-34.7	-6.3	Step 6: 0.977	0.016	0.973	0
PORTS	57.1	5.5	Step 7: 0.981	0.004	0.977	0.007
SMES	1.0903	8.2	Step 4: 0.931	0.034	0.923	0
CONSTANT	51.5	12.8				
R^2	0.992					
No of data	43	43	43	43	43	43

All the variables (9) in the OLS regression are highly significant[5] according to the t-statistic test (third column). The stepwise regression results (4th to 8th column) also show the importance of each variable and the incremental change in R^2 and F statistic. This is a cross-section analysis with 43 data and 33 degrees of freedom minimum. Tests for heteroscedasticity did not reveal any problems. In order to further examine the significance of these results we will now comment on the residuals of the 9 variable regression as shown in Table 2. The magnitude of the "totsal" variable is such that for example for the USA this variable indicates that US$597.7 billions of exports out of a total of US$653 billions are due to the impact of the 711 American largest firms of the Forbes list.

[5] Regressions were also run without the USA and Japan (which have exceptionally high LFs sales) to verify the stability of coefficients and their significance. Even without these two countries all coefficients are still very significant; a noticeable change (smaller) in the coefficient of "totsal" is also recorded as expected.

The magnitude of the “euro14” variable is such that for example for Germany this variable indicates that US$361.7 billions of exports out of a total of US$540 billions are due to the impact of European integration (whereas, the direct effect of “totsal” of the 63 German largest firms of the Forbes list is US$110.2 billions). The “isola” effect is about US$35 billions for each country affected. Thus Greece and South Africa export US$35 less than what they would have exported if their geographical position was different. The “smes” factor increases exports of the most SMEs oriented countries (Italy, Japan, Spain, and Belgium) by about US$60 billion for Belgium to US$77 billion for Italy. China can export US$151.5 billions more because she is part of the *de facto* integrated groups with Hong Kong, and Japan plus South Korea, whereas the latter countries export about US$60 billion more due to the same reason (this is shown by the factors “chijako” and “chihok”).

Table 2 Residual analysis of the regression

	Actual	Pred/ted	Res/al	totsal	euro14	isola	smes	chihok	chijako	canmex	portseasteur	const
Australia	58.0	33.5	24.5	16.7	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	51.5
Austria	64.0	55.5	8.5	3.1	0.8	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Belgium	188.0	193.7	-5.7	8.4	17.8	0.0	58.9	0.0	0.0	0.0	57.1	0.0	51.5
Brazil	52.0	60.7	-8.7	9.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Canada	221.0	224.9	-3.9	33.2	0.0	0.0	0.0	0.0	0.0	140.1	0.0	0.0	51.5
Chile	16.0	17.5	-1.5	0.7	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
China	214.0	214.3	-0.3	11.2	0.0	0.0	0.0	89.4	62.1	0.0	0.0	0.0	51.5
Czech Rep	27.0	26.0	1.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-25.9	51.5
Denmark	51.0	70.0	-19.0	5.2	13.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Egypt	4.0	16.9	-12.9	0.1	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Finland	41.0	34.7	6.3	10.3	7.6	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
France	309.0	324.3	-15.3	97.4	175.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Germany	540.0	523.4	16.6	110.2	361.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Greece	11.0	21.8	-10.8	2.9	2.2	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Hong Kong	182.0	181.6	0.4	8.1	0.0	0.0	0.0	64.8	0.0	0.0	57.1	0.0	51.5
Hungary	23.0	26.7	-3.7	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-25.9	51.5
India	37.0	26.3	10.7	9.5	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Indonesia	51.0	52.9	-1.9	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Ireland	62.0	56.7	5.3	3.6	1.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Israel	24.0	18.3	5.7	1.5	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Italy	236.0	221.6	14.4	40.5	52.2	0.0	77.4	0.0	0.0	0.0	0.0	0.0	51.5
Japan	419.0	415.4	3.6	236.4	0.0	0.0	65.4	0.0	62.1	0.0	0.0	0.0	51.5
Malaysia	79.0	53.4	25.6	1.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Mexico	119.0	108.3	10.7	5.9	0.0	0.0	0.0	0.0	0.0	50.8	0.0	0.0	51.5
Netherlands	214.0	201.1	12.9	62.1	87.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
New Zealand	14.0	17.0	-3.0	0.2	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Norway	49.0	60.3	-11.3	8.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Pakistan	9.0	17.0	-8.0	0.1	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Peru	6.0	16.9	-10.9	0.1	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Philippines	27.0	51.9	-24.9	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Poland	29.0	26.3	2.7	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-25.9	51.5
Portugal	24.0	21.7	2.3	2.5	2.4	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Russia	89.0	60.0	29.0	8.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Singapore	118.0	112.7	5.3	4.1	0.0	0.0	0.0	0.0	0.0	0.0	57.1	0.0	51.5
South Africa	29.0	23.4	5.6	6.5	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
South Korea	139.0	142.2	-3.2	28.6	0.0	0.0	0.0	0.0	62.1	0.0	0.0	0.0	51.5
Spain	107.0	120.8	-13.8	21.0	9.9	-34.7	73.1	0.0	0.0	0.0	0.0	0.0	51.5
Sweden	80.0	81.2	-1.2	18.1	11.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Switzerland	80.0	87.4	-7.4	35.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Thailand	59.0	53.9	5.1	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
Turkey	27.0	21.1	5.9	4.3	0.0	-34.7	0.0	0.0	0.0	0.0	0.0	0.0	51.5
UK	259.0	297.5	-38.5	122.3	123.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5
USA	653.0	649.3	3.7	597.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	51.5

For the NAFTA countries Canada and Mexico the impact is quite large as well (shown by the variable “canmex”). Thus Canada exports more US$140 billion due to being part of this integrated group, whereas Mexico exports US$51 billion. The natural trade ports of Belgium, Hong Kong, and Singapore export US$57 billion more due to their commercial hub/port qualities (as shown by the variable “ports”). Three

Eastern European countries (The Czech Republic, Hungary, and Poland) have been disadvantaged in their export performance by US$26 billion due to their ex communist affiliation (as shown by the variable “easteur”). Finally the constant of US$51.5 billion shows that even if all the other 9 factors are zero, normally they should be able to export that amount due to many other reasons not taken into account in the present analysis (for example, special comparative advantages in some products, and so on). Note that some of these variables that represent RI (for example “easteur”) might not be significant in a few years once the effect is weakened through time, and some others might be strengthened (e.g. because of the reinforcement of the so far informal integration between China, Japan, and Korea).

The combined results of the 10 variables (including the constant) show that the residuals or errors for each country are quite satisfactory, except for the following cases. The UK’s residual (-US$38.5 billion) is very large (the largest of all) and may be due to the UK’s incomplete integration within the EU. Russia has a positive error (US$29 billion) that could be due to its oil products increased exports recently. The Philippines residual is quite large (-US$24.9 billion) indicating that their performance within ASEAN is the weakest and may be due to their political turmoil. On the contrary, the model underestimates Malaysia’s export performance by US$25.6 billion, probably due to its increased comparative advantage in some primary commodities. Similar comments could be made for other countries, but a detailed analysis of all errors is out of the scope of this paper.

Some overall conclusions can be drawn form the above results. First, the so called capitalism is working very well for countries such as the USA and Japan, because

they have been able to capitalize on their large firms and make inroads on a global scale despite the fact that the integration impact has not been very important (only the USA belong to a formal integrative block the NAFTA with small so far benefits for them). Many other countries would fall into this category but much less in extent. Second, since large firms seem to play such a crucial role in economic development via the effect of exports, we would recommend to governments in any country to support the creation and growth of large firms despite the immediate adverse welfare effects of large firms in the economy. Governments in Asian countries are aware of this issue and as evidence we can mention the recent policy announcement by the Vietnamese authorities aiming at promoting large firms (as published in Vietnamese newspapers following the 10th National Party Congress in April 2006).

Third, the role of large firms can be seen from a different angle, that of creating comparative advantages for their respective countries, and thus enhancing national exports. Table 3 (placed at the end of the main text) shows the sales performance of each major industry[6] for each major country (calculated from the Forbes publication). We can see that for example Korea's sales of semiconductors by its largest companies make about 33% of total semiconductor sales of all these major countries (the USA come first with about 49% of the market in front of Korea). Thus Korea's large firms have created a unique comparative advantage for this country because of this sector and hence have enhanced this county's exports accordingly[7]. In addition, Korea's other "hot" industries as indicated by the performance of its largest companies are in a way revealed comparative advantages (similar to those calculated for total exports for

[6] To see what sort of companies belong to each industry see Appendix 2 for a brief list.
[7] It would be more enlightening to calculate the correlation between the large firms share of sales with the corresponding country's exports for the same products/industry. However, this is beyond the scope of this paper.

each country by ITC, see their site). Thus for Korea, the presence of chaebols has been beneficial for exports and development. These large family conglomerations have been the moving force of the Korean miracle in the last 40 years or so. Japan has a few clear cut comparative advantages, for example in capital goods, technology hardware and equipment, consumer durables, and so on. Table 4 has more analytically the main 10 industries for which some major countries have a revealed comparative advantage.

Table 4 Revealed comparative advantages as per large firms (Forbes data)

Rank	USA	UK	Switz/d	Korea	Nether/s	Japan	Italy	Germany	France
1	Health ca	Hotels	Drugs	Semic/rs	Div fina	Trading	Insur/ce	Chemic	Construc
2	Software	Food ma	Div fina	Trading	Oil&gas	Tech hard	Div fina	Cons dur	Food ma
3	Retailing	Oil&gas	Food Dr	Cons dur	Aerosp/e	Capital	Banking	Congl/es	Media
4	Aerosp/e	Drugs	Insur/ce	Capital	Food ma	Cons dur	Telec/ns	Utilities	Banking
5	Media	Banking	Capital	Chemic	Food Dr	Transp/on	Utilities	Insur/ce	House/d
6	Drugs	Telec/ns	Bus serv	Banking	Congl/es	Bus serv	Oil&gas	Hotels	Hotels
7	House/d	Media	Semic/rs	Mate/als	Chemic	Constr/on	Cons dur	Transp/on	Insur/ce
8	Semic/rs	Food Dr	Chemic	Utilities	Bus serv	Chemic	Aerosp/e	Food ma	Cons dur
9	Congl/es	Mate/als	House/d	Oil&gas	Trading	House/d	Hotels	House/d	Utilities
10	Tech hard	Insur/ce	Construc	Telec/ns	Software	Mate/als	Construc	Telec/ns	Trading

In Table 4 we can see, for example that Korea's top industry is semiconductors as represented by its major large companies (Forbes data), followed by trading firms, consumer durables, and capital goods. Here we can verify what we suggested earlier that large firms create comparative advantages for their countries. Thus, it is obvious for Korea that Samsung Electronics has generated a valuable comparative advantage for semiconductors of Korea in relation to the other Asian countries. Similarly, Japan's strength is in trading, technology hardware and equipment, capital goods, and consumer durables. These two countries have similar revealed comparative advantages (see, for example Sohn and Lee, 2005). On the contrary, the USA, and the UK are best in very different sectors of the economy (for example software for the USA and hotels and leisure for the UK).

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Table 3 Share of each Forbes industry's sales for a given country as a ratio to total all countries sales of that industry

Industry	% sale	sales	usa	UK	switzd	swed	korea	other	nether	mexo	japan	italy	HK	germy	france	finlnd	china	canda	belgm	auslia
Aerospace & defense	1.5	319.8	**62.4**	**9.0**	0.0	0.0	**0.0**	0.6	**11.9**	0.0	**0.0**	2.9	0.0	**0.0**	**8.2**	0.0	**0.0**	5.0	0.0	0.0
Banking	8.0	1663.5	**27.0**	**14.3**	0.3	2.6	**2.7**	7.8	**1.6**	0.2	**10.8**	6.5	0.3	**4.4**	**11.3**	0.0	**0.4**	4.6	1.3	3.8
Business services & supplies	1.9	399.7	**35.4**	**4.6**	5.6	2.2	**1.5**	12.0	**6.0**	0.0	**26.0**	0.5	0.0	**0.0**	**1.0**	0.5	**0.0**	3.3	0.0	1.3
Capital goods	2.4	508.5	**24.8**	**1.4**	5.6	12.9	**3.0**	1.1	**0.0**	0.7	**34.9**	0.0	0.0	**7.1**	**6.8**	1.7	**0.0**	0.0	0.0	0.0
Chemicals	2.4	495.9	**30.6**	**3.6**	4.1	0.0	**2.9**	0.0	**6.7**	0.0	**22.6**	0.0	0.0	**20.2**	**3.5**	0.0	**0.5**	2.5	2.2	0.7
Conglomerates	2.6	542.3	**48.0**	**2.0**	0.0	0.0	**0.0**	2.2	**7.6**	1.9	**15.2**	0.0	3.9	**18.2**	**0.0**	0.0	**0.0**	0.0	0.0	1.0
Construction	3.1	638.6	**18.6**	**9.4**	1.6	4.0	**1.1**	8.5	**1.5**	1.3	**25.8**	1.8	0.5	**4.5**	**19.3**	0.9	**0.0**	0.0	0.0	1.1
Consumer durables	9.2	1927.5	**30.9**	**0.3**	0.0	0.9	**4.4**	0.2	**0.0**	0.0	**29.4**	3.8	0.0	**20.1**	**9.1**	0.0	**0.0**	0.9	0.0	0.0
Diversified financials	4.8	1002.0	**36.2**	**3.6**	12.2	0.3	**0.4**	2.0	**15.6**	0.0	**10.0**	6.9	1.1	**6.0**	**0.2**	0.0	**0.0**	1.6	2.3	1.6
Drugs & biotechnology	2.1	429.2	**53.4**	**14.6**	14.1	0.0	**0.0**	1.6	**0.0**	0.0	**8.6**	0.0	0.0	**4.0**	**2.4**	0.0	**0.0**	0.0	1.0	0.3
Food markets	3.5	737.6	**28.6**	**15.7**	0.0	0.0	**0.0**	0.0	**9.6**	0.0	**6.6**	0.0	0.0	**10.2**	**12.0**	1.4	**0.0**	5.7	3.9	6.5
Food, drink & tobacco	3.7	774.2	**46.4**	**11.8**	9.2	0.3	**0.3**	4.6	**8.9**	2.2	**10.5**	0.0	0.0	**1.7**	**2.7**	0.0	**0.0**	0.4	1.1	0.0
Health care equipment & services	3.2	663.5	**84.6**	**2.9**	0.3	0.5	**0.0**	0.0	**0.0**	0.0	**6.3**	0.0	0.0	**4.9**	**0.4**	0.0	**0.0**	0.0	0.0	0.0
Hotels, restaurants & leisure	1.1	222.8	**39.7**	**34.4**	0.0	0.0	**0.0**	2.4	**0.0**	0.0	**0.0**	1.8	0.0	**10.8**	**10.1**	0.0	**0.0**	0.0	0.0	0.8
Household & personal products	1.7	349.7	**51.4**	**2.1**	2.7	0.0	**1.2**	1.6	**0.0**	0.4	**19.0**	1.0	0.0	**8.3**	**10.6**	0.0	**0.0**	0.0	1.5	0.0
Insurance	7.1	1483.4	**33.5**	**10.3**	8.1	0.6	**0.4**	1.5	**3.3**	0.0	**7.7**	7.0	0.0	**12.7**	**9.2**	0.4	**1.5**	2.9	0.0	0.9
Materials	3.5	725.8	**29.7**	**10.4**	0.0	2.4	**2.5**	1.3	**0.8**	0.7	**17.8**	0.0	0.0	**7.6**	**1.4**	7.2	**1.5**	10.2	1.3	5.1
Media	2.0	425.5	**57.0**	**12.1**	0.0	0.0	**0.0**	0.1	**2.2**	0.6	**9.2**	0.9	0.0	**0.7**	**11.4**	0.8	**0.0**	4.6	0.0	0.5
Oil & gas operations	9.6	2006.2	**41.6**	**14.6**	0.0	0.0	**2.0**	4.8	**13.8**	0.0	**3.6**	4.3	0.2	**0.0**	**6.9**	0.8	**4.3**	2.9	0.0	0.1
Retailing	6.2	1288.0	**77.4**	**6.0**	0.0	0.6	**0.4**	0.0	**0.0**	0.5	**8.6**	0.0	0.2	**2.0**	**2.9**	0.0	**0.0**	1.4	0.0	0.0
Semiconductors	0.9	178.3	**49.4**	**0.0**	5.3	0.0	**32.8**	0.0	**0.0**	0.0	**7.5**	0.0	0.0	**5.0**	**0.0**	0.0	**0.0**	0.0	0.0	0.0
Software & services	0.8	175.1	**79.1**	**0.7**	0.0	0.0	**0.0**	0.0	**3.8**	0.0	**5.9**	0.0	0.0	**5.8**	**4.8**	0.0	**0.0**	0.0	0.0	0.0
Technology hardware & equipment	4.8	990.5	**46.8**	**0.0**	0.0	2.0	**0.0**	0.0	**0.0**	0.0	**43.0**	0.0	0.0	**0.0**	**2.2**	4.0	**0.6**	1.4	0.0	0.0
Telecommunications services	4.0	842.7	**31.3**	**13.7**	1.4	2.2	**1.6**	9.5	**1.8**	2.9	**3.2**	4.6	4.5	**8.3**	**7.6**	0.0	**1.7**	3.2	0.8	1.7
Trading companies	1.7	357.7	**1.5**	**7.1**	0.0	0.0	**11.3**	0.0	**4.2**	0.0	**66.0**	0.0	1.5	**0.0**	**8.4**	0.0	**0.0**	0.0	0.0	0.0
Transportation	3.3	681.1	**30.1**	**5.2**	0.9	1.3	**1.6**	8.0	**3.1**	0.0	**28.6**	1.3	2.5	**10.7**	**4.1**	0.0	**0.4**	1.3	0.0	1.2
Utilities	4.9	1023.0	**36.6**	**8.3**	0.2	0.0	**2.5**	7.7	**0.0**	0.0	**16.8**	4.4	0.6	**12.8**	**8.4**	0.0	**0.4**	0.6	0.0	0.5
Total all sectors	100.0	20852.2	**40.1**	**8.2**	2.4	1.2	**1.9**	3.2	**4.2**	0.4	**15.9**	2.7	0.5	**7.4**	**6.5**	0.7	**0.8**	2.2	0.6	1.1
More export oriented (shaded)	44.9	9352.8	**41.7**	**5.1**	2.3	1.6	**2.4**	2.3	**2.4**	0.7	**20.9**	1.4	0.0	**9.9**	**4.8**	1.1	**0.4**	1.8	0.5	0.7

Notes: All data are expressed as percentages, except for the column of sales. Thus, for the retailing sector, the USA companies constitute 77.4% of the total of all countries' companies. The second column of sales is in US$ millions and concerns the sales of countries shown in this Table; the total sales of US$20852.2 is 95% of grand total (which includes a few more countries not shown in this Table). The first column shows each sector's percentage of sales for all countries shown in this Table.

Appendix 1 Data for the regression and extra information

country	exxpo	Totsal#no	euro14	easteur	canmex	chijako	chihok	isola	ports	smes
Australia	58	233#38	0	0	0	0	0	1	0	0
Austria	64	44#9	2.0	0	0	0	0	0	0	0
Belgium	188	118#12	45.4	0	0	0	0	0	1	54
Brazil	52	128#19	0	0	0	0	0	0	0	0
Canada	221	465#67	0	0	171	0	0	0	0	0
Chile	16	10#5	0	0	0	0	0	1	0	0
China	214	157#25	0	0	0	1	156.6	0	0	0
Czech Rep	27	5.3#2	0	1	0	0	0	0	0	0
Denmark	51	73#10	33.8	0	0	0	0	0	0	0
Egypt	4	1#1	0	0	0	0	0	1	0	0
Finland	41	144#15	19.3	0	0	0	0	1	0	0
France	309	1362#62	447	0	0	0	0	0	0	0
Germany	540	1541#63	922	0	0	0	0	0	0	0
Greece	11	40#12	5.5	0	0	0	0	1	0	0
Hong Kong	182	113.5#28	0	0	0	0	113.5	0	1	0
Hungary	23	14#2	0	1	0	0	0	0	0	0
India	37	133#30	0	0	0	0	0	1	0	0
Indonesia	51	19#8	0	0	0	0	0	0	0	0
Ireland	62	50#8	3.9	0	0	0	0	0	0	0
Israel	24	20.5#8	0	0	0	0	0	1	0	0
Italy	236	566#45	133	0	0	0	0	0	0	71
Japan	419	3306#326	0	0	0	1	0	0	0	60
Malaysia	79	26#14	0	0	0	0	0	0	0	0
Mexico	119	83#18	0	0	62	0	0	0	0	0
Netherlands	214	868#33	223	0	0	0	0	0	0	0
New Zealand	14	3#1	0	0	0	0	0	1	0	0
Norway	49	122#9	0	0	0	0	0	0	0	0
Pakistan	9	2#2	0	0	0	0	0	1	0	0
Peru	6	1#1	0	0	0	0	0	1	0	0
Philippines	27	4.5#2	0	0	0	0	0	0	0	0
Poland	29	8.5#2	0	1	0	0	0	0	0	0
Portugal	24	35#7	6.1	0	0	0	0	1	0	0
Russia	89	118#13	0	0	0	0	0	0	0	0
Singapore	118	57#13	0	0	0	0	0	0	1	0
South Africa	29	91.5#18	0	0	0	0	0	1	0	0
South Korea	139	400#41	0	0	0	1	0	0	0	0
Spain	107	294#30	25.3	0	0	0	0	1	0	67
Sweden	80	253#28	29.5	0	0	0	0	0	0	0
Switzerland	80	501.5#37	0	0	0	0	0	0	0	0
Thailand	59	33#13	0	0	0	0	0	0	0	0
Turkey	27	60.5#11	0	0	0	0	0	1	0	0
UK	259	1710#140	315.3	0	0	0	0	0	0	0
USA	653	8360#711	0	0	0	0	0	0	0	0

Source: Average exports were calculated by the author for the period 1993 to 2003, based on the Word Bank (2005) data base. All the figures regarding no of firms, total sales, etc were calculated by the author based on Forbes (2006) publication.

Notes: For the significance of the variables see text, second section. The exports ("exxpo") and the other variables except the variables expressed as dummies (1 and 0) are in US$ billions. The third column shows totals sales and next to the symbol #, the number of companies in Forbes (2006) publication is added. For the variables "easteur", "chijako", "isola", and "ports" the dummies 1 and 0 are used. For all remaining variables, sales of the most exporting sectors (shaded rows in Table 3) are in US$ billions. In particular, for the "euro14" variable the following calculations made the figures shown on this Table: for example for Finland, the sales of the most exporting sectors were US$101, and this country joined the EU in 1994, hence only 9 years of active

participation in the European integration (out of 47 since the establishment of the EU in 1957, see the EU'site EUROPA); hence the figure shown on this Table is: 101*9/47=19.34.

Appendix 2 A brief list of some well known companies for each industry

Industry	Examples of companies
Aerospace & defense	Boeing (USA); General Dynamics (USA); Thales (France);
Banking	HSBC Group (UK); Barclays (UK); BNP Paribas (France);
Business services & supplies	Xerox (USA); Canon (Japan); Ricoh (Japan);
Capital goods	Caterpillar (USA); Komatsu (Japan); Kubota (Japan); Daewoo Ship & Marine (Korea)
Chemicals	Dow Chemicals (USA); Teijin (Japan); LG Chemicals (Korea);
Conglomerates	3M (USA); Textron (USA); Hitachi (Japan);
Construction	Shimizu (Japan); Saint-Gobain (France);
Consumer durables	Ford Motor (USA); general Motors (USA); Toyota (Japan); LG Electronics (Korea);
Diversified financials	Merrill Lynch (USA); Orix (Japan); ING Group (Netherlands)
Drugs & biotechnology	AstraZeneca (UK); Eisai (Japan);
Food markets	Tesco (UK); Carrefour Group (France); Metro AG (Germany);
Food, drink & tobacco	Pepsi Co (USA); Kellogg (USA); Kirin Brewery (Japan);
Health care equipment & services	McKesson (USA); Cigna (USA); Suzuken (Japan);
Hotels, restaurants & leisure	Intercontinental (UK); Hilton Group (UK); Accor (France);
Household & personal products	Gillette (USA); Eastman Kodak (USA); Fuji (Japan);
Insurance	MetLife (USA); Aioi (Japan); Allianz Worldwide (Germany);
Materials	Bluescope Steel (Australia); Aluminum Co, (China);
Media	Walt Disney (USA); Vivendi Universal (France);
Oil & gas operations	BP (UK); Exxon Mobil (USA); Royal Dutch/Shell (Netherlands);
Retailing	Target (USA); Aeon (Japan);
Semiconductors	Intel (USA); Nikon (Japan); Samsung Electronics (Korea);
Software & services	Microsoft (USA); Oracle (USA); Google (USA);
Technology hardware & equipment	IBM (USA); Dell (USA); Motorola (USA); Sony (Japan);
Telecommunications services	AT&T (USA); Deutsche Telekom (Germany);
Trading companies	Mitsubishi (Japan); Sumitomo (Japan);
Transportation	United Parcel (USA); FedEx (USA); Kintetsu (Japan); Deutsche Lufthansa (Germany)
Utilities	Exelon (USA); Osaka Gas (Japan);

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