Online Appendix to Domestic Value Added in Exports: Theory and Firm Evidence from China

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I Data Description

The main data set for this paper covers the universe of Chinese import and export transactions in each month between 2000 and 2007. It reports values (in US dollars) of a firm's exports (and imports) at the HS 8-digit level (over 7000 products) to each destination (from each source) country. We drop trading companies (intermediaries) in our sample, using the methods proposed by Ahn, Khandelwal, and Wei (2011) to identify them. This level of disaggregation is the finest for empirical studies in international trade – i.e., transactions at the firm-product-country-month level.

Processing trade has been playing a significant role in driving China's export growth. From 2000 to 2007, processing exports have increased by over four folds from 138 billion USD to 680 billion USD with the share of processing exports in total exports held steadily around 55 percent, as shown in Figure A1. In addition, Table A1 shows that, the U.S. consistently ranked as the top destination, accounting for about 25 percent of Chinese total processing exports. Following the U.S. is Hong Kong SAR, China, which accounted for slightly over 20 percent of the total. Japan has been the third largest market for Chinese processing exports, but its prominence has declined from 18 percent in 2000 to 10 percent in 2007. Processing exports are widespread among China's top 10 export destinations, as seen in Figure A2. It accounted for 63 percent of Chinese exports to the U.S. in 2007 and 81 percent for Hong Kong SAR, China, the highest share among the top 10 destinations.

We present in Figure A3 the share of processing exports in 2007 by industry sector,

according to the United Nations groupings of HS2 categories. There exists a substantial heterogeneity in the prevalence of processing exports across industries. The share is about 20 percent for the "wood & articles" sector (HS2 = 6 -14) and is over 80 percent for the "machinery, mechanical, and electrical equipment" sector (HS2 = 84-85).

The advantage of focusing on processing exporters is that we need not worry about their imports for final consumption, as by definition, all imports in processing trade have to be used as intermediate inputs.[52] However, not all processing exporters import for their own use. Some of them import for other processing firms, which also implies that some processing firms must export more than what their imported materials can support. We develop systematic rules to identify processing firms that potentially import from and export for other firms. To this end, we merge the customs transaction data with the firm-level data from the Annual Surveys of Industrial Firms conducted by China's National Bureau of Statistics (NBS hereafter). The surveys cover all state-owned enterprises (SOEs) and non-state-owned firms that have sales above 5 million yuan in a given year.[53] The NBS data contain detailed information for most of the standard balance sheet information, such as firm ownership, output, value added, industry code (480 categories), exports, employment, original value of fixed asset, and intermediate inputs. Tables A2 and A3 present the percentages of firms and sales that are covered by the merged data. Table A4 presents the industry's median of firm materials-to-sales ratios.

[52] Manova and Yu (2013) examine how financial constraints affect exporters positions in global supply chains in China and thus their profits. In this paper, we simply take advantage of the special features of the processing regime without getting into the details about firms' transition from one regime to another.

[53] The industry section in the official statistical yearbooks of China is constructed based on the same data source. The unit of analysis is a firm, and not the plant, but other information in the survey suggests that more than 95% of all observations in our sample are single-plant firms. 5 million yuan is roughly exchanged to 600,000 US dollars during the sample period.

A Transforming Chinese I/O Tables to One Based on UN Industry Code

1. Use the concordance from China's National Bureau of Statistics to match multiple IO codes with multiple HS 6-digit codes (revision 2002).

2. Match multiple HS6 codes to multiple UN industry sector codes (20 of them).

3. For each IO code, pick the UN code that has the largest number of HS6 shared. This will guarantee that all IO codes will be covered.

4. For UN codes that are matched with multiple IO codes, manually choose a unique UN code for the match. It happens in only one case.

5. Then add up the values of intermediate inputs for each pair of upstream-downstream relationship. A matrix of 20 groups by 20 groups will be built.

6. Recompute the IO coefficients based on the UN industry sector classification.

B Computing Domestic Upstream Variety

To compute domestic upstream variety, we use the weighted average of the number of HS6 products exported by non-processing firms across all upstream industries as a proxy for domestic upstream varieties, since data on domestic varieties are not available. The belief is that a firm's export product scope is a subset of its domestic product scope.[54] Specifically, we compute the weighted average of the number of upstream varieties by $V_{jt} = \sum_{i=1}^{I} s_{ij} V_{it}$, where s_{ij} is the share of industry $i's$ goods used in total input costs of industry j, according to the Chinese input-output table for 2002. V_{it} is the number of HS6 products exported by

[54] There could be export varieties that were not sold domestically or vice versa. There could also be domestic varieties produced by non-exporters that were not exported. In these regards, our proxy should be considered as a lower bound of the number of domestic varieties.

non-processing firms in industry i in year t. Since the HS classifications have changed twice (in 2002 and 2007, respectively) during our sample period, we use the concordance file created by Cebeci et al. (2012) to define a consistent set of varieties over time. As reported in Table A5, the number of varieties available to the downstream processing exporters is increasing over time for most industries. Some industries have systematically higher input varieties (e.g. machinery, mechanical, and electrical equipment). This industry-specific feature is already controlled for by industry fixed effects in the regressions.

C Computing Upstream Input Tariffs

Computing an industry's upstream tariffs involves two steps. For each upstream industry, input tariffs are measured as a weighted average of tariffs facing all input suppliers to that industry. Specifically, we obtain the share of industry i's inputs in total material cost of industry j, s_{ij}, from the Chinese IO table for 2002. Then for each industry j, we compute the weighted average of input tariffs as $\widetilde{\tau}_{jt} = \sum_{i=1}^{I} s_{ij}\tau_{it}$, where τ_{it} is the average tariff rate for industry i in year t and I is the total number of industries. Finally, for each downstream industry k, we use the IO coefficients again to compute the weighted average of upstream input tariffs $\widetilde{\tau}^{U}_{kt} = \sum_{j=1}^{I} s_{jk}\widetilde{\tau}_{jt}$. The idea to use the IO tables twice is that we need the measure of tariffs facing domestic input suppliers, not downstream exporters. For example, a garment firm uses fabrics, zippers and buttons. Fabrics firms use cotton yarns, zipper firms use steel, and button firms use plastics. Thus, the upstream input tariff for a garment firm is a weighted average tariff rates on cotton yarns, steel and plastics.

D Computing Industry-specific Exchange Rate Indices

We use the Tornqvist method to construct an industry-specific time-varying exchange rate. For each industry j, let I_{jt} be the set of common countries firms in industry j import from

in two consecutive years, t and $t-1$. Denote country c's currency price of a yuan in year t and $t-1$ by E_{ct} and E_{ct-1}; and denote country c's shares in industry $j's$ total imports in year t and $t-1$ by s_{cjt} and $s_{cj,t-1}$. The industry-specific rate of yuan appreciation with respect to the countries from which industry j imports in year t is defined as

$$\triangle \ln E_{jt} = \sum_{c \in I_{jt}} \frac{1}{2} \left(s_{cjt} + s_{cj,t-1} \right) \left(\ln E_{ct} - \ln E_{c,t-1} \right).$$

Using this weighted average of appreciation rates, we define the industry-specific exchange rate for imports as

$$E_{jt} = E_{j,t-1} \exp \left(\triangle \ln E_{jt} \right),$$

with E_{jt} normalized to 1 in the base year (i.e., 2000) or any starting year for each industry.

E Computing Industry-specific Domestic Input Price Indices

Computing the input price indices involves two steps. First, we use the Tornqvist method to construct an industry-specific time-varying domestic input price indices. For each industry j (15 of them), let I_{jt} be the set of common sub-industries in two consecutive years, t and $t-1$. Denote sub-industry s's output price index in year t and $t-1$ by P_{st} and $P_{s,t-1}$; and denote the share of sub-industry s's sales in industry $j's$ total sales in year t and $t-1$ by ω_{sjt} and $\omega_{sj,t-1}$. Data on output price indices at the 4-digit sector level (based on China's NBS classification) are obtained from Brandt, Van Biesebroeck, and Zhang (2012).[55] The industry-specific rate of output price inflation in year t is defined as

$$\triangle \ln \widetilde{P}_{jt} = \sum_{s \in I_{jt}} \frac{1}{2} \left(\omega_{sjt} + \omega_{sj,t-1} \right) \left(\ln P_{st} - \ln P_{s,t-1} \right).$$

[55] http://www.econ.kuleuven.be/public/N07057/CHINA/appendix/

Using this weighted average of inflation rates, the sector-specific output price level is defined as

$$\widetilde{P}_{jt} = \widetilde{P}_{j,t-1} \exp\left(\triangle \ln \widetilde{P}_{jt}\right),$$

with $\widetilde{P}_{jt}$ normalized to 1 in 2000.

The second step is to compute the weighted average of $\widetilde{P}_{jt}$, with weights equal to the coefficients from the Chinese IO table for 2002. The goal is to compute the average domestic prices facing processing firms in industry j. Specifically, for each industry j, the weighted average of input prices is $P_{jt}^{D} = \sum_{k=1}^{J} a_{kj} \widetilde{P}_{kt}$, where a_k is the share of industry k goods in total material costs for production of a unit of industry j goods and J is the number of industries. Notice that P_{jt}^{D} varies across time purely due to the variation in $\widetilde{P}_{jt}$, since a_{kj} is fixed throughout the sample.

F Computing Industry-specific Imported Input Price Indices

To compute the imported input indices, we use the Tornqvist method to construct an industry-specific time-varying import price indices based on firm-level imports from the customs transaction data. For each industry j (15 of them), let I_{jt} be the set of common product (at the HS 8-digit level) in two consecutive years, t and $t-1$. Denote product s's import prices in year t and $t-1$ by p_{st}^{I} and $p_{s,t-1}^{I}$; and denote the share of product s's imports in industry $j's$ total imports in year t and $t-1$ by ϖ_{sjt} and $\varpi_{sj,t-1}$. Product-level import prices (by processing firms only) are computed as total import value divided by total quantity of import at the HS8 level, using customs transaction-level data. Then sector-specific rate of import price inflation in year t is defined as

$$\triangle \ln \widetilde{P}_{jt}^{I} = \sum_{j \in I_{jt}} \frac{1}{2} \left(\varpi_{sjt} + \varpi_{sj,t-1}\right) \left(\ln p_{st}^{I} - \ln p_{s,t-1}^{I}\right).$$

Using this weighted average of inflation rates, the sector-specific import price level is defined as

$$\widetilde{P}_{jt}^{I} = \widetilde{P}_{j,t-1}^{I} \exp\left(\triangle \ln \widetilde{P}_{jt}^{I}\right),$$

with $\widetilde{P}_{jt}^{I}$ normalized to 1 in 2000. Table A6 reports the ratio of the imported material price index to the domestic material price index across industry-years.

II Theoretical Derivation of Firm DVAR (the Cobb-Douglas Case)

In the main text, we derive the theoretical expression of firm $DVAR$ based on a translog production function. In this section, we use a more convenient form of production function – the Cobb-Douglas production function, as the basis to derive firm $DVAR$.

For each year t, consider firm i with productivity, ϕ_i, which uses both domestic $\left(M_{it}^{D}\right)$ and imported materials $\left(M_{it}^{I}\right)$, alongside capital (K_{it}) and labor (L_{it}) to produce output Y_i, according to the following production production:

$$\begin{aligned} Y_{it} &= \phi_i K_{it}^{\alpha_K} L_{it}^{\alpha_L} M_{it}^{\alpha_M}, && (31) \\ M_{it} &= \left(M_{it}^{D\frac{\sigma-1}{\sigma}} + M_{it}^{I\frac{\sigma-1}{\sigma}}\right)^{\frac{\sigma}{\sigma-1}}, && (32) \\ \alpha_K + \alpha_L + \alpha_M &= 1 \text{ and } \sigma > 1. \end{aligned}$$

Each firm faces input prices $\left(r_t, w_t, P_t^D, P_t^I\right)$ for capital, labor, domestic materials, and imported materials. Given (32) it can be shown that the price index of total materials is a constant-elasticity-of-substitution (CES) function over P_t^D and P_t^I :

$$P_t^M = \left(\left(P_t^D\right)^{1-\sigma} + \left(P_t^I\right)^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$$

Firms' cost minimization implies the following total cost of producing Y_{it} units of output:

$$\begin{aligned} C_{it}\left(r_t, w_t, P_t^D, P_t^I, Y_{it}\right) &= \frac{Y_{it}}{\phi_i}\left(\frac{r_t}{\alpha_K}\right)^{\alpha_K}\left(\frac{w_t}{\alpha_L}\right)^{\alpha_L}\left(\frac{P_t^M}{\alpha_M}\right)^{\alpha_M}, \text{ with} \\ \frac{P_t^M M_{it}}{C_{it}} &= \alpha_M. \end{aligned} \tag{33}$$

Thus, the marginal cost (c_{it}) of producing Y_{it} units of final goods is

$$c_{it} = \frac{\partial C_{it}}{\partial Y_{it}} = \frac{1}{\phi_i}\left(\frac{r_t}{\alpha_K}\right)^{\alpha_K}\left(\frac{w_t}{\alpha_L}\right)^{\alpha_L}\left(\frac{P_t^M}{\alpha_M}\right)^{\alpha_M}, \tag{34}$$

which is constant over output. Note that while input prices and input elasticities are common across all firms within an industry-year, firms have different productivity, ϕ_i, which results in different marginal cost, c_{it}, across firms. Then we can express the share of imported materials in total revenue as:

$$\begin{aligned} \frac{P_t^I M_{it}^I}{P_{it}Y_{it}} &= \frac{P_t^I M_{it}^I}{P_t^M M_{it}}\frac{P_t^M M_{it}}{C_{it}}\frac{C_{it}}{P_{it}Y_{it}} \\ &= \frac{P_t^I M_{it}^I}{P_t^M M_{it}}\alpha_M\frac{c_{it}}{P_{it}} \\ &= \alpha_M\left(1-\chi_{it}\right)\frac{P_t^I M_{it}^I}{P_t^M M_{it}}, \end{aligned}$$

where $\chi_i = \frac{P_{it}-c_{it}}{P_{it}} \in [0,1]$ is the price-cost margin of the firm.[56]

Finally, the share of imported materials in total cost of materials can be obtained by the

[56]Note that price-cost margin, χ_i is closely related to firm's markup, which is usually defined as

$$\mu_i = \frac{P_{it}}{c_{it}} = \frac{1}{1-\chi_i}.$$

If price equals marginal cost, as it is in the case of perfect competition, χ_i equals 0 and $\mu_i = 1$. When $\mu_i > 1$, then $\chi_i > 0$.

following minimization problem:

$$\begin{aligned} & \min P_t^I M_{it}^I + P_t^D M_{it}^D \\ s.t.\ M_{it} &= \left(M_{it}^{D\,\frac{\sigma-1}{\sigma}} + M_{it}^{I\,\frac{\sigma-1}{\sigma}} \right)^{\frac{\sigma}{\sigma-1}}. \end{aligned}$$

Solving it gives the following ratio of imported material cost to total material cost:

$$\frac{P_t^I M_{it}^I}{P_t^M M_{it}} = \frac{1}{1 + \left(\frac{P_t^I}{P_t^D}\right)^{\sigma-1}}. \tag{35}$$

We can then express firm i's $DVAR$ in period t, based on (4), as

$$DVAR_{it} = 1 - \alpha_M \left(1 - \chi_{it}\right) \frac{1}{1 + \left(\frac{P_t^I}{P_t^D}\right)^{\sigma-1}}. \tag{36}$$

According to (36), the determinants of a firm's $DVAR$ can be analyzed as follows:

1. Cross-sectional distribution of the $DVAR$ within an industry-year

Given input prices and elasticities, the cross sectional distribution of $DVAR$ within an industry-year depends on the distribution of firm's price-cost margin, χ_i, given that $DVAR$ is an affine transformation of χ_i. Thus, within an industry-year, a firm with a higher χ_i will have a higher $DVAR$. Factors that affect the price-cost margin will therefore affect firm $DVAR$.

- Perfect Competition

If the industry is perfectly competitive, $\chi_{it} = 0$, $\forall i, t$, the cross-sectional distribution of

$DVAR$ degenerates to the following constant that does not vary across firms:

$$DVAR_{it} = 1 - \alpha_M \frac{1}{1 + \left(\frac{P_t^I}{P_t^D}\right)^{\sigma-1}}, \ \forall i, t.$$

- Monopolistic Competition with CES preferences

Under monopolistic competition with CES preferences, $\chi_{it} = \chi, \forall i$, since markup is constant across all firms, the cross-sectional distribution of $DVAR$ degenerates to the following constant that also does not vary across firms within the same industry:

$$DVAR_{it} = 1 - \alpha_M (1 - \chi) \frac{1}{1 + \left(\frac{P_t^I}{P_t^D}\right)^{\sigma-1}}, \ \forall i, t.$$

Note that the cross-sectional distribution of $DVAR$ does not depend on the distribution of firm productivity under CES preferences, as long as markup is constant across firms. Empirically, if we observe varying $DVAR$ across firms within the same industry-year, it indicates that the CES preference assumption is not supported and that the industry is likely not perfectly competitive.

2. Time-series movement of $DVAR$ within firms

Eq. (36) shows that the time-series movement of $DVAR$ is determined by the price of imported inputs to domestic inputs, $\frac{P_t^I}{P_t^D}$, which is common across firms within the same industry-year. Factors that affect $\frac{P_t^I}{P_t^D}$ will affect a firm's $DVAR$ over time. It is worth emphasizing that factors that do not affect $\frac{P_t^I}{P_t^D}$ directly, such as the firm's wages (w) or productivity (ϕ_i), do not directly affect the time-series movement of $DVAR$ within firms.[57]

[57] Domestic wages can still indirectly affect firm $DVAR$ through affecting the price of domestic materials. In the regression analysis below, controlling for the relative price of materials, we should expect no impact from wages on firm $DVAR$.

References

[1] Ahn, Jaebin., Amit Khandelwal, and Shang-Jin Wei (2011). "The Role of Intermediaries in Facilitating Trade," *Journal of International Economics*, 84, 73–85.

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[5] Manova, Kalina and Zhihong Yu (2013). "Firms and Credit Constraints along the Global Value Chain: Processing Trade in China," NBER Working Paper 18561.

Figure A1: Share of China's Processing Exports, 2000-2007

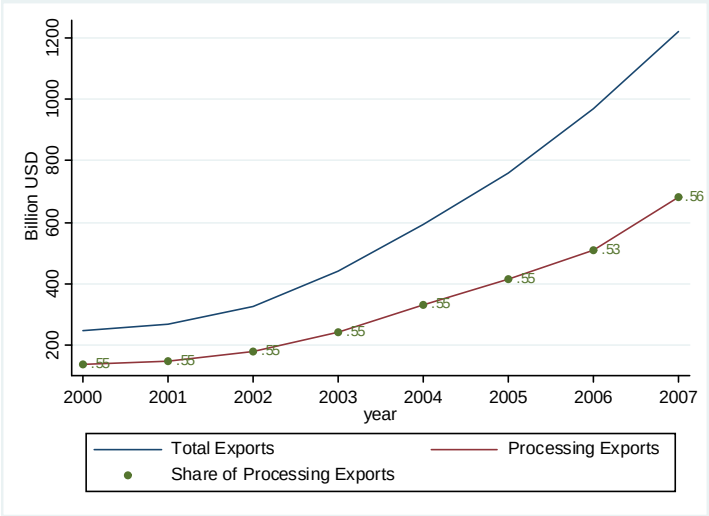

Figure A2: Shares of Processing Exports in China's Top 10 Export Destinations (2000 & 2007)

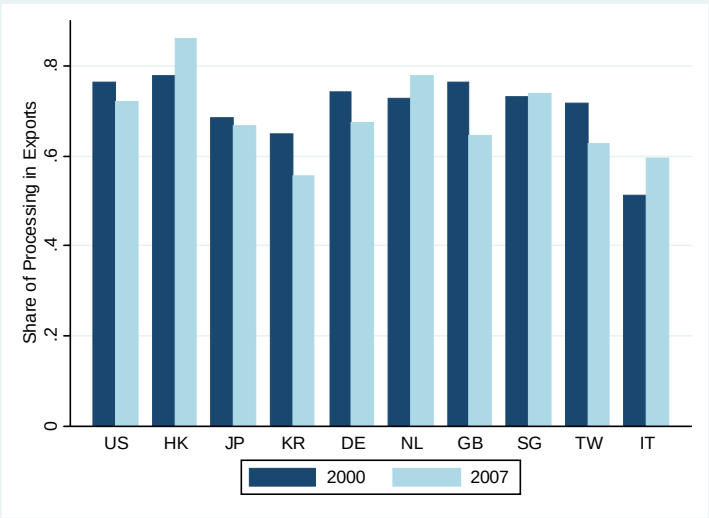

Figure A3: Shares of Processing Exports by Industry Sector (2007)

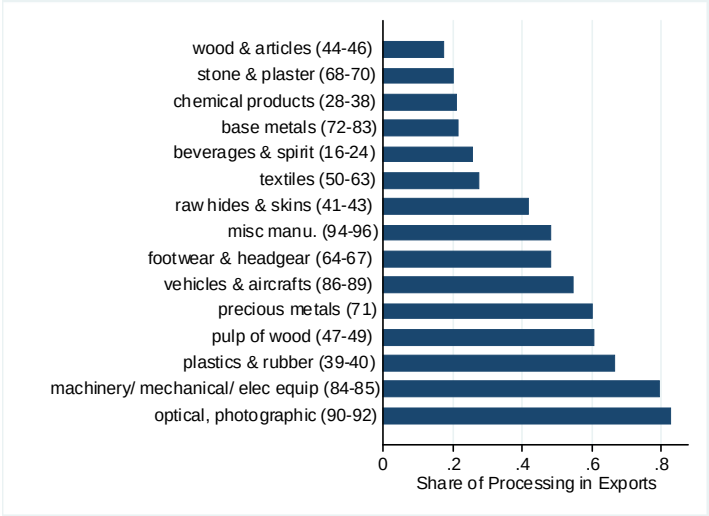

Figure A4: DVAR of Processing Exports - Different Filtered Samples (2000-2007)

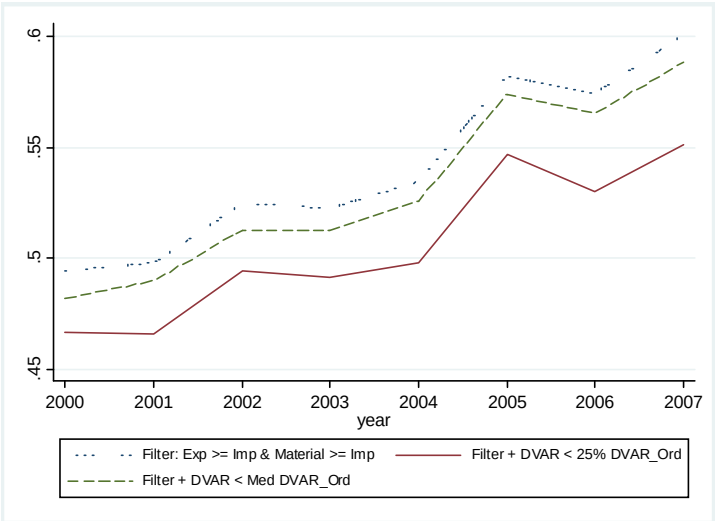

Figure A5: Export Share of the Two Types Processing (2000-2007)

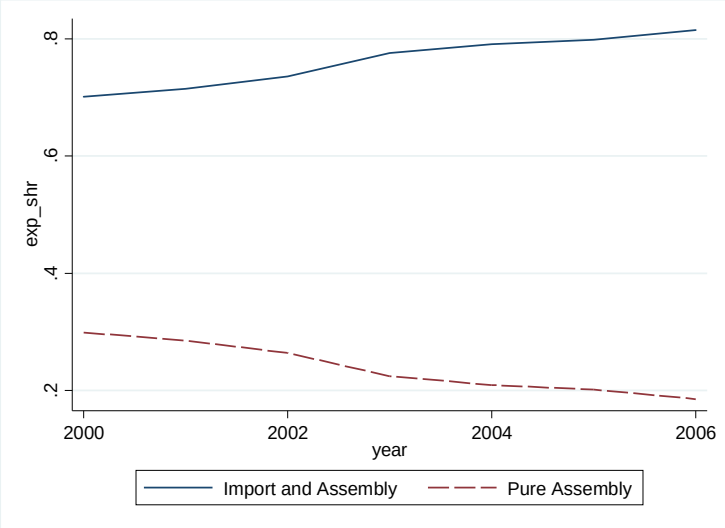

Figure A6: DVAR of Processing Exports (Multi-industry Firms, 2000-2007)

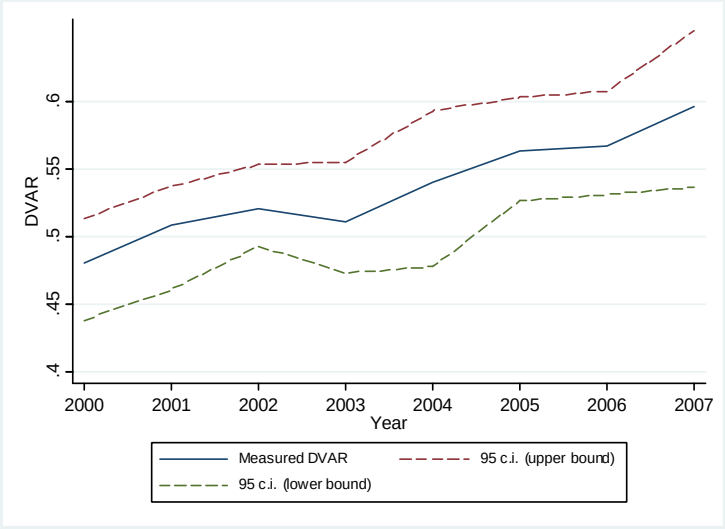

Figure A7: DVAR of Aggregate Exports (Single-industry Firms, 2000-2007)

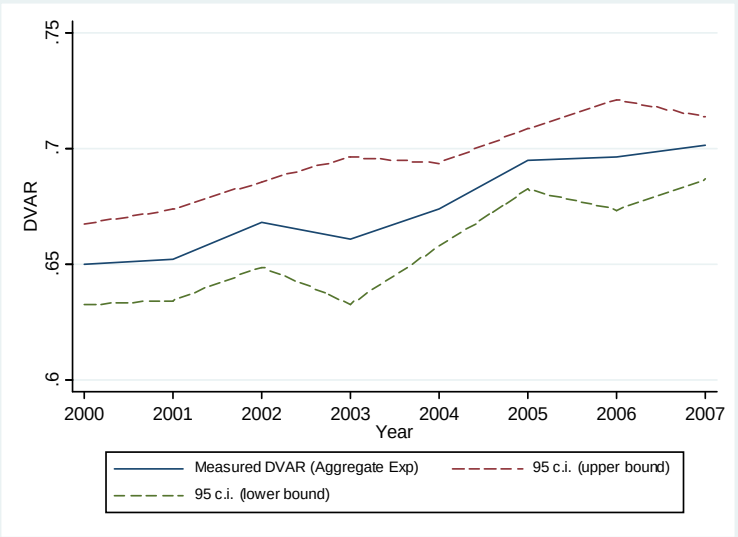

Table A1: Top 10 Destinations of China's Processing Exports

	2000		2007	
Rank		USD (Bil)		USD (Bil)
1	United States	35.17	United States	152.51
2	Hong Kong SAR, China	31.02	Hong Kong SAR, China	150.00
3	Japan	23.17	Japan	60.25
4	Germany	5.62	Netherlands	29.08
5	Korea, Republic of	5.34	Germany	29.00
6	Netherlands	3.90	Korea, Republic of	26.70
7	United Kingdom	3.90	Singapore	19.04
8	Singapore	3.62	United Kingdom	17.41
9	Taiwan, China	2.92	Taiwan, China	13.22
10	France	2.10	France	11.81

Source: China's Customs Trade Data.

Table A2: Representation of Different Subsamples by Numbers of Exporters

Industry	Number of Firm-year Observations				
	customs	merged w/ NBS	% of customs	filtered	% of customs
04:beverages & spirit (16-24)	830	356	42.89	257	30.96
06:chemical products (28-38)	2278	920	40.39	410	18.00
07:plastics & rubber (39-40)	7139	2656	37.20	1190	16.67
08:raw hides & skins (41-43)	3472	1242	35.77	678	19.53
09:wood & articles (44-46)	637	169	26.53	77	12.09
10:pulp of wood (47-49)	2570	1204	46.85	337	13.11
11:textiles (50-63)	20054	7619	37.99	4806	23.97
12:footwear & headgear, etc. (64-67)	4776	2158	45.18	1329	27.83
13:stone, plaster, cement, etc. (68-70)	993	401	40.38	226	22.76
14:precious metals (71)	1826	446	24.42	219	11.99
15:base metals (72-83)	4278	1725	40.32	786	18.37
16:machinery, mech, elect eqmt (84-85)	22574	9420	41.73	4986	22.09
17:vehicles & aircraft (86-89)	1281	627	48.95	405	31.62
18:optical, photographic, etc. (90-92)	3498	1211	34.62	810	23.16
20:misc manufacturing (94-96)	5376	1954	36.35	1391	25.87
Total	81582	32108	39.36	17907	21.95

Source: China's Customs Trade Data and National Bureau of Statistics (NBS) Manufacturing Survey.
Sections 1, 2, 3, 5, and 19 are non-manufacturing sectors and are excluded from the analysis.
Sample pooled across 2000-2007.

Table A3: Representation of Different Subsamples By Export Values

Industry	Sales (million usd)				
	customs (mil usd)	merged	% of customs	filtered	% of customs
04:beverages & spirit (16-24)	1447	1042	72.02	822	56.78
06:chemical products (28-38)	4401	2584	58.71	1308	29.72
07:plastics & rubber (39-40)	14156	9535	67.36	6331	44.72
08:raw hides & skins (41-43)	6639	4199	63.25	1843	27.77
09:wood & articles (44-46)	718	434	60.48	217	30.17
10:pulp of wood (47-49)	2760	1923	69.66	1130	40.93
11:textiles (50-63)	42272	29606	70.04	20168	47.71
12:footwear & headgear, etc. (64-67)	18123	13333	73.57	10567	58.31
13:stone, plaster, cement, etc. (68-70)	1575	1133	71.92	706	44.82
14:precious metals (71)	13299	9838	73.97	1616	12.15
15:base metals (72-83)	12562	6439	51.25	4166	33.16
16:machinery, mech, elect eqmt (84-85)	223527	151238	67.66	102399	45.81
17:vehicles & aircraft (86-89)	25232	19782	78.40	17525	69.45
18:optical, photographic, etc. (90-92)	10041	8039	80.06	4155	41.38
20:misc manufacturing (94-96)	13514	9050	66.97	6690	49.50
Total	390268	268173	68.72	179641	46.03

Source: China's Customs Trade Data and National Bureau of Statistics (NBS) Manufacturing Survey.
Sections 1, 2, 3, 5, and 19 are non-manufacturing sectors and are excluded from the analysis.
Sample pooled across 2000-2007.

Table A4: Median of Materials to Sales Ratio by Industry and Year

Industry Sector	Year							
	2000	2001	2002	2003	2004	2005	2006	2007
04:beverages & spirit (16-24)	0.785	0.774	0.779	0.724	0.833	0.784	0.797	0.774
06:chemical products (28-38)	0.813	0.824	0.777	0.790	0.814	0.771	0.787	0.772
07:plastics & rubber (39-40)	0.806	0.791	0.791	0.799	0.830	0.806	0.798	0.798
08:raw hides & skins (41-43)	0.806	0.810	0.788	0.766	0.772	0.792	0.763	0.741
09:wood & articles (44-46)	0.801	0.788	0.769	0.741	0.776	0.801	0.796	0.815
10:pulp of wood (47-49)	0.800	0.796	0.778	0.785	0.818	0.799	0.769	0.771
11:textiles (50-63)	0.791	0.782	0.770	0.771	0.769	0.758	0.753	0.736
12:footwear & headgear, etc. (64-67)	0.795	0.778	0.754	0.770	0.763	0.745	0.749	0.720
13:stone, plaster, cement, etc. (68-70)	0.795	0.768	0.735	0.777	0.750	0.777	0.739	0.753
14:precious metals (71)	0.780	0.754	0.739	0.749	0.744	0.711	0.724	0.762
15:base metals (72-83)	0.826	0.817	0.797	0.782	0.812	0.791	0.787	0.810
16:machinery, mech, elect & eqmt (84-85)	0.800	0.803	0.773	0.773	0.804	0.796	0.780	0.780
17:vehicles & aircraft (86-89)	0.811	0.829	0.800	0.776	0.811	0.787	0.809	0.788
18:optical, photographic, etc. (90-92)	0.806	0.785	0.750	0.759	0.773	0.753	0.753	0.727
20:misc manufacturing (94-96)	0.796	0.776	0.757	0.764	0.783	0.755	0.758	0.761

Source: China's Customs Trade Data and National Bureau of Statistics Manufacturing Survey.

Table A5: Upstream Variety Counts

Industry Sector	Year							
	2000	2001	2002	2003	2004	2005	2006	2007
01:live animals (1-5)	287.7	288.2	292.1	289.9	291.2	293.5	291.5	293.4
02:vegetables (6-14)	333.4	335.0	340.4	339.2	340.9	344.1	342.3	342.8
03:animal or vegetable oil (15)	294.2	294.5	297.9	295.6	296.4	299.2	297.3	298.0
04:beverages & spirit (16-24)	307.3	308.4	313.3	311.7	313.2	316.2	314.3	315.3
05:mineral products (25-27)	253.5	256.0	258.9	261.2	262.6	265.2	266.5	265.4
06:chemical products (28-38)	304.5	307.4	312.4	313.5	315.5	318.6	319.8	316.9
07:plastics & rubber (39-40)	263.6	263.6	268.4	268.1	270.9	273.2	273.6	272.1
08:raw hides & skins (41-43)	308.1	309.1	312.8	310.8	312.1	314.5	314.1	312.2
09:wood & articles (44-46)	186.2	188.2	192.3	192.0	194.1	195.2	193.6	193.2
10:pulp of wood (47-49)	202.6	205.3	207.3	209.4	209.6	213.3	210.8	209.8
11:textiles (50-63)	445.7	447.2	452.0	449.6	452.3	454.4	453.1	451.8
12:footwear & headgear, etc. (64-67)	374.5	374.6	378.6	376.5	379.5	381.1	380.4	378.6
13:stone, plaster, cement, etc. (68-70)	282.2	284.2	288.9	289.9	292.3	294.6	295.5	293.6
14:precious metals (71)	310.3	313.5	319.3	320.1	323.8	326.3	326.9	324.4
15:base metals (72-83)	348.7	352.7	359.5	361.0	366.4	369.0	370.4	367.4
16:machinery, mech, elect eqmt (84-85)	447.6	450.9	456.3	457.6	461.6	463.6	464.3	462.9
17:vehicles & aircraft (86-89)	296.4	297.3	302.6	304.7	308.1	309.4	310.9	311.0
18:optical, photographic, etc. (90-92)	421.6	424.6	430.7	430.9	435.7	437.6	438.3	435.8
20:misc manufacturing (94-96)	326.8	328.5	333.5	333.0	336.6	338.4	338.5	336.4

Source: China's Customs Trade Data and National Bureau of Statistics Manufacturing Survey. Each variety is defined as a HS-6 digit product.

Table A6: Price Index of Imported Materials/ Price Index of Domestic Materials

Industry Sector	Year							
	2000	2001	2002	2003	2004	2005	2006	2007
04:beverages & spirit (16-24)	1	0.980	0.975	1.075	1.067	1.092	1.187	1.220
06:chemical products (28-38)	1	0.981	1.028	1.145	1.219	1.385	1.564	1.657
07:plastics & rubber (39-40)	1	0.997	1.053	1.139	1.183	1.288	1.418	1.526
08:raw hides & skins (41-43)	1	1.000	0.997	1.098	1.125	1.192	1.279	1.355
09:wood & articles (44-46)	1	0.960	0.991	1.077	1.112	1.162	1.233	1.262
10:pulp of wood (47-49)	1	0.998	1.024	1.116	1.168	1.241	1.332	1.486
11:textiles (50-63)	1	0.995	1.004	1.087	1.108	1.153	1.228	1.253
12:footwear & headgear, etc. (64-67)	1	0.994	1.019	1.101	1.150	1.234	1.328	1.396
13:stone, plaster, cement, etc. (68-70)	1	0.996	1.007	1.095	1.197	1.356	1.510	1.659
14:precious metals (71)	1	0.985	0.960	1.048	1.094	1.208	1.316	1.403
15:base metals (72-83)	1	0.978	0.991	1.043	1.112	1.256	1.403	1.488
16:machinery, mech, elect eqmt (84-85)	1	1.021	1.115	1.237	1.305	1.431	1.572	1.890
17:vehicles & aircraft (86-89)	1	1.044	1.053	1.136	1.245	1.390	1.547	1.890
18:optical, photographic, etc. (90-92)	1	1.015	1.120	1.299	1.416	1.541	1.672	2.022
20:misc manufacturing (94-96)	1	0.992	1.009	1.105	1.175	1.286	1.413	1.563

Source: China's Customs Trade Data and National Bureau of Statistics Manufacturing Survey. Both prices are normalized to 1 for year 2000.

Table A7: Percentage of Foreign Content in Domestic Materials

Industry Sector	Year							
	2000	2001	2002	2003	2004	2005	2006	2007
04:beverages & spirit (16-24)	0.727	0.795	0.960	1.176	1.560	2.032	2.029	2.084
06:chemical products (28-38)	0.670	0.744	0.921	1.151	1.595	2.134	2.183	2.318
07:plastics & rubber (39-40)	0.386	0.433	0.544	0.691	0.975	1.312	1.374	1.466
08:raw hides & skins (41-43)	0.718	0.788	0.972	1.210	1.652	2.169	2.210	2.291
09:wood & articles (44-46)	1.110	1.209	1.465	1.826	2.518	3.353	3.352	3.493
10:pulp of wood (47-49)	0.892	1.012	1.286	1.680	2.389	3.211	3.374	3.549
11:textiles (50-63)	1.058	1.163	1.443	1.800	2.436	3.226	3.288	3.426
12:footwear & headgear, etc. (64-67)	0.927	1.027	1.290	1.631	2.263	3.023	3.133	3.293
13:stone, plaster, cement, etc. (68-70)	1.204	1.338	1.662	2.094	2.944	3.967	4.103	4.381
14:precious metals (71)	0.918	1.024	1.276	1.607	2.249	3.053	3.188	3.450
15:base metals (72-83)	1.146	1.282	1.602	2.026	2.857	3.907	4.122	4.511
16:machinery, mech, elect eqmt (84-85)	1.089	1.230	1.544	1.974	2.737	3.689	3.939	4.375
17:vehicles & aircraft (86-89)	1.414	1.586	1.981	2.528	3.564	4.855	5.134	5.657
18:optical, photographic, etc. (90-92)	0.730	0.820	1.028	1.311	1.829	2.466	2.617	2.877
20:misc manufacturing (94-96)	1.015	1.129	1.412	1.787	2.502	3.366	3.513	3.759

Source: From Koopman, Wang, and Wei (2012) and authors' imputation based on the growth rate of the number of ordinary importers

Table A8: 25th-percentile of Ordinary Exporters' DVAR by Industry and Year

Industry Sector	Year							
	2000	2001	2002	2003	2004	2005	2006	2007
04:beverages & spirit (16-24)	0.909	0.928	0.897	0.884	0.876	0.922	0.911	0.931
06:chemical products (28-38)	0.880	0.906	0.895	0.942	0.880	0.914	0.904	0.915
07:plastics & rubber (39-40)	0.811	0.862	0.853	0.838	0.795	0.845	0.849	0.848
08:raw hides & skins (41-43)	0.792	0.846	0.876	0.894	0.870	0.792	0.803	0.777
09:wood & articles (44-46)	0.820	0.848	0.855	0.878	0.859	0.898	0.870	0.901
10:pulp of wood (47-49)	0.804	0.850	0.826	0.873	0.775	0.946	0.893	0.895
11:textiles (50-63)	0.802	0.852	0.855	0.873	0.858	0.890	0.893	0.891
12:footwear & headgear, etc. (64-67)	0.756	0.789	0.792	0.855	0.804	0.870	0.823	0.888
13:stone, plaster, cement, etc. (68-70)	0.942	0.889	0.912	0.907	0.861	0.876	0.877	0.892
14:precious metals (71)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
15:base metals (72-83)	0.851	0.861	0.896	0.916	0.876	0.917	0.926	0.953
16:machinery, mech, elect eqmt (84-85)	0.830	0.833	0.841	0.893	0.836	0.900	0.910	0.915
17:vehicles & aircraft (86-89)	0.944	0.971	0.978	0.967	0.943	0.980	0.982	0.989
18:optical, photographic, etc. (90-92)	0.808	0.867	0.843	0.882	0.897	0.901	0.915	0.915
20:misc manufacturing (94-96)	0.730	0.804	0.892	0.901	0.899	0.912	0.932	0.923

Source: China's Customs Trade Data and National Bureau of Statistics Manufacturing Survey.

Table A9: DVAR by Industry and Year

Industry Sector	Year							
	2000	2001	2002	2003	2004	2005	2006	2007
04:beverages & spirit (16-24)	0.650	0.685	0.699	0.694	0.725	0.680	0.732	0.750
06:chemical products (28-38)	0.386	0.463	0.500	0.481	0.384	0.452	0.564	0.443
07:plastics & rubber (39-40)	0.418	0.458	0.364	0.403	0.357	0.507	0.417	0.443
08:raw hides & skins (41-43)	0.426	0.343	0.410	0.418	0.504	0.525	0.531	0.573
09:wood & articles (44-46)	0.438	0.604	0.445	0.289	0.552	0.594	0.347	0.390
10:pulp of wood (47-49)	0.304	0.401	0.395	0.393	0.452	0.547	0.562	0.515
11:textiles (50-63)	0.495	0.464	0.525	0.546	0.558	0.599	0.620	0.561
12:footwear & headgear, etc. (64-67)	0.590	0.571	0.613	0.663	0.628	0.657	0.686	0.693
13:stone, plaster, cement, etc. (68-70)	0.550	0.517	0.538	0.617	0.587	0.504	0.530	0.554
14:precious metals (71)	0.248	0.262	0.094	0.306	0.531	0.291	0.504	0.528
15:base metals (72-83)	0.525	0.468	0.545	0.477	0.556	0.356	0.426	0.491
16:machinery, mech, elect eqmt (84-85)	0.402	0.428	0.467	0.436	0.489	0.540	0.479	0.529
17:vehicles & aircraft (86-89)	0.501	0.657	0.507	0.628	0.554	0.617	0.721	0.767
18:optical, photographic, etc. (90-92)	0.469	0.530	0.509	0.529	0.463	0.574	0.641	0.558
20:misc manufacturing (94-96)	0.617	0.572	0.599	0.606	0.620	0.584	0.663	0.650

Source: China's Customs Trade Data and National Bureau of Statistics Manufacturing Survey
DVAR is computed using single-industry firm sample and Filter 2 stated in Table 3.

Table A10: Characteristics of Exiting Exporters

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep Var			$Exit_t$		$state_{t-1}$	$DVAR_{t-1}$	$ln(sales_{t-1})$	$ln(exp_{t-1})$
$state_{t-1}$	0.0680*	0.0606*	0.0686*	0.0617				
	(0.039)	(0.035)	(0.039)	(0.038)				
$DVAR_{t-1}$	0.101***	0.108***						
	(0.015)	(0.014)						
$ln(sales_{t-1})$	-0.0035*		-0.0039					
	(0.002)		(0.003)					
$ln(exp_{t-1})$		-0.0088***		-0.0073***				
		(0.002)		(0.002)				
$Exit_t$					0.0035**	0.0374***	-0.0461*	-0.151***
					(0.002)	(0.005)	(0.026)	(0.028)
Controls				Industry-Year Fixed Effects				
N	15271	15274	15271	15274	15274	15304	15299	15304
R^2	.0737	.075	.0702	.0711	.0148	.0828	.0944	.0753

Note: Industry-year fixed effects are always included. Data set: merged NBS and customs data. Columns (1)-(4) examine the relation between the (lagged) firm characteristics and the probability of exits. Columns (5) and (8) examine the characteristics of exiting firms. Bootstrapped standard errors are in parentheses. * p<0.10; ** p<0.05; *** p<0.01.

Table A11: Import and Assembly versus Pure Assembly

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dep. Var.	DVAR		Imp/Material		ln(Exp Variety)		ln(Imp variety)	
Sample:	IA	PA	IA	PA	IA	PA	IA	PA
Year Dummies:								
2001	0.0298***	0.0237	-0.0232***	0.00386	-0.123***	-0.0524	-0.0366*	-0.0264
	(0.007)	(0.032)	(0.007)	(0.033)	(0.019)	(0.101)	(0.022)	(0.088)
2002	0.0494***	0.0422	-0.0295***	0.0359	-0.114***	-0.0604	0.0601**	0.0335
	(0.008)	(0.034)	(0.007)	(0.035)	(0.020)	(0.106)	(0.024)	(0.093)
2003	0.0682***	0.0618*	-0.0700***	0.00539	-0.224***	-0.0959	0.101***	0.119
	(0.007)	(0.034)	(0.007)	(0.038)	(0.021)	(0.107)	(0.023)	(0.093)
2004	0.0706***	0.0486	-0.0917***	0.0271	-0.286***	-0.133	0.118***	0.217**
	(0.008)	(0.032)	(0.008)	(0.044)	(0.022)	(0.106)	(0.024)	(0.096)
2005	0.0980***	0.100***	-0.118***	-0.0290	-0.349***	-0.221**	0.203***	0.228**
	(0.008)	(0.034)	(0.009)	(0.047)	(0.024)	(0.107)	(0.025)	(0.105)
2006	0.140***	0.132***	-0.161***	-0.0467	-0.202***	-0.136	0.283***	0.285***
	(0.008)	(0.038)	(0.010)	(0.045)	(0.025)	(0.106)	(0.029)	(0.102)
$\left(\frac{wL}{PY}\right)_{it}$	-0.0044	0.0009	0.0270	0.251*	-0.0343	-0.231	-0.0417	0.0059
	(0.016)	(0.065)	(0.052)	(0.136)	(0.055)	(0.226)	(0.037)	(0.241)
$\left(\frac{P^D M^D + P^I M^I}{PY}\right)_{it}$	-0.0247***	0.0073			0.0143	-0.0867	0.0097	-0.123
	(0.009)	(0.058)			(0.025)	(0.164)	(0.026)	(0.224)
$\ln(K/L)_{it}$			-0.0037	-0.0071				
			(0.005)	(0.011)				
N	13062	1744	13040	1733	13062	1744	13062	1744
R^2	.0686	.0459	.0867	.0579	.0647	.0208	.0419	.0372

Note: Firm and year fixed effects are always included. Data set: merged NBS-customs data. IA and PA stand for import and assembly and pure assembly, respectively. Columns (1) and (2) use firm DVAR as the dependent variable; columns (3) and (4) use firm imports-to-materials ratio as the dependent variable; columns (5) and (6) use log of the firm's export varieity as the dependent variable; columns (7) and (8) use log of the firm's export varieity as the dependent variable. Bootstrapped standard errors are in parentheses. * p<0.10; ** p<0.05; *** p<0.01.

Table A12: Products that used to be imported by processing exporters but not exported by ordinary exporters in 2000

Rank	HS6 (96)	Description	Imp00	Exp07	% Exp07 by FIE
1	740200	Unrefined copper; copper anodes	94775.05	1.785	1.5
2	530121	Broken and scutched	69219.71	73.338	0.0
3	740311	Refined copper - Cathododes	52945.12	115.669	0.0
4	510130	Carbonised	47167.51	4099.934	19.2
5	291733	Aromatic polycarboxylic acids	22195.56	71.764	63.5
6	740321	Copper alloys - Copper-zinc base alloys	13405.72	21.957	5.0
7	710610	Powder	10303.45	6269.82	47.3
8	291412	Acyclic ketones without oxygen function	9354.077	20100.525	13.8
9	740329	Other copper alloys	8589.997	250.009	1.2
10	410122	Other hides and skins of bovine animals	7923.013	409.437	91.7
11	30375	Other fish, excluding livers and roes	7108.482	403.583	18.1
12	470720	Other paper or paperboard	5220.848	57.024	0.0
13	750712	Tubes and pipes - of nickel	4757.735	1073.887	1.5
14	750511	Bars, rods and profiles, of nickel	4255.77	87.14	0.0
15	721113	Not further worked than hot-rolled	3560.055	1737.362	0.0
16	400260	Isoprene rubber (IR)	3206.528	2492.855	0.6
17	870423	Other, with compression-ignition	2527.633	796856.69	8.4
18	481031	Kraft paper and paperboar	2410.466	2424.858	2.1
19	370120	Instant print film	2332.919	351.927	0.0
20	370256	Other film, for colour photography	2135.713	55.455	0.0
21	722530	Other, not further worked	2130.281	69535.009	10.3
22	40110	Of a fat content	2022.768	0.023	100.0
23	40410	Whey and modified whey	1992.98	0.71	0.0
24	721020	Plated or coated with lead	1506.084	2511.163	0.9
25	540342	Other yarn, multiple or cabled	1413.818	80.048	7.3
26	530129	Flax, broken, scutched, hackled - other	1163.462	135.442	49.7
27	370510	For offset reproduction	1067.683	91.158	10.4
28	740312	Refined copper - Wire-bars	1028.783	0.455	100.0
29	370231	Other film, without perforations	888.111	38.389	0.0
30	480240	Wallpaper base	772.938	6382.673	28.0
31	80221	Hazelnuts or filberts	617.869	5.9	0.0
32	50710	Ivory; ivory powder and waste	540.557	20.158	0.0
33	151329	Palm kernel or babassu oil	445.65	24.453	99.4
34	80211	Almonds - In shell	376.58	3.5	0.0
35	890392	Motorboats, other than outboard	360	607.729	0.0
36	841013	Hydraulic turbines and water wheels	300	2133.552	0.0

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Rank	HS6 (96)	Description	Imp00	Exp07	% Exp07 by FIE
37	293211	Compounds containing unfused furan ring	298.517	3480.953	62.8
38	30541	Smoked fish, including filletsi	268.626	51.527	15.2
39	290121	Unsaturated - Ethylene	228.697	53980.444	62.4
40	720450	Remelting scrap ingots	213.786	0.15	0.0
41	320120	Wattle extract	186.009	4.052	61.1
42	330112	Essential oils of citrus fruit	182.584	216.775	14.5
43	180320	Wholly or partly defatted	132.859	3.155	100.0
44	220860	Vodka	70.474	110.711	83.5
45	382313	Industrial monocarboxylic fatty acids	60.583	58.399	0.0
46	151229	Cotton-seed oil and its fractions	51.215	1788.796	55.8
47	520625	Single yarn, of combed fibres	50.501	721.513	1.0
48	470319	Unbleached - Non-coniferous	40.203	97.423	0.0
49	271129	In gaseous state - Other	39.653	14.256	18.4
50	722720	Of silico-manganese steel	37.912	48480.139	17.5
51	180310	Not defatted	37.019	1449.275	51.3
52	550520	Of artificial fibres	33.626	195.591	7.0
53	150300	Lard stearin, lard oil, oleostearin	32.134	1.57	100.0
54	20319	Fresh or chilled - Other	28.441	25052.286	0.0
55	292213	Amino-alcohols, their ethers and esters	25.68	58.781	0.0
56	711510	Catalysts in the form of wire cloth	18.672	0.432	0.0
57	151000	Other oils and their fractions	14.377	0.035	0.0
58	151521	Maize (corn) oil and its fractions	11.338	20758.875	22.8
59	151110	Crude oil	9.91	0.137	0.0
60	262011	Containing mainly zinc	7.8	226.859	0.0
61	180400	Cocoa butter, fat and oil	6.861	27570.497	45.3
62	270730	Xylole	6.047	41.119	0.0
63	630631	Sails - Of synthetic fibres	5	1073.53	0.0
64	722592	Otherwise plated or coated w/ zinc	1.681	1002.997	0.0
65	252230	Hydraulic lime	1.344	11.135	0.0
66	310229	Ammonium sulphate; double salts	0.992	155.239	0.0
67	854340	Electric fence energisers	0.54	441628.86	25.1
Total			392,126	1,546,760	16.63

Imp00 is the value of imports by processing exporters in 2000, in thousands USD.
Exp07 is the value of exports by non-processing exporters in 2007, in thousands USD.