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ABSTRACT

The rise of China in world trade has brought both benefits and anxiety to other economies. For many policy questions, it is crucial to know the extent of domestic value added (DVA) in exports, but the computation is more complicated when processing trade is pervasive. We propose a method for computing domestic and foreign contents that allows for processing trade. By our estimation, the share of domestic content in exports by the PRC was about 50% before China's WTO membership, and has risen to over 60% since then. There are also interesting variations across sectors. Those sectors that are likely labeled as relatively sophisticated such as electronic devices have particularly low domestic content (about 30% or less).

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1. Introduction

"Made in China" is one of the most common labels one encounters in a shopping mall in the United States and Europe. Increasingly, many products that are supposed to be technically sophisticated and therefore likely to be associated with exports from high-income countries, such as digital cameras and computers, also carry that label. Since the most salient characteristic of the factor endowment in China is a vast supply of unskilled labor relative to either physical or human capital, is the country's actual export structure inconsistent with the predictions from the international trade theory based on its endowment? A possible resolution to the puzzle is that China is simply the last section of a long global production chain that ends up assembling components from various countries into a final product before it is exported to the US and EU market. Indeed, a MacBook computer carries a label at its back (in small type) that reads "Designed by Apple in California; Assembled in China." This label is likely to be oversimplified already, as it reports only the head and the tail of a global production chain, but skips many other countries that supply other components that go into the product.

China is the archetype of a national economy that is well integrated into a global production chain. It imports raw material, equipment, and intermediate inputs, and then exports a big fraction of its output **(**on the order of 37% of GDP in 2006**)** to the world market. The PRC is not the only country whose production and exports are a part of a global chain; Japan, Korea, Singapore, and Malaysia are some other examples of countries that participate actively in the international divisions of labor. However, the PRC is noteworthy due to its sheer size. In addition, its export/GDP ratio, at 35% or higher in recent years, is extraordinarily high for a large economy, when compared with 8% for the US and 13% for India. With a reputation as a "world factory," China is a top supplier of manufacturing outsourcing for many global companies.

For many policy issues, it is important to assess the extent of domestic content in exports. For example, what is the effect of a currency appreciation on a country's exports? The answer depends crucially on the share of domestic content in the exports. Other things being equal, the lower the share of domestic content in the exports, the smaller the effect on trade volume a given exchange rate appreciation would have. As

another example, what is the effect of trading with the PRC on US income inequality? The answer depends in part on whether the PRC simply exports products that are intensive in low-skilled labor or whether its exports are more sophisticated. Rodrik (2006) notes that the per capita income typically associated with the kind of goods bundle that the PRC exports is much higher than the country's actual income. He interprets this as evidence that the skill content of its exports is likely to be much higher than its endowment may imply. Schott (2008) documents an apparent rapid increase in the similarity between the PRC's export structure and that of high-income countries, and interprets it as evidence of a rise in the level of sophistication embedded in the country's exports. Wang and Wei (2008a) use disaggregated regional data to investigate the determinants of the rise in export sophistication. Indeed, many other observers have expressed fear that the PRC is increasingly producing and exporting sophisticated products and may be providing wage competition for mid- to high-skilled workers in the US and Europe. However, the calculations by Rodrik (2006) and Schott (2008) do not take into account the imported content in the country's exports. If the domestic content in exports from the PRC is low, especially in sectors that would have been considered sophisticated or high-skilled in the US, then imports from the PRC may still generate a large downward pressure on the wage of the low-skilled Americans after all (as pointed out by Krugman, 2008). These are important policy questions and have implications for both developing and developed countries. A good understanding of the nature and extent of global supply chains can provide important insights for economists and policy makers.

How would one assess foreign versus domestic content in a country's exports? Hummels et al. (2001) (HIY in subsequent discussion) propose a method to decompose a country's exports into domestic and foreign value added share based on a country's input-output (IO) table. They make a key assumption that the intensity in the use of imported inputs is the same between production for exports and production for domestic sales. This assumption is violated in the presence of processing exports. Processing exports are characterized by imports for exports with favorable tariff treatment: firms import parts and other intermediate materials from abroad, with tariff exemptions on the imported inputs and other tax preferences from local or central governments, and, after processing or assembling, export the finished products. The policy preferences for

processing exports usually lead to a significant difference in the intensity of imported intermediate inputs in the production of processing exports and that in other demand sources (for domestic final sales and normal exports). Since processing exports have accounted for more than 50% of China's exports every year at least since 1996, the HIY formula is likely to lead to a significant under-estimation of the share of foreign value added in its exports. In fact, most economies offer tariff reductions or exemptions on imported intermediate inputs used in production for exports. Ignoring processing exports is likely to lead to estimation errors, especially for economies that engage in a massive amount of tariff/tax-favored processing trade, such as the China, Mexico and Viet Nam.

In this paper, we aim to make two contributions to the literature. First, we present a formula for computing shares of foreign and domestic value added in a country's exports when processing exports are pervasive. We develop this formula because the production technology and input sourcing differs for goods produced for domestic consumption and normal exports compared to those produced under export processing regimes. The HIY formula is a special case of this general formula. Second, we apply our methodology to China using data for 1997, 2002, and 2007. We estimate that the share of foreign value added in China's manufactured exports was about 50% during 1997 to 2002 before China's WTO membership, almost twice as high as that implied by the HIY formula, and has risen to over 60% in 2007 after 5 years of its WTO membership. There are also interesting variations across sectors. Those sectors that are likely labeled as relatively sophisticated such as computers, telecommunication equipments, and electronic devices have particularly low domestic content (about 30% or less). By design, this is an accounting exercise, and does not intend to examine the determinants, driving forces and the consequences of changes in domestic contents in China's gross exports thoroughly. However, a solid methodology to estimate and account domestic and foreign value added in developing countries exports is the necessary first step toward a better understanding of these issues.

Besides the papers on vertical specialization in the international trade literature, this paper is also related to the I/O literature. In particular, Chen et al. (2004) and Lau et al (2007) are the first to develop a "non-competitive" type I/O model for China (i.e., one

in which imported and domestically produced inputs are accounted for separately) and to incorporate processing exports explicitly. However, these papers do not describe a systematic way to infer separate input-output coefficients for production of processing exports versus those for other final demands. It is therefore difficult for others to replicate their estimates or apply their methodology to other countries. In addition, they use an aggregated version of China's 1995 and 2002 input-output tables, respectively, to perform their analysis, with 20 some goods producing industries. We provide a more up-to-date and more disaggregated assessment of foreign and domestic values added in Chinese exports with 83 goods producing industries. Finally, they impose an assumption in estimating the import use matrix from the competitive type I/O table published by China's National Statistical Bureau: within each industry, the mix of the imported and domestic inputs is the same in capital formation, intermediate inputs, and final consumption. We relax this assumption by refining a method proposed in Dean, Fung, and Wang (2007) that combines China's processing imports statistics with United Nations Broad Economic Categories (UNBEC) classification.

The rest of the paper is organized as follows. Section 2 presents a conceptual framework for estimating shares of domestic and foreign value added in a country's exports when processing exports are pervasive. It also describes a mathematic programming procedure to systematically infer a set of I/O coefficients called for by the new formula but not typically available from a conventional I/O table. Section 3 presents the estimation results for Chinese exports. Section 4 evaluate the accuracy of the estimation results by using an IO table with separate processing trade account complied by Mexico national statistical agency based 2003 economic census. Section 5 concludes.

2. Conceptual Framework and Estimation Method

2.1 When special features of processing exports are not taken into account

We first discuss how domestic and foreign contents in a country's exports can be computed when it does not engage in any processing trade. The discussion follows the input-output literature, and is the approach adopted (implicitly) by Hummels et al. (2001)

and Yi (2003). Along the way, we will point out a clear connection between the domestic content concept and the concept of vertical specialization. [2]

When imported and domestically produced intermediate inputs are accounted separately, a value-based input-output table can be specified as follows:[3]

$$A^D X + Y^D = X \tag{1}$$

$$A^M X + Y^M = M \tag{2}$$

$$uA^D + uA^M + A_v = u \tag{3}$$

where $A^D = [a^D_{ij}]$ is an $n_x n$ matrix of direct input coefficients of domestic products; $A^M = [a^M_{ij}]$ is an $n_x n$ matrix of direct inputs of imported goods; Y^D is an $n_x 1$ vector of final demands for domestically produced products, including usage in gross capital formation, private and public final consumption, and gross exports; Y^M is an $n \times 1$ vector of final demands for imported products, including usages in gross capital formation, private and public final consumption; X is a $n \times 1$ vector of gross output; M is a $n \times 1$ vector of imports; $A_v = [a^v_j]$ is a $1 \times n$ vector of each sector j's ratio of value added to gross output, and u is a $1 \times n$ unity vector. Subscripts i and j indicate sectors, and superscripts D and M represent domestically produced and imported products, respectively.

Equations (1) and (2) define two horizontal balance conditions for domestically produced and imported products, respectively. A typical row k in Equation (1) specifies that total domestic production of product k should be equal to the sum of the sales of product k to all intermediate and final users in the economy (the final sales include domestic consumption and capital formation, plus exports of product k). A typical row h in Equation (2) specifies that the total imports of product h should be equal to the sum of the sales of product h to all users in the economy, including intermediate inputs for all sectors, plus final domestic consumption and capital formation. Equation (3) is both a vertical balance condition, and an adding-up constraint for the input-output coefficients.

[2] We use the terms "domestic value added" and "domestic content" interchangeably. Similarly, we use the terms "foreign value added", "foreign content", and "vertical specialization" to mean the same thing.

[3] Such a model is called a "non-competitive" model in the IO literature. HIY (2001) do not specify this system explicitly but go straight to the implied Leontief inverse while Chen et al. (2004) specify only the first two equations. A fully specified model facilitates better understanding of the connection between vertical specialization and domestic content, and a comparison with the model in the next sub-section that features processing exports.

It implies that the total output (X) in any sector *k* has to be equal to the sum of direct value added in sector *k*, and the cost of intermediate inputs from all domestically produced and imported products.

From Equation (1) we have

$$X = (I - A^D)^{-1} Y^D \qquad (4)^4$$

$(I - A^D)^{-1}$ is the well-known Leontief Inverse, a matrix of coefficients for the total domestic intermediate product requirement. Define a vector of share of domestic content, or domestic value added, in a unit of domestically produced products, $DVS = \{dvs_j\}$, a $1 \times n$ vector, as the additional domestic value added generated by one additional unit of final demand of domestic products ($\Delta Y^D = u'$):

$$DVS = \hat{A}_v \, \Delta X / \Delta Y^D = \hat{A}_v (I - A^D)^{-1} = A_v (I - A^D)^{-1} \qquad (5)$$

where $\hat{A}_V$ an $n_x n$ diagonal matrix with a^v_j as its diagonal elements. Equation (5) indicates that the domestic content for an IO industry is the corresponding column sum of the coefficient matrix for total domestic intermediate goods requirement, weighted by the direct value-added coefficient of each industry. Because standard model assumes that exports and domestic sales are produced by the same technology, the share of domestic content in final demand and the share of domestic content in total exports are the same. So Equation (5) is also the formula for the share of domestic content in total exports for each industry.

Define a vector of share of foreign content (or foreign value added) in final demand for domestically produced products by $FVS = u - DVS$. By making use of Equation (3), it can be verified that

$$FVS = u - A_v (I - A^D)^{-1} = uA^M (I - A^D)^{-1} \qquad (6)$$

For each industry, this is the column sum of the coefficient matrix for total intermediate import requirement. This turns out to be the same formula used to compute vertical specialization by Hummels et al. (2001). In other words, the concepts of vertical specialization and of foreign content are identical.

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[4] $(I - A^D)$ has to be full rank.

2.2 Domestic Content in Exports When Processing Trade is Prevalent

We now turn to the case in which tariff-favored processing exports are prevalent; these exports have a different intensity in the use of imported inputs than do domestic final sales (and normal exports). Conceptually, we wish to keep track separately of the IO coefficients of the processing exports and those of domestic final sales and normal exports. For now, we ignore the fact that these IO coefficients may not be directly available, and will discuss a formal approach to estimate them in the next subsection.

The expanded I/O table with a separate account for processing exports is represented by Figure 1.

Figure 1: Input-output table with separate production account for processing trade

			Intermediate use			
			Production for domestic use & normal exports	Production of processing exports	Final use (C+I+G+E)	Gross Output or Imports
		DIM	1,2,…, N	1,2,…, N	1	1
Domestic Intermediate Inputs	Production for domestic use & normal exports (D)	1 . . . N	Z^{DD}	Z^{DP}	$Y^D - E^P$	$X - E^P$
	Processing Exports (P)	1 . . . N	0	0	E^P	E^P
Intermediate Inputs from Imports		1 . . . N	Z^{MD}	Z^{MP}	Y^M	M
Value-added		1	V^D	V^P		
Gross output		1	$X - E^P$	E^P		

We use superscript *P* and *D*, respectively, to represent processing exports on one hand, and domestic sales and normal exports on the other. This expanded IO model can be formally described by the following system of equations:

$$\begin{bmatrix} I - A^{DD} & -A^{DP} \\ 0 & I \end{bmatrix} \begin{bmatrix} X - E^P \\ E^P \end{bmatrix} = \begin{bmatrix} Y^D - E^P \\ E^P \end{bmatrix} \tag{7}$$

$$A^{MD}(X - E^P) + A^{MP}E^P + Y^M = M \tag{8}$$

$$uA^{DD} + uA^{MD} + A_v^D = u \tag{9}$$

$$uA^{DP} + uA^{MP} + A_v^P = u \tag{10}$$

This is a generalization of the model discussed in the previous subsection. Equations (7) and (8) are a generalization of Equations (1)–(2), and Equations (9)–(10) are a generalization of Equation (3), with a separate account for processing exports. Equations (9) and (10) are also the new adding-up constraint for the IO coefficients.

The analytical solution of the system is

$$\begin{bmatrix} X - E^P \\ E^P \end{bmatrix} = \begin{bmatrix} I - A^{DD} & -A^{DP} \\ 0 & I \end{bmatrix}^{-1} \begin{bmatrix} Y^D - E^P \\ E^P \end{bmatrix} \tag{11}$$

The generalized Leontief inverse for this expanded model can be computed as follows:

$$B = \begin{bmatrix} I - A^{DD} & -A^{DP} \\ 0 & I \end{bmatrix}^{-1} = \begin{bmatrix} B^{DD} & B^{DP} \\ B^{PD} & B^{PP} \end{bmatrix} = \begin{bmatrix} (I - A^{DD})^{-1} & (I - A^{DD})^{-1} A^{DP} \\ 0 & I \end{bmatrix} \tag{12}$$

Substituting Equation (12) into Equation (11), we have:

$$X - E^P = (I - A^{DD})^{-1}(Y^D - E^P) + (1 - A^{DD})^{-1} A^{DP} E^p \tag{13}$$

Substituting Equation (13) into Equation (8), the total demand for imported intermediate inputs is

$$M - Y^M = A^{MD}(I - A^{DD})^{-1}(Y^D - E^P) + A^{MD}(1 - A^{DD})^{-1} A^{DP} E^P + A^{MP} E^p \tag{14}$$

It has three components: the first term is total imported content in final domestic sale and normal exports, and the second and the third terms are indirect and direct imported content in processing exports, respectively.

We can compute vertical specialization (VS) or foreign content share in processing and normal exports in each industry separately:

$$\begin{vmatrix} VSS^D \\ VSS^P \end{vmatrix}^T = \begin{vmatrix} uA^{MD}(I - A^{DD})^{-1} \\ uA^{MD}(1 - A^{DD})^{-1} A^{DP} + uA^{MP} \end{vmatrix}^T \tag{15}$$

The total foreign content share in a particular industry is the sum of the two weighted by the share of processing and non-processing exports s^p and $u - s^p$, where both s and u are a 1 by n vector:

$$\overline{VSS} = (u - s^P, s^P) \begin{vmatrix} VSS^D \\ VSS^P \end{vmatrix} \tag{16}$$

The foreign content (or foreign value-added) share in a country's total exports is:

$$TVSS = uA^{MD}(I - A^{DD})^{-1}\frac{E - E^P}{te} + u(A^{MD}(1 - A^{DD})^{-1}A^{DP} + A^{MP})\frac{E^P}{te} \qquad (17)$$

where *te* is a scalar, the country's total exports. Equation (16) is a generalization of Equation (7), the formula to compute industry-level share of vertical specialization. Equation (17) is a generalization of the formula for country-level share of vertical specialization proposed by Hummels et al. (2001, page 80). In particular, either when $A^{DD} = A^{DP}$ and $A^{MD} = A^{MP}$, or when $E^P/te = 0$, Equation (18) reduces to the HIY formula for VS.

Similarly, the domestic content share for processing and normal exports at the industry level can be computed separately:

$$\begin{aligned}\begin{vmatrix} DVS^D \\ DVS^P \end{vmatrix}^T &= \bar{A}_v B = (A_v^D \quad A_v^p)\begin{bmatrix} (I - A^{DD})^{-1} & (I - A^{DD})^{-1}A^{DP} \\ 0 & I \end{bmatrix} \\ &= \begin{vmatrix} A_v^D(I - A^{DD})^{-1} \\ A_v^D(I - A^{DD})^{-1}A^{DP} + A_v^P \end{vmatrix}^T \end{aligned} \qquad (18)$$

The total domestic content share in a particular industry is a weighted sum of the two:

$$\overline{DVS} = (u - s^P, s^P)\begin{vmatrix} DVS^D \\ DVS^P \end{vmatrix} \qquad (19)$$

The domestic content share in a country's total exports is:

$$TDVS = A_V^D(I - A^{DD})^{-1}\frac{E - E^P}{te} + (A_V^D(1 - A^{DD})^{-1}A^{DP} + A_V^P)\frac{E^P}{te} \qquad (20)$$

Either when $A^{DD} = A^{DP}$ and $A_v^D = A_v^P$, or when $E^P/te = 0$, Equation (20) reduces to the HIY formula in Equation (5). Note we can easily verify that for both processing and normal exports, the sum of domestic and foreign content shares is unity.

2.3 Estimation Issues

Equations (18-20) allows us to compute the shares of domestic content in processing and normal exports for each industry as well as in a country's total exports. However, statistical agencies typically only report a traditional I/O matrix, A^D, and sometimes A^M, but not A^{DP}, A^{DD}, A^{MP} and A^{MD} separately. Therefore, a method to estimate these matrices, based on available information, has to be developed. In this sub-section,

we propose to do this via a quadratic programming model by combining information from trade statistics and conventional I/O tables.

The basic idea of this model is to use information from the standard I/O table to determine sector-level total imports/exports, and information from trade statistics to determine the relative proportion of processing and normal exports within each sector, thus use up all available data to split the national economy into processing and non-processing blocks, each with its own IO structure. Using the data from the I/O table to determine sector-level total imports/exports helps to ensure that the balance conditions in the official I/O account are always satisfied, and that the I/O table with separate processing and non-processing accounts estimated from the model always sums to the published official table. Such a method is a formalization of the calibration methods widely used in macroeconomics and CGE modeling when the number of endogenous variables larger than the number of equations.

The following data are observable from a standard I/O table:

x_i = Gross output of sector *i*;

z_{ij} = Goods *i* used as intermediate inputs in sector *j*;

v_j = Value-added in sector *j*;

m_i = Total imports of sector *i* goods; and

y_i =Total final demand except for exports of goods *i*.

` We combine those observed data from the I/O table and processing trade shares[5] observed from trade statistics to determine the values for:

m_i^p = Imports of sector *i* good used as intermediate inputs to produce processing exports;

m_i^d = Imports of sector *i* goods used as intermediate inputs for domestic production and normal exports;

e_i^n = Normal exports of sector *i* ; and

e_i^p = Processing exports of sector *i*.

The partition of imports into intermediate and final use is based on a combination of China custom import statistics and UN BEC classification, as described in Dean, Fang

[5] Processing trade are defined by China Customs, which include trade regime “Process & assembling "(14) and “Process with imported materials" (15) in China Customs statistics. These statistics are relatively accurate because they involve duty exemption and value-added tax rebates which under intensive Customs monitoring.

and Wang (2011). The results of such partition and the actual numbers used in our empirical estimation are reported and discussed in the data source subsection later. Parameters on domestic and imported final demand can be inferred from the observed data discussed above:

y_i^m = Final demand of goods *i* from imports (residuals of m_i - m_i^p - m_i^d);

y_i^d = Final demand of goods *i* provided by domestic production (residual of y_i - y_i^m).

All those data based on official statistics are entered our estimation model as constants.

Define z_{ij}^{dd} = Domestically produced intermediate good *i* used by sector *j* for domestic sales and normal exports; z_{ij}^{dp} = Domestically produced intermediate good *i* used by sector *j* for processing exports; z_{ij}^{md} = Imported intermediate good *i* used by sector *j* for domestic sales and normal exports; z_{ij}^{mp} = Imported intermediate good *i* used by sector *j* for processing exports; v_j^d = Direct value added by domestic and normal export production in industry *j* ; v_j^p = Direct value added by processing export production in industry *j*. Then the IO coefficients for the expanded IO model can be written as:

$$A^{DD} = [a_{ij}^{dd}] = [\frac{z_{ij}^{dd}}{x_j - e_j^p}],\ A^{MD} = [a_{ij}^{md}] = [\frac{z_{ij}^{md}}{x_j - e_j^p}],\ A_v^D = [a_j^{vd}] = [\frac{v_j^d}{x_j - e_j^p}],$$

$$A^{DP} = [a_{ij}^{dp}] = [\frac{z_{ij}^{dp}}{e_j^p}], A^{MP} = [a_{ij}^{mp}] = [\frac{z_{ij}^{mp}}{e_j^p}], A_v^P = [a_j^{vp}] = [\frac{v_j^p}{e_j^p}],$$

To obtain these unobservable IO coefficients, we need estimate within-industry transactions $[z_{ij}^{dd}]$, $[z_{ij}^{dp}]$, $[z_{ij}^{md}]$, and $[z_{ij}^{mp}]$, as well as sector-level value added $[v_j^d]$, and $[v_j^p]$, subject flowing I/O account identities and statistical adding up constraints:

$$\sum_{j=1}^{K}(z_{ij}^{dd} + z_{ij}^{dp}) = x_i - e_i^p - e_i^n - y_i^d \qquad (21)$$

$$\sum_{j=1}^{K}(z_{ij}^{md} + z_{ij}^{mp}) = m_i - y_i^m \qquad (22)$$

$$\sum_{j=1}^{K}(z_{ij}^{dd}+z_{ij}^{md})+v_j^d=x_j \; -e_j^p \tag{23}$$

$$\sum_{i=1}^{K}(z_{ij}^{dp}+z_{ij}^{mp})+v_j^p=e_j^p \tag{24}$$

$$\sum_{j=1}^{K}z_{ij}^{md}=m_i^d \tag{25}$$

$$\sum_{j=1}^{K}z_{ij}^{mp}=m_i^p \tag{26}$$

$$\sum_{j=1}^{K}(z_{ij}^{dd}+z_{ij}^{dp})=\sum_{j=1}^{K}z_{ij}-(m_i^d+m_i^p) \tag{27}$$

$$z_{ij}^{dd}+z_{ij}^{dp}+z_{ij}^{md}+z_{ij}^{mp}=z_{ij} \tag{28}$$

$$v_j^d+v_j^p=v_j \tag{29}$$

The economic meanings of these 9 groups of constraints are straightforward. Equations (21) and (22) are row sum identities for the expanded I/O account. They state that total gross output of sector *i* has to equal to the sum of domestic intermediaries, final demand and exports (both processing and normal exports) in that sector. Similarly, total imports have to equal imported intermediate inputs plus imports delivered to final users. Equations (23) and (24) are column sum identities for the expanded I/O account. They define the value of processing exports in sector *j* as the sum of domestic and imported intermediate inputs as well as primary factors used in producing processing exports; these four groups of constraints correspond to equations (7)-(10) in the extended I/O model respectively. Equations (25) to (29) are a set of adding up constraints to ensure that the solution from the model is consistent with official statistics on sector-level trade and within-industry transactions. Suppose there are K sectors, then there will be $4K^2 + 2K$ unknowns and only $7K+K^2$ independent constraints, so we have to cast the calibration problem as a constrained optimization procedure to minimize following objective functions:

$$\text{Min } S = \sum_{i=1}^{K}\sum_{j=1}^{K} \frac{(z_{ij}^{dd} - z0_{ij}^{dd})^2}{z0_{ij}^{dd}} + \sum_{i=1}^{K}\sum_{j=1}^{K} \frac{(z_{ij}^{dp} - z0_{ij}^{dp})^2}{z0_{ij}^{dp}} + \sum_{i=1}^{K}\sum_{j=1}^{K} \frac{(z_{ij}^{md} - z0_{ij}^{md})^2}{z_{ij}^{md}} + \sum_{i=1}^{K}\sum_{i=1}^{K} \frac{(z_{ij}^{mp} - z0_{ij}^{mp})^2}{z0_{ij}^{mp}} + \sum_{j=1}^{K} \frac{(v_j^{d} - v0_j^{d})^2}{v0_j^{d}} + \sum_{j=1}^{K} \frac{(v_j^{p} - v0_j^{p})^2}{v0_j^{p}} \quad (30)$$

Where *z*'s and *v*'s are variables to be estimated, those variables with a 0 in the suffix denote initial values**.**

These initial values are guesses about the values of variables based on official statistics using proportional assumptions (will discuss below). However, because all parameters in the 9 groups of linear constraints (right hand side of equations (21) to (29)) were directly or indirectly obtained from observable official statistical sources, model solutions thus are restricted into a convex set and will be relatively stable respect to variations in these initial values as long as all the parameters in these linear constraints kept as constants.

The initial value of z_{ij}^{md} and z_{ij}^{md}, are generated by allocating m_i^d and m_i^p in proportion to input i's usage in sector j as equation (31):

$$z0_{ij}^{mp} = \frac{z_{ij}(e_j^p / x_j)}{\sum_k^N z_{ik}(e_k^p / x_k)} m_i^p \qquad z0_{ij}^{md} = \frac{z_{ij}(x_j - e_j^p)/x_j}{\sum_k^N z_{ik}(x_k - e_k^p)/x_k} m_i^d \quad (31)$$

The split of total inter-sector intermediate inputs flow from sector i to sector *j* between normal and processing use are based on their proportion in gross output. The residuals of the total intermediate inputs and the imported intermediate inputs estimated from equation (31) are taken the initial values for domestically produced intermediate inputs as equations (32) and (33):

$$z0_{ij}^{dd} = z_{ij}\frac{(x_j - e_j^p)}{x_j} - z0_{ij}^{md} \quad (32)$$

$$z0_{ij}^{dp} = z_{ij}\frac{e_j^p}{x_j} - z0_{ij}^{mp} \quad (33)$$

The initial values for direct value added in the production for processing exports in sector *j* ($v0_j^p$), are generally set to be the residuals implied by Equation (24). However, we set a minimum value at the sum of labor compensation and depreciation in

a sector multiplied by the share of processing exports in that sector's total output. In other words, the initial value $v0_j^p$ is set to equal the greater of the residuals from Equation (24) or the minimum value. The initial value for direct value added in the production for domestic sales and normal exports ($v0_j^d$) is set as the difference between v_j (from the I/O table) and $v0_j^p$.

We conduct some sensitivity checks using alternative initial values to empirically verify whether the model solutions are sensitive to these initial values. It turns out that these alternative initial values do not materially alter our basic conclusions. We implement this quadratic programming model in GAMS (Brooke *et al*, 2005), related computer programs and data files will be available at the USITC website for downloading.

3. Estimation Results

After describing the data sources, we report and discuss the estimation results for shares of domestic and foreign content in Chinese exports at the aggregate level, and by sector, firm ownership and major destination countries.

3.1 Data

Inter-industry transaction and (direct) value-added data are from China's 1997, 2002 and 2007 benchmark I/O tables published by the National Bureau of Statistics of China (NBS). We use detailed exports and imports data of 1997, 2002, and 2007 from the General Customs Administration of China to help differentiate the processing and normal trade in each sector. The trade statistics are first aggregated from the 8-digit HS level to China's I/O industries, and then used to compute the share of processing exports in each I/O industry. Modifying a method from Dean, Fung and Wang (2009), we partition all imports in a given commodity classification into three parts based on the distinction between processing and normal imports in the trade statistics, and on the UN BEC classification scheme: (a) intermediate inputs in producing processing exports; (b) intermediate inputs for normal exports and other domestic final sales; and (c) those used in gross capital formation and final consumption. A summary of these trade statistics as a percentage of China's total imports along with share of processing exports during 1996-

2008 is reported in Table 1, which shows a downward trend for the use of imported inputs in producing processing exports, and an upward trend in their use in producing normal trade and domestic final sales. Processing exports as a share of China's total merchandise exports also gradually decline in recent years. Such trend seems partially reflects the consequence of a series of policy measures to change the preferences to processing trade and foreign invested enterprises has adopted by Chinese government since the end of 2006.

Detailed trade share parameters for each I/O industry in the three benchmark year (1997, 2002, and 2007) are listed in Appendix tables A-C. These data computed directly from detailed Chinese official trade statistics are important to understand our estimates of domestic and imported content in Chinese gross exports, especially their change trends over time.

(Inset Table 1 here)

3.2 Domestic and foreign contents in total exports

Table 2 presents the results for the decomposition of aggregate foreign and domestic value-added shares in 1997, 2002 and 2007. For comparison, the results from the HIY method that ignores processing trade are also reported. The estimated aggregate domestic value added share in China's merchandise exports was 54% in 1997, and 60.6% in 2007. For manufacturing products, these estimated shares are slightly lower in levels but trending upward significantly at 50% in 1997 and 59.7% in 2007, respectively. In general, the estimated direct domestic value-added shares are less than half of the total domestic value-added shares. However, the estimated indirect foreign value-added share was relatively small; most of the foreign content comes from directly imported foreign inputs, especially in 1997 and 2002. The indirect foreign value-added increase over time, and reach about a quarter of China's directly imported foreign inputs in 2007, indicating the share of simple processing and assembling of foreign parts is declining, while more imported intermediates are being used in the production of other intermediate inputs that are then used in the production process.

(Insert table 2 here)

Relative to the estimates from the HIY method, our procedure produces estimates of a much higher share of foreign value added in Chinese gross exports and with a different trend over time. To be more precise, estimates from the HIY method show that the foreign content share (total VS share) increased steadily from 17.6% in 1997 to 28.7% in 2007 for all merchandise exports, and from 19.0% to 27.1% for manufacturing only during the same period. In contrast, our estimates suggest a trend in the opposite direction, with the share of foreign value added in all merchandise exports falling from 46% in 1997 to 39.4% in 2007, and a similar decline for the share in manufacturing exports, it fell from 50% in 1997 to 40.3% in 2007. The decline occur mainly during 2002-2007 period, which corresponds to the first 5 years of China's entry to the WTO. Our estimates indicate that the HIY method appears to incorrectly estimate both the level and the trend in domestic versus foreign content in the PRC's exports.

What accounts for the difference between ours and HIY approaches? There are at least three factors drive the change of foreign content of the country's gross exports: (1) the relative proportions of its total imports used as intermediate inputs in producing processing exports and domestic sales & normal exports; (2) the share of processing exports in its total exports; and (3) the sector composition of its exports. Because processing exports tend to use substantially more imported inputs, and processing exports account for a major share of China's total exports, the HIY indicator is likely to substantially underestimate the true for foreign content in China's exports. This explains the level of domestic content by our measure is much lower than that of the HIY indicator. On the other hand, as exporting firms (both those producing for normal exports and those for processing exports) gradually increase their intermediate inputs sourcing from firms within China or multinationals move their upstream production to be near their downstream production, the extent of domestic content in exports rose over time. This exactly is what has happened since China joining the WTO. However, because exports from industries with relatively lower domestic content often grow faster due to dramatic inflow of foreign direct investment, the composition of a countries total exports may play as an offsetting factor to reduce the share of domestic value-added in the country's gross exports thus slow down the increase of domestic value-added share in a country's total exports. As Chinese government start to reduce the policy incentives for

both Foreign Invested Enterprises (FIE) and processing exports at the end of 2006, we are observing a trend of increasing domestic contents in Chinese exports as China continue its industrial upgrading in the years to come.

Our interpretation is confirmed by DVA shares for processing and normal exports estimated separately (Table 3). There is a more than 10 percentage point increase in the total foreign value-added share for domestic sales and normal exports between 1997 and 2007, which is consistent with the trend indicated by HIY measure. However, in processing exports we see that more domestic-produced inputs were used, domestic value-added share increased from 20.7% in 1997 to 37.0% in 2007, up more than 16 percentage point. Because processing exports still constitute more than 50% of China's total exports in 2007, which resulting the weighted average total domestic value-added share went up during the decades.

There are conflicting forces at work. On the one hand, as domestic input suppliers increase their quality over time, and multinationals move more and more of their upstream production into China, exporting firms may decide to increase local sourcing of their inputs. On the other hand, the reductions in the country's trade barriers also encourage exporting firms to use more imported inputs. These two opposing forces partially offset each other. However, on net, the domestic content share in China's exports appears to be on the rise. Looking ahead, the share of imported content in exports could fall or rise, depending on the relative speed with which domestic input suppliers and multi-nationals can step up their quality and variety versus the extent of additional reductions in the cost of using imported inputs.

(insert table 3 here)

We perform a number of robustness checks on the sensitivity of our main results to alternative ways of setting the initial values of the variables and the share parameters of import use. First, we initialize $v0_j^p$ and $v0_j^d$ by apportioning the observed direct value added in a sector to processing exports and other final demands based on their respective portions in the sector's total output. Second, we initialize $v0_j^p$ either at the residuals implied by equation (24) if the residuals are positive, or by following the previous alternative if the residuals are non-positive. Third, when we partition imports into

different users, we use the average of a three-year period (previous, current, and following years) rather than just one year's statistics. Fourth, we experiment with 0% versus 10% annual depreciation rate for capital goods. These variations produce relatively little change in the main results. For example, the estimated share of domestic value added in manufacturing exports lies in a relatively narrow range between ?% and ?% in 2002, and between ?% and ?% in 2007.

3.3 Domestic content in exports by firm ownership

Since foreign-invested firms account for over half of China's exports, compare the share of domestic content in exports between them and other Chinese firms may help us better to understand why there is a raising trend of domestic value-added share in China's total exports. However, there is no information on separate input-output coefficients by firm ownership, our estimation assumes that they are the same on this dimension. The variation in the share of domestic content comes from different degrees of reliance on processing exports with a sector, and differences in the sector composition of their total exports.

Estimates of the domestic content shares by firm ownership are presented in Table 4. The results show that exports by wholly foreign owned enterprises exhibit the lowest share of domestic valued-added (at 33.4% in 2002 and increase to 44.1% in 2007), followed by Sino-foreign joint venture companies (about 44% in both 2002 and 2007). Exports from Chinese private enterprises embodied the highest domestic content shares (83.9% and 80.8% in 2002 and 2007, respectively), while those from the state-owned firms were in the middle (about 70% in both years). Note that these estimates represent the best guesses based on currently available information; better estimates can be derived once information on I/O coefficients by firm ownership becomes available.

The most noticeable feature of this table is the raising domestic contents in export produced by foreign invested firms, their DVA share increased more than 10 percentage points between 2002 to 2007(There is a 10.5% percentage point increase for wholly Foreign Owned firms, and a 13.6 percentage point increase for joint ventures), while DVA share of Chinese domestic firms basically stay steady during the same period. This indicates the raise of domestic contents in Chinese exports during the first 5 years of

China in WTO is mainly due to FIE sourcing more of their intermediate inputs within China. This is consistent with the observation of more and more multinationals move their upstream production to China getting closer to their downstream production already in China and FIE using more and more intermediate inputs from local suppliers.

Further exam the change of domestic value-added share across firms with the same ownership but engage in processing and non-processing exports reveals that firms engage in normal exports and domestic sales used more imported intermediate inputs while firms engage in processing exports sourced more of their intermediate inputs domestically, regardless their ownership types. Therefore, we can conclude that the raise of domestic value-added content share in Chinese exports are majorly caused by China's processing exports using more locally supplied intermediate inputs in 2007 than that in 2002[6]. If this trend continues, the difference in the intensity of using imported inputs for processing and non-processing exports will be further reduced in next decades.

(Insert table 4 here)

3.4 Domestic content by sector

To see if there are interesting patterns at the sector level that helps to explain the decline trend of imported contents in China's total exports, and further assess whether the increasing domestic value-added share reflect actual upgrade of Chinese industrial structure, Tables 5 and 6 report, in ascending order on domestic content share, the value-added decomposition in China manufacturing exports by industry in 2002 and 2007 respectively, together with shares of processing and foreign invested enterprises exports in each sector's exports as well as the sector's share in China's total merchandise exports. We choose to report the results from 2002 and 2007 not only because we would like use the latest I/O table released but also due to these two benchmark tables are consistently classified on most recent Chinese industry classifications, which simplifies issues involved in overtime comparison. Similar results for 1997 are omitted to save space.

Among the 57 manufacturing industries in the table, 15 have a share of domestic value-added in their exports less than 50 percent in 2002, and collectively account for

[6] Domestic value-added is a concept consistent with Gross Domestic products, which measures the value creation production activities occurring with national boarder regardless firm ownerships.

nearly 35 percent of China's merchandise exports that year. Many low-DVA industries are likely to be labeled as relatively sophisticated, such as telecommunication equipment, electronic computer, measuring instruments, and electronic devices. A common feature of these industries is that processing exports account for over two-thirds of their exports and foreign invested enterprises played an overwhelming role. In 2007, the number of industry with less than 50 percent domestic contents in their exports declined into 10, but their exports count for more than 32 percent of China's total merchandise exports and these low-DVA industry are more concentrated in high-tech sectors. There are 11 industries in the top 15 low-DVA industries in 2002 still remain in the15 top low-DVA industries in 2007.

(insert table 5 and table 6 here)

The next 18 industries in table 6 have their share of domestic value-added in the range of 51 to 65 percent; they collectively accounted for 28 percent of China's total merchandise exports in 2002. Several labor-intensive sectors are in this group, such as furniture, toys and sports products, Leather, fur, down and related products.

The remaining 24 industries have relatively high shares of domestic value-added. However, they as a group produced only less than 30 percent of China's total merchandise exports in 2002. Apparel, the country's largest labor intensive exporting industry, which by itself was responsible for 7 percent of the country's total merchandise exports in 2002, is at the top of this group with a share of domestic content at 66 percent. The 12 industries at the bottom of Table 6 with DVA share more than 75 percent collectively produced only less 10 percent of China's total merchandise exports in 2002.

The weights of high-DVA industries in China's exports increased significantly in 2007. There are, the number of industries with DVA share more than 75 percent increase to 25 in 2007 (bottom of Table 7), and their exports constitute more than 30 percent of China's total merchandise exports in 2007. Among these High-DVA industries, we not only see the traditional labor industries such as furniture, textiles and apparel still play an significant role (account for more than half of these high DVA-sector exports) , but also the increasing role of heavy and capital intensive industries such as automobile, industrial machinery and rolling steel (account for nearly one thirds of these high-DVA sector's

exports). The data clearly indicate China's industrial upgrade is real and FIEs have played very important role in this process.

3.5 DVA shares in Chinese exports by trading partners

By assuming domestic and foreign value added shares in per unit gross exports are the same for all destination countries in each IO industry and export regime, we can further estimate the domestic value-added share in China's exports to each of its major trading partners. The decomposition results for China's total merchandise exports to each of its major trading partners are reported in Table 7 in increasing order of the estimated domestic value-added share. Note, however, the variation by destination in this method is caused solely by China's export structure to each of its trading partners (exports to each individual country/region vary by sector and trade regime structures), not the direct input intensities of imported intermediates in producing such exports.

Hong Kong, the United States, Singapore, Taiwan and Malaysia are at the top of the table in both 2002 and 2007, with less than or about 50/60 percent of China's domestic value-added embodied in its exports to these five destinations in 2002 and 2007 respectively. Since a large portion of Chinese exports to Hong Kong are re-exports to the United States, the U.S. remain as China's largest exports market in both 2002 and 2007. The lower domestic value-added share in its exports to the U.S. may partially explain why Chinese exports continued their rapid expansion in the U.S. market despite RMB gradually appreciation since July 2005. China's exports to the U.S. have started to slow down since 2008 when China return to peg exchange its rate to U.S. dollars because the world financial crisis, likely because of other macro economic factors and policy measures adopted by the Chinese government during last year.[7]

(Insert table 7 here)

Another interesting feature in Table 8 is that China's exports to developing countries embody much higher domestic valued added than its exports to OECD countries, but exports with higher domestic value-added (more than two thirds of the gross value of its exports) constituted of less than 13 percent of its total exports of goods

[7] China has taken a series of policy measures to change its preferences to processing trade and foreign invested enterprises since the end of 2006.

in 2002, this share raised to about 20 percent in 2007. It is also interesting to note that the domestic value-added share in China's exports to high income country was increased between 2002 and 2007, while they are declined for exports to developing countries (split at the row of Mexico in the middle of table 8) indicating relatively more local supplied inputs were used to making exports to high income countries while relative more imported inputs were used in producing exports to developing countries.

4. The accuracy of Content Share Estimates

As we discussed earlier, the estimation procedure presented in this paper is a formalization and extension of calibration methods widely used in macroeconomics and CGE modeling. Different from econometric model, evaluation on the accuracy of the calibration largely rely on a benchmark data set from the real world. However, it is not very easy to find such a benchmark data set to assess the accuracy of results from our estimation method because the "true" IO account that separately trace processing exports and other production transactions in national economy is rarely exist. Fortunately, Mexico's statistical agency, the Instituto Nacional de Estadística, Geografía e Informática (INEGI), has complied 2003 benchmark IO table based on economic census, which have separate accounts for Mexico domestic and Maquiladora industries[8], which is the major exports promotion program in Mexico. The table includes national production of goods and services classified under Mexico's 2002 3- and 4-digit NAICS, inputs purchased in the domestic and Maquiladora industries, and imports from the rest of the world by both economies. The domestic and foreign content share computed directly from this special Mexico IO table provides a reference benchmark to test the performance of the estimation method we proposed. Based on exports and import statistics for Maquiladora industries in the World Trade Atlas and Mexico's aggregate 2003 IO table, we implemented the same quadratic programming model that generates domestic/foreign content estimates for Chinese exports, to compute domestic and foreign value-added share in Mexico manufacturing exports, and report the estimation results in Table 8. The three panels in table 8 lists direct/total domestic/foreign value-added share for normal, processing and total exports respectively. To quantitatively assess know how much each set of value-added share estimates differs from the "true" share data computed directly from the Mexico IO table with

[8] We are grateful to INEGI for providing us with the input-output table.

a separate processing trade account, we report three type metrics in the three bottom row of table 8.

The first bottom row list the absolute difference between the estimated share and the "true" shares computed directly from Mexico IO table with a separate processing trade account for manufacture as a whole. The errors for various share estimates seems less than 3 percentage point. However, it is the proportionate errors and not the absolute errors that matter; therefore, we computed the "Mean Absolute Percentage Error" with respect to the true shares as follows:

$$MAPE = \frac{100 \bullet \sum_{i=1}^{n} |s_i - s0_i|}{\sum_{i=1}^{n} s0_i}$$

where s_i is the estimated share and $s0_i$ share is the reference share for industry i. The resulted index number is reported in the second bottom row. The error range from 4% to 17% for normal exports, 14% to 28% for processing exports and 12% to 15% for total exports. Numbers in the last row of table 8 are the correlation coefficients between the estimated share and the reference shares, they reveal that our estimates are highly correlated with the true shares computed directly from Mexico IO table with a separate processing trade account for normal and total exports, while the correlation are lower for processing exports.

5. Concluding Remarks

Segmentation of production across countries allows for reductions in production costs and more efficient allocation of resources. The opening-up of China has likely facilitated this process. A quantitative assessment of the extent of its participation in global production chains allows us to get a better grasp of many policy questions, including the effect of an exchange rate change on bilateral trade balances.

In this paper, we first present a general framework in assessing the shares of domestic and foreign value added in a country's exports when tariff-favored processing exports are pervasive. This formula nests the existing best known approach (HIY, 2001) as a special case. Because some of the I/O coefficients called for by the new formula are not readily available from conventional I/O tables, we propose an easy-to-replicate mathematical programming procedure to estimate these coefficients by combining information from detailed trade statistics (which records processing and normal

exports/imports separately) with conventional input-output tables. This methodology should be applicable to Vietnam, Mexico, and many other developing countries that engage in a significant amount of processing exports.

By applying our methodology to Chinese data We find several interesting patterns. First, the share of foreign content in manufacturing exports from China was close to 50% during 1997-2002, almost twice as high as that calculated using the HIY formula. Second, the share of domestic content increased from 51% in 2002 to 60% in 2007, which corresponds to the first five years of China's membership in the WTO. We also report interesting heterogeneity across sectors: those sectors that are likely to be labeled as sophisticated or high-skilled, such as computers, electronic devices, and telecommunication equipment, tend to have notably low shares of domestic content. Conversely, many sectors that are relatively intensive in low-skilled labor, such as apparel, are likely to exhibit a high share of domestic content in the country's exports. Finally, we find that foreign invested firms (including both wholly-owned foreign firms and Sino-foreign joint venture firms) tend to have a relatively low share of domestic content in their exports.

There are several areas in which future research can improve upon the estimation in this paper. First, we assign initial values of the direct domestic value added for processing exports at the industry level based on the information in a conventional I/O table. If a firm-level survey data becomes available that tracks the direct value added for processing and normal exports separately, we can improve the accuracy of our estimates. Second, as an inherent limitation of an I/O table, the input-output coefficients are assumed to be fixed - that's the nature of a Leontief technology - rather than be allowed to respond to price changes. This could be problematic when a big change in export volume, such as what China has been experiencing, induces a change in the world market price for imported inputs, which in turn could trigger a change in the underlying production technology and in the corresponding I/O coefficients. These could be fruitful areas for future research.

Table 1: Major trade share parameters used in estimation, 1997-2008

Year	Imported intermediates %		Imported capital goods %		Imported final Consumption %	Processing exports as % of total exports
	for processing exports	for normal use	for processing exports	for normal use		
	(1)	(2)	(3)	(4)	(5)	(6)
1996	46.2	26.8	16.7	8.1	2.2	56.0
1997	51.2	28.2	12.1	7.3	1.3	55.1
1998	50.7	28.2	9.7	10.0	1.4	57.4
1999	43.6	35.0	8.2	11.2	2.0	57.3
2000	39.4	41.2	8.5	9.1	1.8	55.7
2001	36.6	41.2	8.7	11.6	1.9	55.9
2002	38.0	39.1	10.2	11.0	1.8	55.9
2003	35.0	41.8	10.7	10.8	1.6	56.0
2004	34.7	43.0	11.8	8.9	1.5	56.3
2005	36.1	43.6	10.6	8.1	1.5	55.6
2006	35.3	44.2	9.8	8.9	1.7	53.6
2007	32.7	47.3	9.0	7.6	3.3	50.1
2008	27.5	53.5	8.1	7.2	3.7	48.1

Source: Authors' calculations based on official China Custom trade statistics and the United Nation Broad Economic Categories (UNBEC) classification scheme.

Note: "Normal use" refers to "normal exports and domestic sales." The UNBEC scheme classifies each HS 6-digit product into one of three categories: "intermediate inputs," "capital goods," and "final consumption." For the first two categories, we further decompose the imports into two subcategories: "processing imports" by customs declaration are classified as used for producing processing exports and cannot be sold to any domestic users by regulation, and the remaining imports are classified as for normal use. Capital goods are part of the final demand in a conventional I/O model (Column (1) to (5) sum to 100%). However, this classification may under-estimate the import content of exports. We therefore also experiment with classifying a fraction of the capital goods as inputs used in current year of production. This is discussed in Section 3.2.

Table 2 Shares of domestic and foreign value added in total exports (%)

	The HIY Method			The KWW Method		
	1997	**2002**	**2007**	**1997**	**2002**	**2007**
All Merchandise						
Total Foreign value-added	17.6	25.1	28.7	46.0	46.1	39.4
Direct foreign value-added	*8.9*	*14.7*	*13.7*	*44.4*	*42.5*	*31.6*
Total Domestic Value-added	82.4	74.9	71.3	54.0	53.9	60.6
Direct domestic value-added	*29.4*	*26.0*	*20.3*	*22.2*	*19.7*	*17.1*
Manufacturing Goods Only						
Total Foreign value-added	19.0	26.4	27.1	50.0	48.7	40.3
Direct foreign value-added	*9.7*	*15.6*	*16.3*	*48.3*	*45.1*	*32.4*
Total Domestic Value-added	81.1	73.6	72.9	50.0	51.3	59.7
Direct domestic value-added	*27.5*	*24.6*	*24.6*	*19.6*	*18.1*	*16.5*

Source: Authors' estimates based on China's 1997, 2002 and 2007 Benchmark input-output table published by Bureau of National Statistics and Official China trade statistics from China Customs.

Note: The HIY method refers to estimates from using the approach in Hummels, Ishii, and Yi (2001). The KWW method refers to estimates from using the approach developed in this paper that takes into account special features of processing exports.

Table 3: Domestic and Foreign Values Added: Processing vs. Normal Exports

(in percent of total exports)

	Normal Exports			Processing Exports		
	1997	**2002**	**2007**	**1997**	**2002**	**2007**
All Merchandise						
Total Foreign value-added	5.2	10.4	16.0	79.0	74.6	62.7
Direct foreign value-added	*2.0*	*4.2*	*5.0*	*78.6*	*73.0*	*58.0*
Total Domestic Value-added	94.8	89.6	84.0	21.0	25.4	37.3
Direct domestic value-added	*35.1*	*31.9*	*23.4*	*11.7*	*10.1*	*10.9*
Manufacturing Goods Only						
Total Foreign value-added	5.5	11.0	16.4	79.4	75.2	63.0
Direct foreign value-added	*2.1*	*4.5*	*5.2*	*79.0*	*73.6*	*58.3*
Total Domestic Value-added	94.5	89.0	83.6	20.7	24.8	37.0
Direct domestic value-added	*31.5*	*29.5*	*22.4*	*11.7*	*10.0*	*10.9*

Source: Authors' estimates based on China's 1997, 2002 and 2007 Benchmark input-output table published by Bureau of National Statistics and Official China trade statistics from China Customs.
Note: The HIY method refers to estimates from using the approach in Hummels, Ishii, and Yi (2001). The KWW method refers to estimates from using the approach developed in this paper that takes into account special features of processing exports.

Table 4: Shares of Domestic Value Added in Exports by Firm Ownership (%), 2002 and 2007

	Share of processing exports in total exports	*Non processing*		*Processing*		*Weighted-sum*		*Share of exports by firm ownership in China's total exports*
		Direct domestic value-added	Total Domestic Value-added	Direct domestic value-added	Total Domestic Value-added	Direct domestic value-added	Total Domestic Value-added	
2002								
Wholly Foreign Owned	87.5	34.9	90.1	9.8	25.3	13.0	33.4	*28.9*
Joint Venture Firms	70.5	31.2	89.4	9.9	24.5	16.2	43.6	*22.9*
State Owned Firms	32.2	32.1	89.6	10.7	26.4	25.2	69.3	*38.1*
Collectively Owned Firms	27.4	29.9	89.6	10.8	28.2	24.7	72.8	*5.8*
Private Firms	9.0	30.7	89.6	10.7	26.3	28.9	83.9	*4.3*
All Firms	**55.7**	31.8	89.3	10.1	26.1	19.7	**53.9**	***100.0***
2007								
Wholly Foreign Owned	83.0	23.8	83.8	11.4	36.0	13.5	44.1	38.1
Joint Venture Firms	59.5	23.0	83.6	10.4	38.7	15.5	56.9	17.7
State Owned Firms	25.8	23.4	83.4	10.0	39.5	20.0	72.1	18.9
Collectively Owned Firms	24.0	22.4	83.1	8.9	42.0	19.1	73.3	4.0
Private Firms	9.6	23.5	84.9	9.8	42.0	22.2	80.8	21.3
All Firms	50	23.5	83.9	10.5	38.7	17.1	60.6	100.0

Source: **Source**: Authors' estimates based on China's 2002 and 2007 Benchmark input-output table published by Bureau of National Statistics and Official China trade statistics from China Customs. Input/output structure is assumed to be the same for a given export regime within a sector across all type firms. The variation of domestic value-added by firm types is due solely to variation in sector composition and the relative reliance on processing exports.

Table 5 Domestic Value-added Share in Manufacturing Exports by Sector, 2002

IO Industry description	Value-added decomposition %						% of processing exports	% of FIE exports	% of merchandise exports
	Non-processing		Processing		Weighted sum				
	FVA	DVA	FVA	DVA	FVA	DVA			
Telecommunication equipment	12.6	87.5	94.7	5.3	87.5	12.5	91.2	88.4	3.2
Ship building	17.7	82.3	85.3	14.7	82.5	17.5	95.8	21.0	0.6
Electronic computer	16.4	83.6	81.3	18.7	80.7	19.3	99.1	89.7	7.0
Cultural and office equipment	20.3	79.7	80.7	19.3	76.7	23.3	93.4	71.6	4.3
Household electric appliances	11.8	88.2	93.2	6.8	76.2	23.9	79.1	56.9	1.9
Household Audiovisual Apparatus	17.5	82.5	78.7	21.3	73.0	27.0	90.6	62.3	5.2
Printing, Reproduction of Recording Media	8.9	91.1	80.3	19.7	68.1	31.9	83.0	62.7	0.3
Plastic	15.6	84.4	89.7	10.3	63.4	36.6	64.5	51.2	2.4
Electronic Component	15.4	84.6	67.2	32.8	61.9	38.1	89.7	87.5	3.4
Steelmaking	11.0	89.0	87.2	12.8	55.8	44.3	58.8	86.1	0.0
Generators	14.8	85.2	68.1	32.0	55.7	44.3	76.8	55.8	0.9
Other electronic and communication equipment	2.2	97.8	64.0	36.0	54.7	45.3	84.9	84.9	1.8
Rubber	9.4	90.6	87.8	12.2	51.1	48.9	53.1	44.4	1.6
Nonferrous metal pressing	13.8	86.2	92.5	7.5	50.7	49.3	46.9	48.7	0.4
Measuring Instruments	14.2	85.8	67.1	32.9	50.5	49.5	68.6	51.8	1.8
Paper and Paper Products	9.2	90.8	87.6	12.4	48.9	51.1	50.7	57.0	0.5
Furniture	11.7	88.3	87.5	12.5	47.5	52.5	47.2	56.8	1.7
Articles for Culture, Education and Sports Activities	12.5	87.5	61.8	38.2	47.3	52.7	70.6	56.3	3.3
Nonferrous metal smelting	11.1	88.9	89.4	10.6	46.4	53.6	45.0	17.4	0.8
Smelting of Ferroalloy	16.5	83.6	87.1	13.0	45.2	54.8	40.8	13.1	0.2
Synthetic Materials	19.5	80.5	62.9	37.1	44.8	55.2	58.3	65.4	0.3
Petroleum refine and Nuclear Fuel	20.6	79.4	94.5	5.5	44.3	55.7	32.1	24.9	0.8
Metal products	9.7	90.3	89.8	10.2	44.3	55.7	43.2	45.6	4.4
Other transport equipment	14.0	86.0	87.3	12.7	44.2	55.8	41.2	50.5	1.2
Other electric machinery and equipment	11.6	88.4	59.9	40.1	43.9	56.2	66.8	60.1	5.6
Special Chemical Products	17.1	82.9	68.6	31.4	41.3	58.7	46.9	48.4	0.8
Other manufacturing products	10.8	89.2	68.7	31.3	41.0	59.0	52.2	37.6	1.7
Woolen textiles	8.9	91.1	91.2	8.8	40.0	60.1	37.8	42.6	0.3
Paints, Printing Inks, Pigments and Similar Products	16.5	83.5	91.7	8.3	38.4	61.6	29.1	44.4	0.4
Motor vehicles	10.5	89.6	90.0	10.0	38.4	61.6	35.2	48.2	0.8
Glass and Its Products	13.2	86.8	83.5	16.5	36.4	63.6	33.0	48.8	0.5
Leather, fur, down and related products	8.1	91.9	59.7	40.4	36.1	63.9	54.3	50.3	4.5
Chemical Products for Daily Use	14.7	85.3	73.2	26.8	36.0	64.1	36.3	43.6	0.4
Wearing apparel	8.7	91.3	65.7	34.3	34.4	65.6	45.1	39.2	7.0
Chemical Fiber	19.8	80.2	90.8	9.2	34.3	65.7	20.5	29.2	0.0
Other special industrial equipment	10.8	89.3	68.0	32.0	33.6	66.4	39.9	44.0	1.3
Boiler, engines and turbine	14.1	85.9	86.9	13.1	33.5	66.5	26.7	28.4	0.4
Other industrial machinery	9.9	90.1	61.4	38.6	32.4	67.6	43.7	43.7	3.5
Iron-smelting	13.2	86.8	89.0	11.0	31.2	68.8	23.7	3.0	0.1
Railroad transport equipment	16.2	83.9	85.4	14.6	29.9	70.1	19.9	5.9	0.1
Wood, Bamboo, Rattan, Palm and Straw Products	12.2	87.8	88.7	11.3	27.2	72.8	19.6	45.6	1.0
Knitted and crocheted fabrics and articles	9.4	90.6	65.3	34.7	27.1	72.9	31.6	34.2	5.8
Agriculture, forestry, animal husbandry and fishing machinery	14.3	85.7	86.1	13.9	27.1	72.9	17.8	20.8	0.1
Pesticides	23.0	77.0	88.5	11.5	27.1	72.9	6.3	14.4	0.2

Hemp textiles	10.5	89.5	88.3	11.7	25.7	74.3	19.5	19.5	0.3
Textiles productions	9.9	90.1	71.1	28.9	24.6	75.5	24.0	31.8	1.4
Cotton textiles	8.2	91.8	64.5	35.6	24.3	75.7	28.7	28.8	3.3
Fire-resistant Materials	9.5	90.5	84.6	15.4	23.8	76.2	19.1	49.8	0.1
Metalworking machinery	12.8	87.2	81.2	18.8	21.9	78.1	13.3	27.0	0.2
Medicines	9.8	90.2	75.7	24.3	20.9	79.1	16.9	28.7	0.7
Pottery and Porcelain	11.8	88.2	85.3	14.8	20.2	79.8	11.4	33.1	0.7
Other non-metallic mineral products	9.6	90.4	83.3	16.7	19.9	80.1	14.0	35.7	0.4
Fertilizers	15.6	84.4	90.3	9.7	18.9	81.1	4.5	21.7	0.1
Basic Chemical Raw Materials	12.9	87.1	56.3	43.7	18.0	82.0	11.7	18.8	2.0
Rolling of Steel	9.8	90.2	59.5	40.5	17.7	82.3	16.0	16.8	0.3
Cement, Lime and Plaster	9.0	91.0	79.8	20.3	14.0	86.0	7.0	77.7	0.1
Coking	8.6	91.4	86.8	13.2	10.6	89.4	2.6	5.3	0.3
Total Merchandise	**10.4**	**89.6**	**74.6**	**25.4**	**46.1**	**53.9**	**55.7**	**51.8**	**92.5**

Data source: Authors' estimates. China 2002 and 2007 benchmark IO table have 84 and 90 goods producing sector respectively, they both concord to China's 4 digit classification of economic activities (GB/T 4754-2002). This concordance enable us aggregate both year's estimates to 77 consistent goods producing industries reported in this table.

Table 6 Domestic Value-added Share in Manufacturing Exports by Sector, 2007

IO Industry description	Value-added decomposition %						% of processing exports	% of FIE exports	% of merchandise exports
	Non-processing		Processing		Weighted sum				
	FVA	DVA	FVA	DVA	FVA	DVA			
Electronic Component	22.5	77.5	76.9	23.1	67.7	32.3	83.1	89.8	4.9
Household Audiovisual Apparatus	24.1	75.9	70.4	29.6	67.4	32.6	93.4	79.1	2.5
Electronic computer	24.3	75.7	67.1	33.0	66.2	33.9	97.9	93.3	11.3
Cultural and office equipment	25.9	74.1	66.9	33.1	63.5	36.5	91.7	86.4	1.6
Other electronic and communication equipment	32.0	68.0	65.3	34.7	60.3	39.7	84.8	81.6	1.4
Telecommunication equipment	24.8	75.2	64.7	35.3	56.4	43.6	79.3	83.6	5.9
Ship building	16.1	83.9	60.9	39.1	56.2	43.8	89.4	16.5	1.1
Petroleum feline and Nuclear Fuel	31.3	68.7	79.9	20.1	55.6	44.4	50.1	27.3	0.7
Measuring Instruments	20.0	80.0	62.2	37.8	54.2	45.8	81.2	73.3	2.5
Synthetic Materials	23.6	76.4	66.1	34.0	52.4	47.7	67.7	66.1	0.6
Household electric appliances	18.0	82.0	64.4	35.6	48.2	51.8	65.1	61.7	2.7
Other electric machinery and equipment	19.7	80.3	66.3	33.7	47.9	52.1	60.5	65.9	4.9
Rubber	18.3	81.8	73.0	27.0	46.7	53.4	51.8	41.9	1.7
Plastic	19.2	80.8	68.9	31.1	44.9	55.1	51.7	54.7	1.7
Articles for Culture, Education and Sports Activities	17.0	83.0	54.4	45.6	41.7	58.4	66.0	64.9	2.1
Special Chemical Products	23.3	76.7	66.0	34.0	38.4	61.6	35.3	51.2	0.8
Chemical Fiber	23.6	76.4	48.1	51.9	37.4	62.6	56.2	48.7	0.3
Other special industrial equipment	17.5	82.5	57.0	43.0	34.8	65.2	43.8	54.7	2.7
Generators	19.7	80.3	48.8	51.2	33.4	66.6	47.2	50.3	0.7
Railroad transport equipment	22.3	77.7	45.9	54.1	31.0	69.0	37.0	12.2	0.1
Leather, fur, down and related products	9.6	90.4	59.6	40.4	30.8	69.2	42.5	46.0	2.4
Paper and Paper Products	14.5	85.5	42.4	57.6	30.8	69.2	58.4	62.8	0.4
Metal products	15.0	85.1	60.4	39.7	29.9	70.1	32.9	49.5	4.4
Boiler, engines and turbine	18.4	81.6	61.3	38.7	29.4	70.6	25.6	37.8	0.5
Nonferrous metal pressing	21.4	78.6	43.9	56.1	28.8	71.2	32.7	41.4	1.0
Other manufacturing products	13.5	86.5	52.0	48.1	27.7	72.3	36.8	41.5	1.6
Paints, Printing Inks, Pigments and Similar Products	23.5	76.5	43.2	56.8	27.5	72.6	20.1	47.3	0.3
Pesticides	26.1	73.9	46.5	53.6	27.1	72.9	4.8	19.5	0.1
Chemical Products for Daily Use	19.2	80.8	41.6	58.4	26.7	73.3	33.5	55.5	0.3
Nonferrous metal smelting	23.8	76.2	43.6	56.4	26.7	73.3	14.6	19.6	0.8
Other transport equipment	19.0	81.0	45.1	54.9	26.2	73.8	27.8	46.5	0.9
Basic Chemical Raw Materials	19.2	80.8	57.5	42.5	25.1	74.9	15.6	26.4	1.9
Motor vehicles	16.0	84.0	52.6	47.4	24.7	75.3	23.7	42.0	2.0
Agriculture, forestry, animal husbandry and fishing machinery	19.4	80.6	42.3	57.7	24.4	75.6	21.9	32.7	0.1
Other industrial machinery	16.5	83.6	43.8	56.2	24.4	75.6	29.0	49.9	3.4
Iron-smelting	24.1	75.9	49.4	50.6	24.4	75.6	1.1	24.3	0.1
Smelting of Ferroalloy	24.3	75.7	46.7	53.3	24.4	75.6	0.4	8.8	0.4
Furniture	13.3	86.7	43.9	56.1	23.8	76.2	34.2	56.0	2.0
Printing, Reproduction of Recording Media	13.6	86.4	39.0	61.0	23.5	76.5	39.0	44.4	0.2
Glass and Its Products	16.7	83.3	41.0	59.0	23.3	76.7	27.2	46.4	0.6
Woolen textiles	10.6	89.4	42.2	57.9	23.1	76.9	39.8	46.8	0.2
Metalworking machinery	18.8	81.2	43.2	56.8	22.7	77.3	16.0	36.4	0.3
Rolling of Steel	20.0	80.0	47.2	52.9	22.2	77.8	8.3	22.6	3.8

Fertilizers	19.0	81.0	42.7	57.3	22.1	77.9	13.2	9.5	0.3
Cotton textiles	12.0	88.0	54.3	45.8	21.1	78.9	21.5	26.1	2.1
Wearing apparel	10.5	89.5	46.1	53.9	21.0	79.0	29.7	36.9	4.6
Medicines	12.4	87.6	62.5	37.5	19.7	80.3	14.5	32.3	0.8
Wood, Bamboo, Rattan, Palm and Straw Products	15.4	84.6	41.7	58.4	19.6	80.4	16.1	33.1	1.0
Steelmaking	19.2	80.8	48.3	51.7	19.2	80.8	0.2	7.1	0.3
Pottery and Porcelain	16.6	83.4	41.9	58.2	18.0	82.0	5.2	29.9	0.5
Textiles productions	11.6	88.4	45.1	54.9	17.6	82.4	18.1	35.1	1.8
Knitted and crocheted fabrics and articles	11.8	88.2	48.4	51.6	17.5	82.5	15.6	25.7	5.7
Other non-metallic mineral products	14.0	86.0	43.4	56.6	17.0	83.0	10.1	25.1	0.5
Hemp textiles	13.4	86.6	43.2	56.8	16.1	83.9	9.0	14.7	0.2
Fire-resistant Materials	13.5	86.6	44.9	55.1	15.3	84.7	5.8	51.6	0.1
Cement, Lime and Plaster	11.0	89.0	47.1	52.9	11.6	88.4	1.7	29.6	0.1
Coking	10.4	89.6			10.4	89.6	0.0	11.4	0.3
Total Merchandise	16.0	84.0	62.7	37.3	39.4	60.6	50.1	55.7	96.0

Data source: Authors' estimates. China 2002 and 2007 benchmark IO table have 84 and 90 goods producing sector respectively, they both concord to China's 4 digit classification of economic activities (GB/T 4754-2002). This concordance enable us aggregate both year's estimates to 77 consistent goods producing industries reported in this table.

Table 7 Total Domestic Value-added Share in Chinese Gross Merchandise Exports to its Major Trading Partners, in percent, 2002 and 2007

Region description	Share of processing exports in total exports		*Non processing*		*Processing*		*Weighted-sum*		Share in total exports to the World	
Year	2002	2007	2002	2007	2002	2007	2002	2007	2002	2007
Hong Kong	74.0	77.4	89.8	83.0	26.3	35.3	42.8	46.0	17.5	14.3
United States	67.2	61.7	89.2	84.6	24.3	38.2	45.5	56.0	21.6	19.1
Singapore	62.7	59.7	88.7	83.4	24.3	33.0	48.3	53.3	2.1	2.4
Taiwan province	59.6	50.7	89.3	81.9	27.1	34.9	52.2	58.0	2.0	1.9
Malaysia	57.6	52.0	90.4	84.0	25.5	33.5	53.0	57.7	1.5	1.5
Japan	59.2	56.4	90.7	85.4	27.6	40.5	53.3	60.1	15.0	8.4
EU15	54.8	50.9	89.4	84.0	23.6	37.2	53.4	60.2	14.9	18.3
Thailand	48.1	38.8	88.3	82.0	22.9	38.7	56.8	65.2	0.9	1.0
Rest of OECD	46.9	38.5	89.7	85.4	25.4	40.3	59.5	68.0	1.7	2.1
Korea Rep	45.4	43.2	90.4	83.5	27.1	37.0	61.6	63.4	4.8	4.7
Australia/NZ	41.6	42.8	89.3	84.4	23.0	38.6	61.7	64.8	1.6	1.7
Mexico	42.1	49.1	89.6	84.2	26.6	35.8	63.1	60.4	0.9	0.9
Philippines	37.6	38.2	89.1	83.5	25.2	33.8	65.1	64.5	0.6	0.6
EU12	36.5	50.8	90.2	83.4	22.9	35.8	65.7	59.2	1.5	1.9
Brazil	35.0	36.7	89.4	83.2	27.1	37.7	67.6	66.5	0.5	0.9
India	24.0	27.0	89.3	81.7	21.5	38.6	73.1	70.1	0.8	2.0
Rest of Latin Am/Caribbean	20.3	24.2	89.2	83.4	23.1	38.1	75.8	72.5	1.6	2.4
Indonesia	20.7	23.4	89.4	83.3	25.8	36.1	76.2	72.2	1.1	1.1
Middle East/North Africa	19.4	18.2	89.3	83.9	21.9	38.8	76.3	75.6	3.6	4.8
Eastern Europe/Central Asia	18.9	16.6	89.4	85.0	26.3	39.2	77.5	77.4	0.9	2.8
Rest Asia	17.2	18.9	88.6	83.5	27.0	41.6	77.9	75.6	2.2	2.6
Sub-Saharan Africa	15.5	16.1	89.6	83.9	22.1	38.8	79.2	76.6	1.4	2.1
Russia	15.5	16.9	90.9	85.6	30.4	39.3	81.5	77.8	1.1	2.4
World	55.7	50.0	89.6	84.0	25.4	37.3	53.9	60.6	100.0	99.9

Source: Authors' estimates based on China's 2002 and 2007 Benchmark input-output table published by Bureau of National Statistics and Official China trade statistics from China Customs. Input/output structure is assumed to be the same for a given export regime within a sector across all trading partners. The variation of domestic value-added by destination is due solely to variation in sector composition and the relative reliance on processing exports.

Table 8 Domestic and Foreign content in Mexico Gross Exports, 2003

– Estimated from aggregated Mexico IO table by Mathematical Programing model

		Normal Exports				Maquiladora exports				Weighted Sum			
NAICS code	NAICS description	**Direct foreign value-added**	**Direct domestic value-added**	**Total Foreign value-added**	**Total Domestic Value-added**	**Direct foreign value-added**	**Direct domestic value-added**	**Total Foreign value-added**	**Total Domestic Value-added**	**Direct foreign value-added**	**Direct domestic value-added**	**Total Foreign value-added**	**Total Domestic Value-added**
311	Food Manufacturing	6.2	38.4	12.3	87.7	46.7	20.2	50.3	49.7	10.1	36.7	16.0	84.0
312	Beverage and Tobacco Product Manufacturing	12.4	42.4	17.5	82.5	54.9	22.6	57.7	42.3	14.1	41.6	19.1	81.0
313	Textile Mills	20.3	33.6	27.7	72.3	46.1	16.4	51.3	48.7	30.0	27.2	36.6	63.4
314	Textile Product Mills	24.9	35.4	32.4	67.6	66.2	16.4	67.5	32.5	41.8	27.7	46.7	53.3
315	Apparel Manufacturing	17.8	49.2	23.7	76.3	67.5	18.6	68.5	31.5	54.1	26.8	56.4	43.6
316	Leather and Allied Product Manufacturing	11.0	36.4	19.3	80.7	64.3	18.7	65.7	34.3	27.0	31.1	33.3	66.8
321	Wood Product Manufacturing	7.2	43.6	10.7	89.4	59.9	23.0	62.1	37.9	25.3	36.5	28.3	71.7
322	Paper Manufacturing	11.8	33.1	19.9	80.1	57.6	17.0	59.6	40.4	27.8	27.5	33.7	66.3
323	Printing and Related Support Activities	14.8	40.5	20.9	79.2	54.9	20.2	56.6	43.4	46.5	24.5	49.1	50.9
324	Petroleum and Coal Products Manufacturing	4.9	14.3	10.0	90.0	56.3	8.1	60.8	39.2	5.2	14.3	10.4	89.7
325	Chemical Manufacturing	12.0	30.6	17.1	82.9	48.6	15.8	50.7	49.3	13.6	29.9	18.7	81.4
326	Plastics and Rubber Products Manufacturing	21.9	34.0	28.1	72.0	60.0	16.3	61.8	38.2	41.3	25.0	45.3	54.8
327	Nonmetallic Mineral Product Manufacturing	7.6	53.6	11.8	88.2	45.6	27.6	47.9	52.1	15.5	48.2	19.3	80.7
331	Primary Metal Manufacturing	10.5	36.6	17.5	82.5	74.6	18.9	75.4	24.6	15.0	35.3	21.7	78.4
332	Fabricated Metal Product Manufacturing	18.4	38.6	24.5	75.5	57.2	18.2	59.6	40.5	37.3	28.7	41.6	58.4
333	Machinery Manufacturing	18.4	40.9	25.1	74.9	60.1	19.0	61.8	38.2	35.1	32.1	39.9	60.2
334	Computer and Electronic Product Manufacturing	30.6	39.0	38.0	62.0	82.4	8.8	83.1	16.9	74.6	13.4	76.3	23.7
335	Electrical Equipment and Component Manufacturing	25.2	42.3	31.3	68.7	70.6	13.3	72.1	27.9	62.7	18.3	65.0	35.0
336	Transportation Equipment Manufacturing	24.8	34.6	31.6	68.4	**83.8**	**16.1**	**83.8**	**16.2**	45.1	28.2	49.6	50.4
337	Furniture and Related Product Manufacturing	16.3	47.1	21.2	78.8	57.9	21.4	59.6	40.4	44.5	29.7	47.2	52.8
339	Miscellaneous Manufacturing	19.9	50.5	24.9	75.1	65.7	18.5	67.1	32.9	56.2	25.2	58.2	41.8
	Total	**20.4**	**36.7**	**26.9**	**73.2**	**75.8**	**13.2**	**76.8**	**23.2**	**51.2**	**23.6**	**54.6**	**45.4**
B1	**Error at manufacture aggregate compare to true data**	**1.4**	**-1.0**	**2.1**	**-2.1**	**-0.4**	**-0.3**	**-0.7**	**0.7**	**-3.3**	**1.0**	**-2.8**	**2.8**
B2	**Mean Absolute Percentage Error from the True Data**	**22.7**	**2.9**	**17.3**	**4.3**	**16.1**	**14.1**	**14.2**	**28.0**	**18.5**	**7.8**	**15.3**	**12.4**
B3	**Correlation with true data**	**0.829**	**0.985**	**0.862**	**0.862**	**0.462**	**0.666**	**0.474**	**0.474**	**0.936**	**0.972**	**0.944**	**0.944**

Domestic and Foreign content in Mexico Gross Exports, 2003

– Computed directly from Mexico IO Table with Separate Maquiladora Economy Account

		Normal Exports				Maquiladora exports				Weighted Sum			
NAICS code	NAICS description	**Direct foreign value-added**	**Direct domestic value-added**	**Total Foreign value-added**	**Total Domestic Value-added**	**Direct foreign value-added**	**Direct domestic value-added**	**Total Foreign value-added**	**Total Domestic Value-added**	**Direct foreign value-added**	**Direct domestic value-added**	**Total Foreign value-added**	**Total Domestic Value-added**
311	Food Manufacturing	7.6	38.5	13.3	86.7	48.9	23.3	52.0	48.0	16.7	35.1	21.8	78.2
312	Beverage and Tobacco Product Manufacturing	7.2	42.4	13.0	87.0	8.8	19.2	19.6	80.4	7.3	41.2	13.4	86.6
313	Textile Mills	25.0	34.6	29.9	70.1	50.5	19.0	54.8	45.2	40.5	25.1	45.0	55.0
314	Textile Product Mills	18.1	39.5	24.9	75.1	71.4	18.6	72.5	27.5	59.1	23.4	61.6	38.4
315	Apparel Manufacturing	15.3	48.7	21.5	78.5	63.3	21.5	65.3	34.7	53.3	27.2	56.2	43.8
316	Leather and Allied Product Manufacturing	12.8	37.3	20.2	79.8	70.7	17.5	72.1	27.9	48.0	25.3	51.8	48.2
321	Wood Product Manufacturing	5.1	43.8	7.9	92.1	55.8	24.1	58.1	41.9	33.0	32.9	35.6	64.4
322	Paper Manufacturing	19.0	33.3	26.3	73.7	65.6	20.0	67.3	32.7	45.3	25.8	49.4	50.6
323	Printing and Related Support Activities	14.2	40.3	20.7	79.3	63.4	19.6	64.9	35.1	48.6	25.8	51.6	48.4
324	Petroleum and Coal Products Manufacturing	4.5	14.3	8.1	91.9	78.4	14.6	79.1	20.9	4.5	14.3	8.1	91.9
325	Chemical Manufacturing	11.2	30.7	15.6	84.4	64.3	18.0	66.4	33.6	17.3	29.2	21.5	78.5
326	Plastics and Rubber Products Manufacturing	22.7	34.7	27.6	72.4	64.1	19.0	66.2	33.8	52.8	23.3	55.7	44.3
327	Nonmetallic Mineral Product Manufacturing	5.9	54.5	9.7	90.3	62.2	20.3	64.3	35.7	27.8	41.2	31.0	69.0
331	Primary Metal Manufacturing	12.8	37.0	19.4	80.6	61.9	17.8	64.4	35.6	22.6	33.2	28.4	71.6
332	Fabricated Metal Product Manufacturing	14.7	39.7	20.9	79.1	70.6	16.4	72.1	27.9	45.6	26.8	49.2	50.8
333	Machinery Manufacturing	18.2	43.7	23.1	76.9	75.3	11.9	76.7	23.4	43.7	29.5	47.0	53.0
334	Computer and Electronic Product Manufacturing	24.2	43.9	28.8	71.2	**85.2**	**8.2**	**86.0**	**14.0**	77.7	12.6	78.9	21.1
335	Electrical Equipment and Component Manufacturing	17.8	41.0	23.5	76.5	74.2	13.7	75.7	24.3	63.5	18.9	65.8	34.2
336	Transportation Equipment Manufacturing	24.8	35.6	31.2	68.8	74.3	16.5	75.3	24.7	45.8	27.5	49.9	50.1
337	Furniture and Related Product Manufacturing	11.5	49.2	16.2	83.8	65.3	18.4	67.2	32.8	52.3	25.9	54.8	45.2
339	Miscellaneous Manufacturing	11.7	52.6	16.1	84.0	70.4	18.5	71.7	28.3	61.4	23.7	63.1	36.9
	Total	**19.0**	**37.7**	**24.7**	**75.3**	**76.3**	**13.4**	**77.5**	**22.5**	**54.5**	**22.6**	**57.5**	**42.6**

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Appendix Table A Trade share parameters used in estimation, %, 2007

IO Industry description	Interme-diates for processing exports	Interme-diates for normal use	Capital goods for normal use	Capital goods for Processing exports	final Consu m-ption	processing exports
	(1)	(2)	(3)	(4)	(5)	(6)
Farming	7.7	83.9			8.4	2.0
Forestry	31.2	68.8				3.4
Animal Husbandry	30.6	66.9	2.0		0.5	2.2
Fishery	39.1	6.6			54.3	2.4
Services in Support of Agriculture	14.3	85.7				
Mining and Washing of Coal		100.0				0.0
Extraction of Petroleum and Natural Gas	8.5	91.5				5.4
Mining of Ferrous Metal Ores	0.0	100.0				
Mining of Non-Ferrous Metal Ores	4.3	95.7				18.1
Mining and Processing of Nonmetal Ores and Other Ores	45.4	54.6				57.6
Grinding of Grains	12.6	37.6			49.9	9.7
Processing of Forage	1.9	94.8			3.3	5.5
Refining of Vegetable Oil	2.7	93.0			4.3	32.9
Manufacture of Sugar	13.5	69.6			16.9	18.5
Slaughtering and Processing of Meat	9.8	28.7			61.5	17.0
Processing of Aquatic Product	58.4	24.9			16.7	46.5
Processing of Other Foods	34.4	22.2			43.4	15.2
Manufacture of Convenience Food	11.4	11.2			77.4	29.5
Manufacture of Liquid Milk and Dairy Products	0.9	61.1			37.9	8.6
Manufacture of Flavoring and Ferment Products	53.2	9.1			37.7	17.9
Manufacture of Other Foods	7.0	23.5			69.5	27.3
Manufacture of Alcohol and Wine	0.5	1.1			98.5	8.6
Processing of Soft Drinks and Purified Tea	7.3	16.8			75.8	30.6
Manufacture of Tobacco	30.9	8.4			60.6	2.6
Spinning and Weaving, Printing and Dyeing of Cotton and Chemical Fiber	90.4	9.5			0.0	21.5
Spinning and Weaving, Dyeing and Finishing of Wool	73.4	26.5			0.2	39.8
Spinning and Weaving of Hemp and Tiffany	61.2	38.8			0.0	9.0
Manufacture of Textile Products	77.5	19.8			2.8	18.1
Manufacture of Knitted Fabric and Its Products	84.4	5.1			10.6	15.6
Manufacture of Textile Wearing Apparel, Footwear and Caps	57.5	0.0			42.5	29.7
Manufacture of Leather, Fur, Feather(Down) and Its Products	68.1	23.6			8.3	42.5
Processing of Timbers, Manufacture of Wood, Bamboo, Rattan, Palm and Straw Products	46.0	53.7			0.3	16.1
Manufacture of Furniture	8.3	56.2	5.4	0.4	29.7	34.2
Manufacture of Paper and Paper Products	28.3	66.2			5.5	58.4
Printing, Reproduction of Recording Media	59.2	23.8			17.0	39.0
Manufacture of Articles for Culture, Education and Sports Activities	69.9	6.9	1.9	4.0	17.3	66.0
Processing of Petroleum and Nuclear Fuel	2.3	97.5	0.3		0.0	50.1
Coking	0.6	99.4				
Manufacture of Basic Chemical Raw Materials	19.8	80.2				15.6
Manufacture of Fertilizers	0.2	99.8				13.2
Manufacture of Pesticides	0.4				99.6	4.8
Manufacture of Paints, Printing Inks, Pigments and Similar Products	41.7	58.2			0.0	20.1
Manufacture of Synthetic Materials	58.8	41.2				67.7
Manufacture of Special Chemical Products	48.2	50.6	0.0		1.2	35.3
Manufacture of Chemical Products for Daily Use	16.3	61.0			22.7	33.5
Manufacture of Medicines	10.2	38.4			51.4	14.5
Manufacture of Chemical Fiber	50.3	49.7			0.0	56.2

Manufacture of Rubber	27.7	69.2			3.2	51.8
Manufacture of Plastic	64.2	28.5			7.3	51.7
Manufacture of Cement, Lime and Plaster	8.7	91.3				1.7
Manufacture of Products of Cement and Plaster	16.1	83.9				26.8
Manufacture of Brick, Stone and Other Building Materials	34.9	65.1				9.3
Manufacture of Glass and Its Products	73.4	25.0			1.6	27.2
Manufacture of Pottery and Porcelain	33.1	62.2			4.8	5.2
Manufacture of Fire-resistant Materials	20.0	80.0				5.8
Manufacture of Graphite and Other Nonmetallic Mineral Products	41.3	58.2			0.5	7.1
Iron-smelting	7.9	92.1				1.1
Steelmaking	3.4	96.6				0.2
Rolling of Steel	48.7	51.3				8.2
Smelting of Ferroalloy	16.7	83.3				0.4
Smelting of Non-Ferrous Metals and Manufacture of Alloys	37.4	62.6				14.5
Rolling of Non-Ferrous Metals	68.0	32.0				32.7
Manufacture of Metal Products	42.5	46.6	3.0	6.1	1.8	32.9
Manufacture of Boiler and Prime Mover	19.6	50.8	22.1	7.3	0.2	25.6
Manufacture of Metalworking Machinery	2.3	10.5	30.8	56.4		16.0
Manufacture of Lifters			41.9	58.1		51.8
Manufacture of Pump, Valve and Similar Machinery	11.4	41.0	32.3	15.4		23.3
Manufacture of Other General Purpose Machinery	20.3	42.5	18.2	18.9	0.0	27.8
Manufacture of Special Purpose Machinery for Mining, Metallurgy and Construction	7.6	34.4	41.1	17.0		12.3
Manufacture of Special Purpose Machinery for Chemical Industry, Processing of Timber and Nonmetals	1.7	2.9	32.2	63.3		19.3
Manufacture of Special Purpose Machinery for Agriculture, Forestry, Animal Husbandry and Fishery	3.3	11.2	70.4	7.8	7.4	21.9
Manufacture of Other Special Purpose Machinery	14.6	10.4	32.7	41.2	1.1	66.0
Manufacture of Railroad Transport Equipment	1.9	68.4	29.7	0.0		37.0
Manufacture of Automobiles	2.3	49.8	4.8	0.3	42.7	23.7
Manufacture of Boats and Ships and Floating Devices	21.4	9.5	65.3	0.8	3.0	89.4
Manufacture of Other Transport Equipment	3.2	9.2	86.3		1.3	27.7
Manufacture of Generators	11.8	21.0	41.1	26.0		47.2
Manufacture of Equipments for Power Transmission and Distribution and Control	39.4	36.8	12.9	10.9		73.9
Manufacture of Wire, Cable, Optical Cable and Electrical Appliances	60.1	35.3	2.4	1.9	0.3	65.5
Manufacture of Household Electric and Non-electric Appliances	17.7	18.3	20.3	37.0	6.8	65.1
Manufacture of Other Electrical Machinery and Equipment	59.1	15.0	13.8	11.2	0.9	45.7
Manufacture of Communication Equipment	36.6	31.6	22.2	9.5	0.1	79.3
Manufacture of Radar and Broadcasting Equipment	51.3	16.6	7.0	4.9	20.2	84.8
Manufacture of Computer	34.0	10.3	29.8	25.9		97.9
Manufacture of Electronic Component	77.0	18.9	0.9	2.9	0.3	83.1
Manufacture of Household Audiovisual Apparatus	74.5	7.6	3.3	1.9	12.6	93.4
Manufacture of Other Electronic Equipment	15.8	4.1	18.7	60.7	0.8	80.9
Manufacture of Measuring Instruments	32.3	16.4	37.3	9.4	4.6	91.7
Manufacture of Machinery for Cultural Activity & Office Work	70.0	9.6	0.3	0.0	20.1	36.8
Manufacture of Artwork, Other Manufacture	10.9	89.1				7.9
Scrap and Waste		100.0				41.0
Total Merchandise	32.7	47.3	7.6	9.0	3.3	51.6

Source: **Source**: Author's aggregation from official trade statistics from China Customs. UN BEC classification and processing trade information from China custom trade statistics were combined to identify the purpose of final use.

Note: Column (1) to (5) sum to 100.

Appendix Table B Trade share parameters used in estimation, %, 2002

IO Industry description	Interme-diates for processing exports	Interme-diates for normal use	Capital goods for normal use	Capital goods for Processing exports	final Consum-ption	processing exports
	(1)	(2)	(3)	(4)	(5)	(6)
Agriculture	11.9	75.0			13.1	2.6
Forestry	66.0	34.0			0.0	4.0
Logging and transport of timber and bamboo	4.0	96.0				
Animal Husbandry	32.5	64.9	2.5		0.0	2.8
Fishery	6.0	0.5			93.5	1.2
Technical services for agriculture, forestry, livestock and fishing	52.4				47.6	30.0
Mining and Washing of Coal	0.9	99.1				
Extraction of Petroleum and Natural Gas	11.2	88.8				3.4
Ferrous metal ore mining	5.9	94.1				
Non-ferrous metal ore mining	19.4	80.6				7.2
Salt mining	9.8	90.2				1.0
Non-metal minerals and other mining	70.6	29.4				33.9
Grain mill products	71.0	24.7			4.3	53.0
forage	1.9	95.4			2.7	18.2
vegetable oil refining	4.0	91.4			4.6	33.1
Sugar manufacturing	32.1	66.7			1.2	87.9
Slaughtering and meat processing	9.2	25.4			65.4	17.5
Fish and fish productions	66.8	19.6			13.6	41.6
All other food manufacturing	15.5	27.1			57.4	25.0
Wines, spirits and liquors	1.8	2.2			96.1	21.0
Soft drink and other beverage	5.5	26.5			68.0	15.0
Tobacco products	0.5	0.1			99.4	5.0
Cotton textiles	84.2	15.8			0.0	28.7
Woolen textiles	86.7	13.3			0.1	37.7
Hemp textiles	98.0	1.9			0.0	19.5
Textiles productions	89.5	9.7			0.8	24.0
Knitted and crocheted fabrics and articles	93.1	1.1			5.8	31.6
Wearing apparel	87.2	0.0			12.8	45.1
Leather, fur, down and related products	91.1	7.6			1.3	54.3
Products of wood, bamboo, cane, palm, straw	59.0	41.0				19.6
Furniture	28.0	42.7	7.3	1.8	20.3	47.2
Paper and paper products	36.9	62.8			0.3	50.7
Printing, reproduction of recording media	71.6	8.8			19.5	83.0
Stationary and related products	31.1	60.9			8.0	39.4
Toys, sporting and athletic and recreation products	80.4	1.2	0.3	6.8	11.3	72.9
Petroleum and nuclear processing	2.5	97.1	0.4	0.0		32.1
Coking	3.7	96.3				2.6
Basic chemicals	25.8	74.2				11.7
Chemical fertilizers	0.2	99.8				4.5
Chemical pesticides	5.2				94.8	6.2
paints, varnishes and similar coatings, printing ink and mastics	50.4	49.6			0.0	29.1
Man-made chemical products	59.7	40.3				58.3
Special chemical products	65.9	33.1	0.0	0.0	1.1	46.9
Chemical products for daily use	33.9	53.1			12.9	36.3
Medical and pharmaceutical products	5.8	40.1			54.1	16.9
Chemical fibers	44.1	55.9				20.5
Rubber products	42.5	54.2			3.3	53.1
Plastic products	70.6	25.3			4.1	64.5
Cement, lime and plaster	14.0	86.0				7.0

IO Industry description	Interme-diates for processing exports	Interme-diates for normal use	Capital goods for normal use	Capital goods for Processing exports	final Consum-ption	processing exports
Glass and glass products	73.7	25.6			0.7	33.0
Pottery, china and earthenware	39.8	55.4			4.8	11.4
Fireproof materials	33.6	66.4				19.1
Other non-metallic mineral products	42.9	56.3			0.8	14.0
Iron-smelting	5.4	94.6				23.7
Steel-smelting	36.2	63.8				58.8
Steel pressing	37.6	62.4				16.0
Alloy iron smelting	8.1	91.9				40.8
Nonferrous metal smelting	24.3	75.7				45.0
Nonferrous metal pressing	68.4	31.6				46.9
Metal products	32.9	33.7	5.9	27.1	0.5	43.2
Boiler, engines and turbine	8.8	64.2	21.7	5.2	0.1	26.6
Metalworking machinery	3.7	9.5	28.1	58.8		13.3
Other general industrial machinery	20.7	18.5	18.8	41.6	0.4	43.7
Agriculture, forestry, animal husbandry and fishing machinery	2.3	10.7	62.4	17.2	7.4	17.8
Other special industrial equipment	7.4	8.6	35.5	47.9	0.5	39.9
Railroad transport equipment	0.3	31.9	67.8	0.0		19.9
Motor vehicles	0.6	2.1	87.7	9.3	0.3	37.8
Parts and accessories for motor vehicles and their engines	4.1	95.9				34.3
Ship building	8.0	40.3	45.7	5.3	0.7	95.8
Other transport equipment	9.5	30.7	59.8		0.0	41.2
Generators	22.9	12.5	28.3	36.2		76.8
Household electric appliances	63.6	23.5	1.0	0.5	11.3	79.1
Other electric machinery and equipment	53.5	18.6	8.8	18.9	0.2	66.8
Telecommunication equipment	4.2	17.4	74.6	3.8	0.0	91.2
Electronic computer			91.8	8.2		99.1
Other computer peripheral equipment	54.4	12.4	20.4	12.9		99.2
Electronic element and device	80.6	17.7	0.2	1.5		89.7
Radio, television and communication equipment and apparatus	76.3	4.3	8.2	6.9	4.4	90.6
Other electronic and communication equipment	45.0	50.9	3.5	0.6		84.9
Instruments, meters and other measuring equipment	10.7	3.4	18.1	66.8	0.9	68.6
Cultural and office equipment	54.1	11.2	18.6	14.5	1.6	93.4
Arts and crafts products	93.3	1.4			5.3	53.8
Other manufacturing products	91.4	5.4	0.2	0.0	3.0	48.8
Scrap and waste	9.0	91.0				26.0
Total Merchandise	38.0	39.1	11.0	10.2	1.8	55.9

Source: **Source**: Author's aggregation from official trade statistics from China Customs. UN BEC classification and processing trade information from China custom trade statistics were combined to identify the purpose of final use.

Note: Column (1) to (5) sum to 100.

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Appendix Table C Trade share parameters used in estimation, %, 1997

Description	Interme-diates for processing exports	Interme-diates for normal use	Capital goods for normal use	Capital goods for Processing exports	final Consum-ption	processing exports
	(1)	(2)	(3)	(4)	(5)	(6)
Crop cultivation	43.7	51.7			4.7	2.9
Forestry	45.9	26.2			27.8	3.6
Livestock and livestock products	69.9	29.3	0.7		0.1	3.5
Fishery	16.7	0.0			83.3	8.8
Other agricultural products	77.8	10.6			11.5	11.5
Coal mining and processing	36.0	64.0				
Crude petroleum products	22.2	77.8				0.0
Natural gas products		100.0				
Ferrous ore mining	53.4	46.6				
Non-ferrous ore mining	57.2	42.8				8.2
Salt mining	43.9	56.1				0.9
Non-metal minerals and other mining	84.7	15.3				22.6
Logging and transport of timber and bamboo	27.5	72.5				5.9
Grain mill products, vegetable oil and forage	23.6	76.0			0.4	51.6
Sugar refining	51.1	48.4			0.5	88.5
Slaughtering , meat processing, eggs and dairy products	71.6	22.8			5.6	15.4
Prepared fish and seafood	93.3	1.7			5.0	41.7
Other food products	43.3	21.8			34.9	26.3
Wines, spirits and liquors	5.8	3.9			90.3	18.2
Non-alcoholic beverage	69.3	2.5			28.1	15.9
Tobacco products	1.4	0.1			98.5	7.7
Cotton textiles	98.7	1.3			0.0	40.8
Woolen textiles	93.7	6.2			0.0	64.1
Hemp textiles	95.4	4.6			0.0	30.9
Silk textiles	96.2	3.8			0.0	5.9
Knitted mills	98.0	1.1			0.9	37.3
Other textiles	98.6	1.4			0.0	57.0
Wearing apparel	97.4	0.0			2.5	54.8
Leather, furs, down and related products	98.3	1.0			0.7	72.1
Sawmills and fiberboard	72.3	27.7				22.3
Furniture and products of wood, bamboo, cane, palm, straw, etc.	57.7	16.1	6.0	4.0	16.3	42.5
Paper and products	54.1	45.7			0.1	61.7
Printing and record medium reproduction	76.2	22.6			1.1	78.5
Cultural goods	16.0	83.3			0.6	59.7
Toys, sporting and athletic and recreation products	64.8	0.4	4.2	23.4	7.2	75.6
Petroleum refining	8.9	91.1				46.6
Coking	13.9	86.1				3.6
Raw chemical materials	53.1	46.9				5.5
Chemical fertilizers	0.3	99.7				3.2
Chemical pesticides	6.9	0.8			92.3	21.2
Organic chemical products	50.7	49.3			0.0	17.8
Chemical products for daily use	64.2	20.8			15.0	39.2
Other chemical products	78.6	21.3	0.0	0.0	0.2	38.2
Medical and pharmaceutical products	16.9	28.6			54.4	16.8
Chemical fibers	79.8	20.2			0.0	69.9

Description	Interme-diates for processing exports	Interme-diates for normal use	Capital goods for normal use	Capital goods for Processing exports	final Consum-ption	processing exports
Rubber products	73.7	25.8			0.5	69.0
Plastic products	88.6	9.2			2.2	74.3
Cement	12.4	87.6				4.6
Cement and asbestos products	68.1	31.9				53.7
Bricks, tiles, lime and light-weight building materials	52.7	47.3			0.0	9.7
Glass and glass products	78.6	20.4			1.0	41.5
Pottery, china and earthenware	66.8	29.9			3.3	14.8
Fireproof products	67.0	33.0				7.6
Other non-metallic mineral products	83.8	15.6			0.6	19.0
Iron-smelting	78.1	21.9				91.0
Steel-smelting	23.8	76.2				78.1
Steel processing	62.1	37.9				82.9
Alloy iron smelting	52.5	47.5				46.4
Nonferrous metal smelting	45.0	55.0				38.0
Nonferrous metal processing	83.3	16.7				46.6
Metal products	58.9	19.7	2.5	18.3	0.6	42.7
Boiler, engines and turbine	23.9	48.4	13.4	14.2	0.2	31.5
Metalworking machinery	10.2	9.3	17.9	62.6		22.6
Other general industrial machinery	22.8	14.1	18.6	44.2	0.2	43.7
Agriculture, forestry, animal husbandry and fishing machinery	9.9	4.0	37.1	46.4	2.7	7.7
Other special industrial equipment	12.9	5.6	16.7	64.7	0.1	41.5
Railroad transport equipment	11.1	28.2	59.8	0.8		47.4
Motor vehicles	4.1	64.5	25.6	5.8	0.1	38.1
Ship building	12.0	4.9	25.6	56.6	0.9	89.7
Aircraft	2.7	17.1	78.0	1.4	0.8	23.3
Bicycle	89.6	10.0			0.4	80.7
Other transport machinery	17.5	81.8			0.7	40.7
Generators	29.6	5.5	19.5	45.3		85.2
Household electric appliances	40.8	11.3	4.4	35.0	8.5	80.9
Other electric machinery and equipment	54.3	11.6	9.5	23.9	0.7	76.7
Electronic computer	69.2	3.9	13.4	13.5		97.2
Electronic appliances	93.5	2.6	1.8	2.0	0.1	96.8
Electronic element and device	74.9	17.4	0.8	6.8		85.1
Other electronic and communication equipment	18.5	25.4	47.0	3.5	5.5	92.3
Instruments, meters and other measuring equipment	37.3	5.0	24.5	33.0	0.2	77.7
Cultural and office equipment	89.5	3.2	4.6	2.4	0.3	98.4
Arts and crafts products	89.3	2.2			8.5	55.2
Other manufacturing products	96.6	2.1	0.0	0.0	1.3	71.2
Total Merchandise	51.2	28.2	7.3	12.1	1.3	55.1

Source: Author's aggregation from official trade statistics from China Customs. UN BEC classification and processing trade information from China custom trade statistics were combined to identify the purpose of final use.

Note: Column (1) to (5) sum to 100.

Appendix Table D Domestic and foreign value-added embodied in Chinese gross merchandise exports, in percent, 2007

	Split Method				HIY Method			
IO industry description	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added
Farming	1.6	64.6	6.2	93.8	1.8	64.9	7.1	92.9
Forestry	5.3	67.9	8.8	91.3	2.6	68.5	7.0	93.0
Animal Husbandry	1.7	48.1	6.2	93.8	1.4	48.4	6.7	93.3
Fishery	1.8	60.9	6.2	93.8	1.0	61.3	6.3	93.7
Services in Support of Agriculture	3.5	47.5	9.0	91.0	2.4	47.5	9.3	90.7
Mining and Washing of Coal	2.2	45.9	9.1	90.9	2.7	45.9	11.4	88.6
Extraction of Petroleum and Natural Gas	5.8	57.4	11.7	88.3	3.7	59.7	11.1	88.9
Mining of Ferrous Metal Ores	10.0	33.3	18.7	81.3	8.8	33.3	19.9	80.1
Mining of Non-Ferrous Metal Ores	15.1	33.8	23.3	76.8	6.6	37.9	17.6	82.5
Mining and Processing of Nonmetal Ores and Other Ores	29.3	26.7	35.8	64.2	4.8	39.2	15.5	84.5
Grinding of Grains	8.5	18.2	13.9	86.1	5.3	19.2	11.8	88.2
Processing of Forage	6.9	16.3	13.3	86.7	5.5	16.7	13.3	86.7
Refining of Vegetable Oil	14.7	16.1	21.1	79.0	7.8	18.9	15.3	84.7
Manufacture of Sugar	12.5	19.3	18.5	81.5	5.0	21.8	12.1	87.9
Slaughtering and Processing of Meat	7.2	15.2	13.0	87.0	2.2	16.3	8.9	91.1
Processing of Aquatic Product	14.5	16.9	19.4	80.7	2.7	21.1	9.4	90.7
Processing of Other Foods	13.6	15.3	19.7	80.3	4.9	17.1	13.0	87.1
Manufacture of Convenience Food	14.5	16.5	22.4	77.6	3.8	20.7	13.9	86.1
Manufacture of Liquid Milk and Dairy Products	8.1	17.6	15.5	84.5	4.4	18.7	13.8	86.2
Manufacture of Flavoring and Ferment Products	16.3	17.4	23.2	76.8	5.3	19.7	14.9	85.1
Manufacture of Other Foods	18.6	18.6	25.1	74.9	5.5	22.5	14.7	85.3
Manufacture of Alcohol and Wine	7.0	32.3	13.3	86.8	3.4	34.3	11.1	88.9
Processing of Soft Drinks and Purified Tea	14.7	19.9	22.8	77.2	4.9	24.9	15.8	84.2
Manufacture of Tobacco	3.2	61.1	6.8	93.2	2.1	62.4	6.6	93.4
Spinning and Weaving, Printing and Dyeing of Cotton and Chemical Fiber	12.0	15.8	21.1	78.9	4.5	17.8	17.5	82.5
Spinning and Weaving, Dyeing and Finishing of Wool	15.4	16.2	23.1	76.9	3.3	21.4	13.1	86.9
Spinning and Weaving of Hemp and Tiffany	7.5	18.1	16.1	83.9	4.3	19.0	15.1	84.9
Manufacture of Textile Products	8.8	20.0	17.6	82.4	4.0	21.3	16.6	83.4
Manufacture of Knitted Fabric and Its Products	8.1	21.9	17.5	82.5	4.3	22.1	17.7	82.3
Manufacture of Textile Wearing Apparel, Footwear and Caps	13.0	21.1	21.0	79.0	4.3	23.8	16.4	83.6
Manufacture of Leather, Fur, Feather(Down) and Its Products	24.4	15.9	30.8	69.2	6.6	20.1	18.0	82.0
Processing of Timbers, Manufacture of Wood, Bamboo, Rattan, Palm and Straw Products	10.2	20.5	19.6	80.4	7.9	22.5	19.6	80.4
Manufacture of Furniture	14.5	21.9	23.8	76.2	5.0	25.6	18.1	81.9
Manufacture of Paper and Paper Products	22.3	13.9	30.8	69.2	8.2	21.8	20.1	79.9
Printing, Reproduction of Recording Media	14.4	24.5	23.5	76.5	4.9	30.5	18.0	82.0
Manufacture of Articles for Culture, Education and Sports Activities	33.8	16.7	41.7	58.4	8.3	21.4	24.2	75.9
Processing of Petroleum and Nuclear Fuel	50.9	10.8	55.6	44.4	26.3	15.3	34.7	65.3
Coking	3.4	32.1	10.4	89.6	3.2	32.1	12.0	88.0
Manufacture of Basic Chemical Raw Materials	14.6	19.2	25.1	74.9	9.9	20.9	23.4	76.6
Manufacture of Fertilizers	11.5	17.5	22.1	77.9	8.5	18.9	22.3	77.7
Manufacture of Pesticides	14.7	18.6	27.1	72.9	11.8	19.2	27.1	72.9
Manufacture of Paints, Printing Inks, Pigments and Similar Products	14.6	15.7	27.5	72.6	11.6	18.0	27.9	72.1
Manufacture of Synthetic Materials	41.5	11.2	52.4	47.7	12.8	20.9	29.9	70.1
Manufacture of Special Chemical Products	28.2	13.1	38.4	61.6	13.2	15.4	28.5	71.5
Manufacture of Chemical Products for Daily Use	17.4	20.7	26.7	73.3	9.5	26.3	22.4	77.6
Manufacture of Medicines	12.7	26.4	19.7	80.3	5.8	29.0	15.4	84.6
Manufacture of Chemical Fiber	26.8	10.9	37.4	62.6	13.2	16.7	30.2	69.8

	Split Method				HIY Method			
IO industry description	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added
Manufacture of Rubber	38.9	14.1	46.7	53.4	11.6	19.7	26.6	73.4
Manufacture of Plastic	35.6	13.1	44.9	55.1	11.5	18.5	29.6	70.4
Manufacture of Cement, Lime and Plaster	3.3	27.6	11.6	88.4	3.1	27.8	13.9	86.1
Manufacture of Products of Cement and Plaster	11.9	20.4	21.1	78.9	2.7	24.6	14.6	85.4
Manufacture of Brick, Stone and Other Building Materials	6.8	23.1	16.6	83.4	4.9	24.4	17.1	82.9
Manufacture of Glass and Its Products	13.8	23.6	23.3	76.7	7.5	27.4	19.9	80.1
Manufacture of Pottery and Porcelain	7.8	25.5	18.0	82.0	5.6	26.0	18.5	81.5
Manufacture of Fire-resistant Materials	7.8	37.4	15.3	84.7	4.1	39.0	13.6	86.4
Manufacture of Graphite and Other Nonmetallic Mineral Products	7.9	29.3	16.6	83.4	3.9	30.3	15.0	85.0
Iron-smelting	15.7	18.9	24.4	75.6	14.6	19.0	24.7	75.3
Steelmaking	9.4	27.6	19.2	80.8	9.4	27.6	20.3	79.7
Rolling of Steel	9.6	16.9	22.2	77.8	8.7	17.7	23.0	77.0
Smelting of Ferroalloy	15.0	26.3	24.4	75.6	12.5	26.3	23.6	76.4
Smelting of Non-Ferrous Metals and Manufacture of Alloys	16.3	15.2	26.7	73.3	15.5	16.8	27.5	72.5
Rolling of Non-Ferrous Metals	15.8	16.7	28.8	71.2	9.4	20.9	26.4	73.6
Manufacture of Metal Products	19.2	17.2	29.9	70.1	5.0	20.8	20.5	79.5
Manufacture of Boiler and Prime Mover	19.4	20.2	29.4	70.6	9.3	23.2	23.8	76.2
Manufacture of Metalworking Machinery	11.5	22.3	22.7	77.3	8.1	24.7	23.1	76.9
Manufacture of Lifters	20.0	14.3	30.8	69.2	6.5	19.6	22.8	77.2
Manufacture of Pump, Valve and Similar Machinery	11.7	20.8	23.0	77.0	7.2	23.3	21.9	78.1
Manufacture of Other General Purpose Machinery	12.6	19.2	23.8	76.2	7.4	23.0	22.4	77.6
Manufacture of Special Purpose Machinery for Mining, Metallurgy and Construction	10.9	21.5	22.1	77.9	6.8	23.1	21.7	78.3
Manufacture of Special Purpose Machinery for Chemical Industry, Processing of Timber and Nonmetals	11.0	22.9	22.1	78.0	5.4	25.9	19.9	80.1
Manufacture of Special Purpose Machinery for Agriculture, Forestry, Animal Husbandry and Fishery	13.1	18.9	24.4	75.6	6.0	21.3	21.7	78.4
Manufacture of Other Special Purpose Machinery	36.7	16.2	44.3	55.7	10.7	23.3	25.4	74.6
Manufacture of Railroad Transport Equipment	20.2	16.3	31.0	69.0	8.5	19.9	24.3	75.7
Manufacture of Automobiles	13.3	15.9	24.7	75.3	6.6	18.4	23.3	76.7
Manufacture of Boats and Ships and Floating Devices	50.5	14.8	56.2	43.8	7.9	27.8	22.3	77.7
Manufacture of Other Transport Equipment	14.4	17.6	26.2	73.8	9.4	20.0	25.9	74.1
Manufacture of Generators	22.5	14.9	33.4	66.6	9.5	19.8	26.4	73.6
Manufacture of Equipments for Power Transmission and Distribution and Control	47.6	9.3	54.9	45.1	14.2	17.4	31.1	68.9
Manufacture of Wire, Cable, Optical Cable and Electrical Appliances	37.1	8.3	46.6	53.4	9.1	14.7	27.6	72.4
Manufacture of Household Electric and Non-electric Appliances	40.3	11.3	48.2	51.8	11.1	16.7	28.6	71.4
Manufacture of Other Electrical Machinery and Equipment	32.4	15.1	41.9	58.1	12.2	19.2	29.3	70.8
Manufacture of Communication Equipment	50.2	14.8	56.4	43.6	27.2	15.8	44.5	55.5
Manufacture of Radar and Broadcasting Equipment	55.5	14.0	60.3	39.7	30.8	15.0	46.5	53.5
Manufacture of Computer	62.0	13.6	66.2	33.9	31.1	13.9	50.3	49.7
Manufacture of Electronic Component	63.5	12.1	67.7	32.3	25.3	19.1	41.0	59.0
Manufacture of Household Audiovisual Apparatus	64.1	12.2	67.4	32.6	30.4	17.1	46.3	53.7
Manufacture of Other Electronic Equipment	32.3	15.7	40.7	59.3	18.1	25.7	31.7	68.3
Manufacture of Measuring Instruments	50.3	18.6	55.2	44.8	17.4	25.3	32.8	67.2
Manufacture of Machinery for Cultural Activity & Office Work	58.8	12.4	63.5	36.5	23.6	14.4	41.6	58.4
Manufacture of Artwork, Other Manufacture	19.2	20.4	27.7	72.3	5.4	25.0	18.0	82.0
Scrap and Waste	10.5	74.8	11.7	88.3	3.6	80.9	5.3	94.7
Total Merchandise	31.6	17.1	39.4	60.6	13.7	20.3	28.7	71.3

Appendix Table E Domestic and foreign value-added embodied in Chinese gross merchandise exports, in percent, 2002

	Split Method				HIY Method			
IO industry description	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added
Agriculture	2.9	64.8	6.2	93.8	1.9	65.4	6.2	93.8
Forestry	5.0	64.5	7.8	92.3	1.8	65.5	5.4	94.6
Logging and transport of timber and bamboo	5.6	60.7	8.3	91.7	2.8	60.7	7.0	93.0
Animal Husbandry	2.6	45.3	5.8	94.2	1.2	45.7	5.6	94.4
Fishery	2.3	54.8	6.2	93.8	1.6	55.0	6.7	93.3
Technical services for agriculture, forestry, livestock and fishing	24.6	47.8	26.8	73.2	2.3	54.8	7.3	92.7
Mining and Washing of Coal	2.3	56.9	5.9	94.2	3.3	56.9	8.6	91.4
Extraction of Petroleum and Natural Gas	5.0	69.5	7.5	92.5	2.9	71.1	6.6	93.4
Ferrous metal ore mining	8.6	46.3	12.7	87.3	5.6	46.3	11.9	88.1
Non-ferrous metal ore mining	11.9	38.5	17.7	82.3	5.0	39.9	13.8	86.2
Salt mining	5.1	63.6	7.9	92.1	2.6	63.9	7.5	92.5
Non-metal minerals and other mining	20.0	37.8	24.2	75.9	4.7	44.6	12.3	87.7
Grain mill products	50.5	13.4	52.4	47.6	3.0	20.1	8.7	91.3
Forage	19.8	16.4	23.8	76.2	5.9	18.1	12.4	87.6
vegetable oil refining	32.0	17.5	34.9	65.1	4.6	21.7	10.7	89.3
Sugar manufacturing	65.6	12.8	66.8	33.2	3.2	31.2	8.7	91.3
Slaughtering and meat processing	17.5	14.6	20.6	79.4	2.2	16.1	7.9	92.1
Fish and fish productions	12.1	20.3	16.0	84.0	2.4	24.9	8.3	91.7
All other food manufacturing	16.0	23.2	20.5	79.5	5.1	26.8	12.7	87.4
Wines, spirits and liquors	19.7	35.7	22.9	77.1	2.8	40.7	8.6	91.4
Soft drink and other beverage	17.8	28.4	22.7	77.3	4.5	31.7	13.1	86.9
Tobacco products	5.5	72.8	6.7	93.3	0.7	76.3	2.6	97.4
Cotton textiles	18.9	20.5	24.3	75.7	8.5	23.7	18.6	81.4
Woolen textiles	36.4	18.4	40.0	60.1	6.3	23.5	14.9	85.1
Hemp textiles	20.4	21.4	25.7	74.3	5.1	23.6	14.1	85.9
Textiles productions	19.5	24.1	24.6	75.5	10.7	26.0	21.3	78.7
Knitted and crocheted fabrics and articles	22.0	26.3	27.1	72.9	10.3	27.9	21.0	79.0
Wearing apparel	30.1	22.1	34.4	65.6	10.5	27.1	20.9	79.2
Leather, fur, down and related products	32.3	15.7	36.1	63.9	13.5	20.5	23.5	76.5
Products of wood, bamboo, cane, palm, straw	21.7	24.8	27.2	72.8	8.2	27.8	17.3	82.7
Furniture	43.9	21.1	47.5	52.5	7.8	26.4	18.1	81.9
Paper and paper products	46.1	21.0	48.9	51.1	7.2	29.5	15.5	84.5
Printing, reproduction of recording media	67.2	23.6	68.1	31.9	5.6	42.0	13.9	86.1
Stationary and related products	40.2	21.8	44.2	55.8	8.4	26.9	19.6	80.4
Toys, sporting and athletic and recreation products	43.9	23.7	47.5	52.5	10.9	31.8	21.4	78.6
Petroleum and nuclear processing	41.1	12.2	44.3	55.7	18.7	15.3	24.9	75.1
Coking	6.5	33.8	10.6	89.4	2.9	34.3	9.4	90.6
Basic chemicals	12.4	27.3	18.0	82.0	9.2	28.9	17.2	82.8
Chemical fertilizers	12.1	22.9	18.9	81.1	7.8	23.5	18.6	81.5
Chemical pesticides	19.8	24.9	27.1	72.9	12.7	25.7	23.3	76.7
paints, varnishes and similar coatings, printing ink and mastics	32.0	18.8	38.4	61.6	10.5	22.8	22.1	77.9
Man-made chemical products	37.4	14.9	44.8	55.2	13.5	21.6	25.9	74.1
Special chemical products	36.3	18.5	41.3	58.7	13.3	23.6	23.9	76.1
Chemical products for daily use	30.7	24.2	36.0	64.1	8.0	31.9	18.3	81.7
Medical and pharmaceutical products	16.6	34.3	20.9	79.1	5.3	38.7	12.5	87.5
Chemical fibers	26.5	19.1	34.3	65.7	13.8	21.6	26.4	73.6
Rubber products	48.5	20.5	51.1	48.9	7.3	27.7	15.6	84.4
Plastic products	60.0	15.9	63.4	36.6	14.6	25.1	27.9	72.1
Cement, lime and plaster	8.6	27.4	14.0	86.0	4.8	27.9	13.6	86.4

	Split Method				HIY Method			
IO industry description	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added
Glass and glass products	32.3	29.5	36.4	63.6	8.4	35.2	16.8	83.2
Pottery, china and earthenware	14.8	30.7	20.2	79.8	5.9	32.2	14.9	85.2
Fireproof materials	19.9	36.5	23.8	76.2	3.8	41.4	10.9	89.1
Other non-metallic mineral products	15.2	31.6	19.9	80.1	4.0	33.9	12.0	88.0
Iron-smelting	26.8	20.3	31.2	68.8	7.0	23.2	14.2	85.8
Steel-smelting	53.2	18.1	55.8	44.3	5.2	25.6	13.0	87.0
Steel pressing	11.3	24.2	17.7	82.3	5.0	26.5	13.8	86.2
Alloy iron smelting	41.5	21.9	45.2	54.8	7.1	27.3	15.4	84.6
Nonferrous metal smelting	42.6	17.1	46.4	53.6	7.4	22.0	15.9	84.1
Nonferrous metal pressing	46.5	12.6	50.7	49.3	9.2	16.9	20.4	79.7
Metal products	40.3	18.5	44.3	55.7	7.0	23.7	17.1	82.9
Boiler, engines and turbine	28.6	25.8	33.5	66.5	9.6	30.1	19.2	80.8
Metalworking machinery	16.5	30.2	21.9	78.1	8.1	32.2	17.7	82.3
Other general industrial machinery	27.3	21.8	32.4	67.6	7.5	27.5	18.0	82.0
Agriculture, forestry, animal husbandry and fishing machinery	21.4	26.2	27.1	72.9	6.7	28.8	16.9	83.1
Other special industrial equipment	28.9	21.9	33.6	66.4	9.3	27.4	19.2	80.8
Railroad transport equipment	24.5	25.7	29.9	70.1	7.4	28.4	17.5	82.5
Motor vehicles	36.2	19.6	40.7	59.3	6.1	26.4	17.2	82.8
Parts and accessories for motor vehicles and their engines	32.9	21.5	37.6	62.4	6.6	26.9	17.4	82.6
Ship building	82.2	15.2	82.5	17.5	12.7	23.8	23.1	77.0
Other transport equipment	39.7	20.5	44.2	55.8	10.9	25.0	22.3	77.7
Generators	52.4	14.4	55.7	44.3	10.5	23.5	21.4	78.6
Household electric appliances	74.6	11.1	76.2	23.9	10.5	23.9	23.0	77.0
Other electric machinery and equipment	38.8	16.4	43.9	56.2	9.9	24.4	21.8	78.2
Telecommunication equipment	86.8	7.3	87.5	12.5	24.2	23.5	37.9	62.1
Electronic computer	95.3	4.0	95.4	4.6	35.2	13.2	51.5	48.5
Other computer peripheral equipment	75.9	7.2	77.5	22.5	35.0	20.8	46.2	53.8
Electronic element and device	59.2	14.7	61.9	38.1	23.4	26.1	33.3	66.7
Radio, television and communication equipment and apparatus	71.1	10.7	73.0	27.0	34.6	19.4	45.6	54.4
Other electronic and communication equipment	52.3	24.6	54.7	45.3	31.7	26.0	40.2	59.8
Instruments, meters and other measuring equipment	47.6	22.4	50.5	49.5	14.6	32.1	24.3	75.7
Cultural and office equipment	74.8	9.1	76.7	23.3	40.0	10.6	56.8	43.2
Arts and crafts products	33.3	20.9	37.3	62.7	7.0	27.8	16.5	83.5
Other manufacturing products	45.7	21.5	48.7	51.3	6.9	28.6	16.3	83.8
Total Merchandise	42.5	19.7	46.1	53.9	15.0	26.0	25.4	74.6

Source: Authors' estimates.

Appendix Table F Domestic and foreign value-added embodied in Chinese gross merchandise exports, in percent, 1997

	Split Method				HIY Method			
IO industry description	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added
Crop cultivation	3.5	64.4	5.4	94.6	2.5	65.0	6.0	94.0
Forestry	3.9	72.5	5.2	94.8	1.4	73.3	3.7	96.3
Livestock and livestock products	4.0	49.1	6.0	94.0	2.7	49.6	6.3	93.7
Fishery	6.5	58.9	8.5	91.5	2.2	60.6	6.0	94.0
Other agricultural products	8.0	54.9	9.6	90.4	1.8	57.2	5.3	94.7
Coal mining and processing	1.7	51.4	4.2	95.8	3.7	51.4	9.2	90.8
Crude petroleum products	1.9	75.2	3.3	96.8	2.5	75.2	5.4	94.6
Natural gas products	2.5	54.2	5.3	94.8	4.5	54.2	10.2	89.8
Ferrous ore mining	6.8	33.7	10.6	89.4	8.4	33.7	16.0	84.0
Non-ferrous ore mining	9.1	34.9	12.3	87.8	4.4	36.1	11.5	88.5
Salt mining	3.0	59.7	5.0	95.0	2.1	60.0	7.3	92.7
Non-metal minerals and other mining	19.5	35.9	22.1	77.9	4.9	40.1	11.9	88.1
Logging and transport of timber and bamboo	7.0	60.1	8.6	91.4	2.4	62.1	5.9	94.1
Grain mill products, vegetable oil and forage	48.3	12.3	49.9	50.1	3.7	18.7	9.1	90.9
Sugar refining	80.1	11.0	80.5	19.5	3.3	18.7	9.1	90.9
Slaughtering , meat processing, eggs and dairy products	14.7	14.2	17.4	82.6	1.8	15.3	7.6	92.4
Prepared fish and seafood	12.3	19.7	14.8	85.2	1.1	25.1	6.0	94.0
Other food products	23.5	26.5	25.7	74.3	3.8	31.3	9.7	90.3
Wines, spirits and liquors	17.8	29.0	20.3	79.7	3.1	32.9	9.0	91.0
Non-alcoholic beverage	16.2	26.8	19.0	81.0	3.7	29.7	10.5	89.5
Tobacco products	8.1	52.1	9.8	90.2	2.0	55.8	5.8	94.2
Cotton textiles	35.4	23.0	37.3	62.7	8.5	28.3	18.2	81.8
Woolen textiles	57.8	19.0	58.7	41.3	5.8	33.5	12.3	87.7
Hemp textiles	28.0	24.7	30.1	69.9	6.3	27.9	12.5	87.6
Silk textiles	6.1	24.0	9.2	90.9	2.6	24.9	10.8	89.2
Knitted mills	25.4	26.2	27.5	72.5	9.0	28.1	18.5	81.5
Other textiles	49.0	16.8	50.4	49.6	5.7	25.9	11.6	88.4
Wearing apparel	34.5	28.0	36.1	63.9	6.8	36.1	15.3	84.7
Leather, furs, down and related products	49.5	15.7	50.9	49.2	11.6	22.6	20.6	79.4
Sawmills and fiberboard	21.1	26.9	23.6	76.4	6.4	30.5	13.3	86.7
Furniture and products of wood, bamboo, cane, palm, straw, etc.	38.6	20.8	40.6	59.4	7.3	26.3	16.4	83.6
Paper and products	49.3	20.9	50.6	49.5	5.3	29.4	12.4	87.7
Printing and record medium reproduction	66.2	21.1	66.8	33.2	6.3	37.4	13.6	86.4
Cultural goods	52.8	26.0	53.9	46.1	6.4	41.1	13.7	86.3
Toys, sporting and athletic and recreation products	57.8	20.7	58.8	41.2	10.2	27.9	20.0	80.0
Petroleum refining	50.0	14.4	51.6	48.4	15.2	22.0	20.3	79.7
Coking	5.4	22.7	8.6	91.4	2.5	23.0	9.7	90.3
Raw chemical materials	7.0	31.9	10.3	89.7	3.1	32.9	10.1	89.9
Chemical fertilizers	6.7	22.1	10.7	89.3	5.2	22.4	14.7	85.3
Chemical pesticides	21.7	20.4	25.4	74.6	4.9	23.0	14.6	85.4
Organic chemical products	17.3	20.2	21.3	78.7	8.6	22.2	18.3	81.8
Chemical products for daily use	37.3	27.2	39.4	60.6	4.5	37.8	12.3	87.7
Other chemical products	31.2	20.7	33.8	66.2	8.1	25.7	15.8	84.2
Medical and pharmaceutical products	16.8	32.7	19.3	80.7	3.0	36.9	9.5	90.5
Chemical fibers	61.6	14.0	63.1	36.9	14.8	23.3	25.2	74.8
Rubber products	52.0	16.0	53.4	46.6	8.6	25.0	17.1	82.9
Plastic products	66.8	14.6	67.9	32.1	12.9	24.3	23.6	76.4
Cement	5.2	23.6	8.8	91.2	3.9	24.0	12.7	87.3
Cement and asbestos products	47.6	19.0	49.4	50.7	2.4	26.8	11.1	88.9

	Split Method				HIY Method			
IO industry description	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added	Direct foreign value-added	Direct domestic value-added	Total Foreign value-added	Total Domestic Value-added
Bricks, tiles, lime and light-weight building materials	9.5	37.4	12.4	87.6	3.6	39.6	10.3	89.7
Glass and glass products	37.3	24.3	39.6	60.4	4.5	30.7	12.4	87.6
Pottery, china and earthenware	14.1	35.2	17.0	83.0	3.3	37.8	10.6	89.4
Fireproof products	9.3	27.3	12.7	87.3	3.6	28.5	11.6	88.4
Other non-metallic mineral products	18.7	27.5	21.8	78.2	3.0	30.9	10.6	89.4
Iron-smelting	79.8	13.8	80.1	19.9	5.7	22.3	12.9	87.1
Steel-smelting	67.3	16.8	68.2	31.8	3.9	23.7	11.6	88.4
Steel processing	61.2	12.3	62.8	37.3	5.9	21.0	15.1	84.9
Alloy iron smelting	43.6	17.0	46.1	53.9	5.5	21.4	14.2	85.8
Nonferrous metal smelting	35.5	15.8	38.1	62.0	4.6	19.5	12.5	87.6
Nonferrous metal processing	34.0	11.7	37.2	62.8	7.2	15.4	16.7	83.3
Metal products	31.5	18.6	34.3	65.7	5.9	23.3	15.4	84.6
Boiler, engines and turbine	29.9	28.3	32.6	67.4	7.4	34.6	15.5	84.5
Metalworking machinery	22.1	28.2	25.1	74.9	5.8	31.9	14.5	85.5
Other general industrial machinery	36.9	27.9	39.0	61.0	5.3	37.7	13.3	86.8
Agriculture, forestry, animal husbandry and fishing machinery	10.1	21.0	14.6	85.4	6.5	21.8	17.2	82.8
Other special industrial equipment	36.1	25.0	38.4	61.6	7.6	32.5	16.3	83.7
Railroad transport equipment	43.1	21.5	45.6	54.4	5.5	26.3	15.2	84.8
Motor vehicles	35.5	19.5	38.1	61.9	5.2	25.7	15.3	84.7
Ship building	78.7	15.6	79.1	21.0	8.1	28.7	17.6	82.4
Aircraft	33.3	38.8	35.3	64.7	23.5	42.4	28.0	72.0
Bicycle	73.8	11.5	74.8	25.2	6.5	18.8	18.0	82.0
Other transport machinery	38.5	20.3	41.2	58.9	6.2	27.4	16.3	83.7
Generators	73.6	14.2	74.3	25.7	7.9	26.2	17.8	82.2
Household electric appliances	74.1	12.8	74.9	25.1	8.7	26.3	19.7	80.3
Other electric machinery and equipment	69.7	12.4	70.9	29.2	9.0	19.7	20.0	80.0
Electronic computer	83.5	9.2	83.9	16.1	24.5	23.4	36.7	63.3
Electronic appliances	80.9	9.1	81.5	18.5	21.5	19.8	33.5	66.5
Electronic element and device	66.3	15.1	67.3	32.7	14.6	29.7	23.6	76.4
Other electronic and communication equipment	82.0	13.1	82.3	17.7	18.3	27.3	30.0	70.0
Instruments, meters and other measuring equipment	61.0	22.6	61.8	38.2	10.6	36.3	19.1	80.9
Cultural and office equipment	84.5	8.5	84.9	15.2	15.6	19.8	26.9	73.1
Arts and crafts products	42.1	21.0	43.9	56.1	6.1	29.8	14.2	85.9
Other manufacturing products	61.2	21.0	62.1	37.9	5.5	34.3	13.7	86.3
Total Merchandise	44.4	22.2	46.0	54.0	9.0	29.4	17.9	82.1

Source: Authors' estimates.