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Distinguishing the Processing Trade in the World Input-Output Table: A Case of China

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Abstract

Empirical studies show that the input structures of production for domestic use, processing trade and non-processing trade are significantly different for a specific product. For instance, the production for domestic use requires more imports than the production for processing trade. Studies based on national input-output tables have verified that a large bias could be caused in trade accounting if this heterogeneity is neglected. Therefore, distinguishing the processing trade is very important for countries with high shares of processing trade, such as China. As the prevalence of trade in value added and global value chain, many efforts have been made on compiling world input-output tables in recent years. As far as we know, however, all the well-known world input-output tables do not distinguish the processing trade. Considering the important role of China in international trade, this study attempts to distinguish China’s processing trade in the world input-output table and to investigate the effect of this treatment on accounting results. We choose 2007 world input-output table as an example. The world input-output table by product is obtained from the World Input-Output Database (WIOD) since its supply and use tables are published on the website. The information on processing trade is obtained from the so-called DPN input-output table of China and the General Administration of Customs of China. Finally, a preliminary input-output analysis is made on our extended 2007 world input-output table, and the results are compared with those calculated from the original world input-output table.

1. Introduction

A distinctive characteristic of China's international trade is regarding its high share of processing trade in total export. The processing trade highly accounts for 38.9% of China's total export in goods in 2013, although this share is decreasing in recent years. For a specific product, the input structures of production for domestic use, processing trade and non-processing trade are significantly different. For instance, the production for domestic use requires more imports than the production for processing trade. The production of processing trade thus has a relatively weaker linkage with domestic sectors and instead has a relatively stronger linkage with abroad sectors than the production of non-processing trade. To capture this important heterogeneity, Chen *et al*. (2001, 2012) proposed the so-called DPN input-output table for China. It is a product by product type national input-output table, and the products for domestic use (D), export for processing trade (P) and export for non-processing trade and others (N) are distinguished.

The inter-country linkages become more and more important in the context of growing international fragmentation of production. Many efforts have been made on compiling world input-output tables in recent years. A series of world input-output databases and tables have been constructed, such as Eora MRIO database, EXIOPOL, OECD-WTO TiVA database, and WIOD (Tukker and Dietzenbacher, 2013). As far as we know, however, all the well-known world input-output tables do not distinguish the processing trade, especially for countries with high share of processing trade such as China.

This study attempts to distinguish the processing trade of China in a world input-output framework and to investigate the accounting bias caused by the neglected heterogeneity of China's processing trade. The input-output information on processing trade is taken from the DPN input-output table of China. The world input-output table is taken from the above mentioned well-constructed World Input-Output Database (WIOD). WIOD covers 40 countries plus one "rest of the world (RoW)" and 35 industries, 59 products. For the time dimension, WIOD is organized in annual time series manner from 1995 to 2011. WIOD has the following advantages and they are also the reasons why WIOD is selected for this study. First, the database is open and has detailed compilation manual for researchers. Second, it has international supply and use tables (SUT), which can be used to derive the product by product world input-output tables, since the DPN input-output table of China is also a product by product type table. Third, it has social-economic account and environmental account which can help to carry out many extended studies.

The remaining content is organized as follows. Section 2 introduces the procedure of constructing product by product world input-output table based on international SUTs. Section 3 introduces the procedure of distinguishing the processing trade based on the product by product world input-output table. Section 4 investigates the accounting bias caused by the neglected heterogeneity of China's processing trade and non-processing trade. Section 5 concludes.

2. The construction of product by product world input-output table

As the Chinese DPN input-output table is a product by product type table, the same type of world input-output table is required. WIOD only publishes the industry by industry world input-output table instead of the product by product type. Nevertheless, the product by product type table can also be obtained based on a set of international SUTs for 40 countries published by WIOD. Different from the national SUT, the international SUT for a specific country further distinguish the use of country-specific import based on the information on bilateral trade.

We first give a general description on the procedure of constructing the product by product type table. The detailed procedure is introduced later on. Frist, merge the international SUTs for 40 countries to obtain the world SUT. Second, transform the world SUT into basic product by product type world input-output table based on technology assumption. In this basic world input-output table, rest of the world (RoW) is treated as an exogenous country, as there is no international SUT for it. Third, model the RoW to be an endogenous country based on the basic world input-output table and balance the table to obtain the final analytical product by product world input-output table.

2.1 Construct the basic product by product world input-output table

The product by product world input-output table can be derived from the world SUT based on technology assumptions. The world SUT can be constructed by merging the international SUTs which is available in WIOD. The detailed construction procedure for world SUT is introduced in Timmer *et al.* (2012). We should notice that there is no international SUT for RoW, so we treated RoW as an exogenous country in the world SUT as well as the following derived basic world input-output table.

There are two frequently used assumptions for the transformation of product by product type symmetric input-output table from SUTs (Eurostat, 2008). The first assumption is the so-called *product technology* assumption. It assumes that each product is produced in its own specific way, irrespective of the industry where it is produced. The second assumption is the so-called *industry technology* assumption. It assumes that each industry has its own specific way of production, irrespective of its product mix. Although the product technology assumption is more plausible than the industry technology assumption from the empirical perspective, it suffers from matrix inversion issues, for instance the negative value and rectangular SUT problems. However, these issues will not occur if the industry technology assumption is used. We therefore choose the industry technology assumption for the transformation. The model is introduced as follows.

The product by product input coefficient matrix $\mathbf{A}$ for 40 countries is

$$\mathbf{A} = \mathbf{CD}$$

Where $\mathbf{C}$ is the product by industry input coefficient matrix derived from the "use" part of the world SUT. It indicates the input of each product per unit gross output of an industry. $\mathbf{D}$ is the market share matrix derived from the "supply" part of the world SUT. It indicates the contribution of each industry to the output of a product.

In the same sense, the product by product import coefficient matrix from the RoW $\mathbf{A}^m$ and value added coefficient matrix $\mathbf{A}^v$ can be derived as

$$\mathbf{A}^m = \mathbf{MD}$$

$$\mathbf{A}^v = \mathbf{VD}$$

Where $\mathbf{M}$ is the product by industry import coefficient matrix. It indicates the input of each product imported from the RoW per unit gross output of an industry. $\mathbf{V}$ is the disaggregated value added coefficient matrix by industry. It indicates the value added in terms of each type of primary factor contained in per unit gross output of an industry.

The intermediate delivery matrix, import matrix from RoW and value added matrix are derived from multiplying the corresponding coefficient matrix by the product-specific gross output vector listed in the "supply" part of the world SUT. The product-specific final demand part is already available in the "use" part of the world SUT.

The export to RoW for each country in the world SUT is obtained by deducting the exports to other 39 countries covered by WIOD from the total export of each country. Therefore, it is possible that some negative exports to RoW are yielded. We take a similar procedure as Timmer (2012) to treat these negative values. The negative exports are set to zero and meanwhile the exports to RoW by the same industries in other countries are proportionally lowered. By this treatment, the negative values are removed and meanwhile the total import of RoW from other 40 countries does not change. After the negative value adjustment, an unbalanced table is yielded. We further apply the RAS procedure to the trade blocks of countries to rebalance the table based on the assumption that the negative exports to RoW are caused by the error in the bilateral trade statistics.

2.2 Construct the analytical product by product world input-output table

As there is no international SUT for RoW, RoW is treated as an exogenous country in the basic world input-output table. To construct the analytical world input-output table in which the RoW is also endogenized, we need to model RoW separately.

There are four blocks needed to model for RoW, the product-specific gross output and value added, the use of import from 40 countries (including intermediate use and final use), the final use of RoW produced product in RoW, as well as the intermediate use of RoW produced product in RoW.

The product-specific gross output of RoW is derived from multiplying the industry-specific gross output vector by the product-mix matrix of RoW. We use the average product-mix matrix of Brazil, Russia, India, China, Indonesia and Mexico (BRICIM) as an approximation of the product-mix matrix of RoW. The industry-specific gross output vector is available in the industry by industry type world input-output table in WIOD.

The product-specific value added part is derived from multiplying the product-specific value added coefficient matrix with a diagonal matrix of product-specific gross output. The product-specific value added coefficient matrix can be obtained from multiplying the industry-specific value added coefficient matrix by the market share matrix of RoW. The industry-specific value added matrix is calculated based on the industry by industry type world input-output table in WIOD. The average market share matrix of BRICIM is used as an approximation of the market share matrix of RoW.

The use of import from 40 countries is derived from distributing the total import of RoW to the intermediate use of each product's production and the final use of each final demand category by using the sales structure of import from each country. The import of RoW from country A is the export of country A to RoW which is already available in the constructed basic product by product world input-output table. The sales structure of import from each country in RoW is obtained by using the average sales structure of import from each country in BRICIM countries.

The final use of RoW produced product in RoW is derived from multiplying the industry-specific final use of RoW produced product in RoW by the product-mix matrix of RoW. The industry-specific final use of RoW produced product in RoW is available in the industry by industry world input-output table in WIOD. The average product-mix matrix of BRICIM is used as an approximation of the product-mix matrix of RoW.

The intermediate use matrix between RoW sectors is derived from multiplying the estimated input coefficient matrix between RoW sectors by a diagonal matrix of the already obtained product-specific gross output. The input coefficient matrix between RoW sectors is initially estimated by using the average domestic input coefficient matrix of BRICIM.

Finally, a GRAS (Junius and Oosterhaven, 2003; Temurshoev, 2013) procedure is applied on the intermediate use matrix between RoW sectors as well as the use of import in RoW. After the balancing procedure, the analytical product by product world input-output table is constructed.

3. Distinguish China's processing trade in the world input-output table

The Chinese DPN input-output table is shown in Table 1. It can be seen that unlike the ordinary national input-output table, the input-output data in the DPN table consists of three parts, D, P and N. D, P, and N denote the production for domestic use, production for the exports of processing trade and non-processing trade, and the production by foreign-invested enterprises for domestic demand (called the exports of non-processing trade and others for brevity), respectively. As the input-output data in the Chinese DPN table consists of three parts, each China related cell in the world input-output table is also required to split into three parts. Nevertheless, some of the split parts are zeros according to the definition of DPN. For instance, the part of D in the intermediate use and final use of other countries are zeros, since this part is solely used for domestic use rather than export.

<Insert Table 1>

The main information used for cell split is the share of D, P and N of related input-output variables calculated based on the Chinese DPN table as well as the export and import data by countries and trade types. Conveniently, we first give the relevant shares used in this compilation.

The shares calculated based on the Chinese DPN table are as follows

For product *j*, the share of D and N in the gross output for domestic use

$$xs_j^D = \frac{x_j^D}{x_j^N + x_j^D - f_j^{NE}}, \quad xs_j^N = \frac{x_j^N - f_j^{NE}}{x_j^N + x_j^D - f_j^N}$$

For product *j*, the value added coefficient of D, P and N

$$a_j^{vD} = \frac{v_j^D}{x_j^D}, a_j^{vP} = \frac{v_j^P}{x_j^P}, a_j^{vN} = \frac{v_j^N}{x_j^N}$$

The share of D, P, and N in the domestic intermediate input of product *i* to the production of product *j*

$$zs_{ij}^{ol} = \frac{z_{ij}^{ol}}{\sum_o \sum_l z_{ij}^{ol}}, (o, \quad l = D, \quad P, \quad N)$$

The share of D, P, and N in the intermediate input of imported product *i* to the production of product *j*.

$$zs_{ij}^{Ml} = \frac{z_{ij}^{Ml}}{\sum_l z_{ij}^{Ml}}, \quad (l = D, \quad P, \quad N)$$

The share of D and N in final demand on domestic product *j* (export is excluded).

$$ys_j^N = \frac{y_j^N}{y_j^N + y_j^D}, \quad ys_j^D = \frac{y_j^D}{y_j^N + y_j^D},$$

$$(y = consumption, \quad capital \;\; formation, \quad inventory)$$

The share of P in total export of product *j*

$$es_j^P = \frac{f_j^{EP}}{f_j^{EP} + f_j^{EN}}$$

The shares calculated based on the export data of China by countries and trade types are as follows[1]

The share of P in the export of China to each trade partner used for consumption, capital formation and intermediate use

$$es_j^{Pqk} = \frac{f_j^{EPqk}}{f_j^{EPqk} + f_j^{ENqk}} ,$$

$$(k = Trade\ Partner\ ,\quad q = consumption,\ \ capital\ \ formation,\ \ intermediate\ use\ )$$

Next, we split the China related cell in the world input-output table into D, P and N three parts based on the above shares to obtain the initial estimation of related cells in the world input-output table with distinguished processing trade of China.

The gross output of P for product j wx_j^P

$$wx_j^P = we_j * es_j^P * \frac{\sum_j f_j^{EP}}{\sum_j we_j * es_j^P}$$

Where we_j is China's export of product j calculated from the original product by product world input-output table. It is the sum of product j used in other countries including intermediate use and final use.

The gross output of D for product j wx_j^D

$$wx_j^D = (wx_j - we_j) * xs_j^D$$

Where wx_j is the gross output of product j in the original product by product world

[1] According to the UN BEC classification, the product-specific processing trade and non-processing trade export of China to each trade partner is classified to product for consumption, capital formation and intermediate use, respectively. The reclassified export data is further matched to the input-output sector by using a match table between HS6 code and input-output tables.

input-output table.

The gross output of N for product j wx_j^N

$$wx_j^N = (wx_j - we_j) * xs_j^N + we_j(1 - es_j^P)$$

The value added of D, P and N for product j

$$wv_j^o = wx_j^o * vs_j^o, \quad (o = D, \ P, \ N)$$

The domestic input cells for the production of D, P and N

$$wz_{ij}^{ol} = wz_{ij}^D * zs_{ij}^{ol}, \quad (o, \quad l = D, \quad P, \quad N)$$

Where wz_{ij}^D are the figures in China's domestic input cells in the original product by product world input-output table.

The final demand of China on D and P produced domestic products

$$wy_j^o = wy_j * ys_j^o,$$

$$(o = D, \quad N, \ y = consumption, \quad capital \ formation, \quad inventory)$$

Where wy_j is China's final demand on domestic products in the original product by product world input-output table.

The intermediate input of imported product from each country to the production of D, P and N

$$wz_{ij}^{Mkl} = wz_{ij}^{Mk} * zs_{ij}^{Ml}, \quad (k = Trade\ Partner, \quad l = D, \quad P, \quad N)$$

Where wz_{ij}^{Mk} is the intermediate input of imported product i from each country to the production of product j.

China's export of processing trade used as intermediate input in other countries

$$wz_{ij}^{EPk} = wz_{ij}^{Ek} * es_i^{Pkq}, \quad (k = Trade\ Partner)$$

Where wz_{ij}^{Ek} is China's export of product *i* used as intermediate input by sector *j* in country *k*; q here represents intermediate use.

China's export of non-processing trade used as intermediate input in other countries

$$wz_{ij}^{ENk} = wz_{ij}^{Ek} - wz_{ij}^{EPk}\ , \quad (k = Trade\ Partner)$$

China's export of processing trade used as final demand in other countries

$$wy_{i}^{EPkl} = wy_{i}^{Ekl} * es_{ij}^{Pkl}\ , \quad (k = Trade\ Partner, \quad l = consumption, \quad capital\ \ formation)$$

Where wy_{i}^{Ekl} is China's export of product *i* used as final demand in country *k*.

China's export of non-processing trade used as final demand in other countries

$$wy_{i}^{ENkl} = wy_{i}^{Ekl} - wy_{i}^{EPkl}\ , \quad (k = Trade\ Partner, \quad l = consumption, \quad capital\ \ formation)$$

A two-stage RAS procedure is applied on the following initially estimated cells, China's domestic intermediate input matrix (D, P and N), China's import matrix (D, P and N), China's final demand on domestic product (D and N), intermediate use and final use of China's export in other countries (P and N). This procedure consists of two stages. First, apply the RAS procedure on the initially estimated cells. Second, aggregate the cell to obtain the world input-output table without split D, P and N, and proportionally adjusted to equal the related cell in the original product by product world input-output table. Repeat these two stages and finally obtain the balanced table.

4. Accounting bias

4.1 Models

The value added of other country generated by China's final demand as well as China's value added generated by other country's final demand is calculated by using the following formulae.

In the framework of the original world input-output table, the value added of country *k* generated by the final demand of China can be expressed as

$$v_k = \mathbf{a}_k^{v}{}'(\mathbf{I}-\mathbf{A})^{-1}\mathbf{f}_c \quad (1)$$

Where $\mathbf{a}_k^v$ is a value added coefficient vector with product specific value added coefficient in country k related entries and zeros in the remaining entries; $\mathbf{I}$ is an identity matrix; $\mathbf{A}$ is the world input coefficient matrix; $\mathbf{f}_c$ is the final demand vector with product specific final demand (including consumption and investment) in China related entries and zeros in the remaining entries.

China's value added generated by the final demand of other country can be expressed as

$$v_c = \mathbf{a}_c^{v}{}'(\mathbf{I}-\mathbf{A})^{-1}\mathbf{f}_k \quad (2)$$

Where $\mathbf{a}_c^v$ is a value added coefficient vector with product specific value added coefficient in China related entries and zeros in the remaining entries; $\mathbf{f}_k$ is the final demand vector with product specific final demand (including consumption and investment) in country k related entries and zeros in the remaining entries.

The bilateral trade balance in terms of value added generated by final demand between China and country k thus can be calculated as $v_c - v_k$.

In the framework of world input-output table with distinguished DPN, the formulae are similar with Formula (1)-(3). The difference is that China related entries in the value added coefficient vector and final demand vector consist of D, P and N, three parts. The world input coefficient matrix is also expanded by splitting China related cells into D, P and N.

4.2 Comparison

The results calculated based on the original world input-output table and the world input-output table with distinguished DPN are listed in Table 2 and Table 3. Table 2 gives the results on the value added of other country generated by the final demand of China based on the above two types of world input-output tables as well as their difference. It also gives the results on China's value added generated by the final demand of other country based on the above two types of world input-output tables as well as their difference. Table 3 gives the results on bilateral trade balance in terms of value added generated by final demand between China and each country. The results are also calculated based on two types of world input-output table. Their difference is reported in the last two columns of Table 3.

<Insert Table 2>

<Insert Table 3>

Table 2 shows that both the value added of other country generated by the final demand of China and the value added of China generated by the final demand of other country would be overestimated if the production of processing trade is not distinguished. On average, the value added of other country generated by China's final demand would be overestimated around 15% and the value added of China generated by the final demand of other country would be overestimated around 10%. For the important trade partners of China, the value added of Japan, Korea, Taiwan and USA generated by China's final demand would be overestimated by 12.3%, 16.7%, 9.5% and 10.4%, respectively; meanwhile, the value added of China generated by the final demand of the above mentioned four countries would be overestimated by 19.9%,20.9%, 24.2% and 14.9%, respectively.

The reason for the overestimated value added of other country generated by China's final demand is that a large part of China's final demand are produced by production for domestic use (D) which depends less on the import than the other two production types (P and N). Therefore, if the processing trade is not distinguished, the linkage between production for domestic use (D) and abroad sectors will be overestimated and thus leads to an overestimated value added of other country. In the same sense, if the processing trade is not distinguished, the linkage between production for processing trade as well as non-processing trade and domestic sectors would be overestimated and thus lead to an overestimated value added of China generated by the final demand of other country.

As the value added of other country and China are both overestimated, the sign of the effect on trade balance is not obvious. Table 3 shows that if the production for processing trade is not distinguished, the bilateral trade balances between China and

Germany, Japan as well as Korea would be significantly underestimated. Meanwhile the bilateral trade balances between China and Taiwan as well as USA would be significantly overestimated. As a whole, the trade balance between China and other countries in the world would be overestimated.

5. Conclusions

The input structures of production for domestic use, processing trade and non-processing trade are significantly different. The production for domestic use depends less on imports than the production for processing trade. Distinguishing this heterogeneity is also important for value added accounting in the context of world input-output table.

We split China related cells in the product by product world input-output table into production for domestic use, production for processing trade and production for non-processing trade based on the information from the Chinese DPN input-output table as well as the import and export data by countries and trade types. The product by product world input-output table is derived from the international SUTs available in WIOD.

We further investigate the value added accounting bias caused by the neglected heterogeneity of the above mentioned three types of production. The value added of a country generated by the final demand of another country and the bilateral trade balance in terms of value added generated by final demand are calculated by using the world input-output tables with and without distinguished processing trade. The result shows that both the value added of China generated by the final demand of other countries and the value added of other countries generated by China's final demand would be significantly overestimated if the production for processing trade is not distinguished. For the bilateral trade balance between China and other countries, on the one hand, the trade balance between China and some countries such as Germany, Japan as well as Korea would be significantly underestimated; on the other hand, the trade balance between China and some other countries such as Taiwan and USA would be significantly overestimated. The implication for this finding is that it is important to distinguish China's processing trade in the world input-output table if the value added of China generated by the final demand of other country, the value added of other country generated by China, as well as the bilateral trade balance in terms of value added are concerned.

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Table 1 The Chinese DPN input-output table

<table>
<tr><td colspan="3" rowspan="2"></td><td colspan="3">Intermediate use</td><td colspan="5">Final use</td><td rowspan="2">Total output or import</td></tr>
<tr><td>D</td><td>P</td><td>N</td><td>Consumption</td><td>Gross capital formation</td><td>Export</td><td>Other capital</td><td>Total of final use</td></tr>
<tr><td rowspan="6">Input</td><td rowspan="3">Input of domestic products</td><td>D</td><td>Z^{DD}</td><td>Z^{DP}</td><td>Z^{DN}</td><td>F^{DC}</td><td>F^{DI}</td><td>0</td><td></td><td>F^{D}</td><td>X^{D}</td></tr>
<tr><td>P</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td><td>F^{PE}</td><td></td><td>F^{P}</td><td>X^{P}</td></tr>
<tr><td>N</td><td>Z^{ND}</td><td>Z^{NP}</td><td>Z^{NN}</td><td>F^{NC}</td><td>F^{NI}</td><td>F^{NE}</td><td></td><td>F^{N}</td><td>X^{N}</td></tr>
<tr><td colspan="2">Imports</td><td>Z^{MD}</td><td>Z^{MP}</td><td>Z^{MN}</td><td>F^{MC}</td><td>F^{MI}</td><td></td><td></td><td>F^{M}</td><td>X^{M}</td></tr>
<tr><td colspan="2">Value-added</td><td>V^{D}</td><td>V^{P}</td><td>V^{N}</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="2">Total input</td><td>X^{D}</td><td>X^{P}</td><td>X^{N}</td></tr>
</table>

Table 2 Value added accounting result (original table vs. table with distinguished DPN)

Unit: million dollars

Country	Value added generated by China's final demand				China's value added generated by the final demand of each country			
	Original table (a1)	Table with distinguished DPN (b1)	Absolute difference	Relative difference	Original table (a2)	Table with distinguished DPN (b2)	Absolute difference	Relative difference
AUS	20788	18474	2314	12.5	23524	21424	2100	9.8
AUT	3275	2808	468	16.7	4659	4178	481	11.5
BEL	4592	4008	584	14.6	6237	5554	682	12.3
BGR	183	155	28	18.4	704	615	89	14.4
BRA	8990	7923	1067	13.5	10930	10220	710	7.0
CAN	12231	10504	1726	16.4	28408	26134	2274	8.7
CYT	38	33	5	15.4	361	329	31	9.5
CZE	1250	1077	173	16.1	3213	2951	261	8.8
DEU	44548	38374	6174	16.1	51198	46687	4511	9.7
DNK	2572	2258	315	13.9	3538	3218	320	9.9
ESP	9969	9395	575	6.1	21963	20510	1453	7.1
EST	160	139	21	14.8	545	507	38	7.5
FIN	3127	2759	368	13.4	3448	3204	244	7.6
FRA	13196	11546	1650	14.3	27978	25823	2155	8.3
GBR	18200	16156	2044	12.7	35790	33003	2786	8.4
GRC	538	459	80	17.4	3501	3206	294	9.2
HUN	1042	917	125	13.6	2031	1857	174	9.4
IDN	8769	7527	1242	16.5	8662	7849	812	10.4
IND	8096	6971	1124	16.1	25130	23778	1353	5.7
IRL	2116	1817	300	16.5	3793	3560	232	6.5
ITA	12181	10268	1913	18.6	22038	20095	1943	9.7
JPN	81897	68310	13587	19.9	80441	71633	8808	12.3
KOR	37157	30743	6414	20.9	35627	30524	5103	16.7
LTU	242	219	24	10.8	488	440	47	10.7
LUX	994	883	111	12.6	705	661	44	6.7
LVA	119	105	14	13.0	351	325	26	7.9
MEX	3108	2718	391	14.4	14120	12803	1317	10.3
MLT	243	232	11	4.5	232	212	19	9.1
NLD	9166	8452	714	8.4	13002	11517	1485	12.9
POL	1865	1592	273	17.1	7104	6547	557	8.5
PRT	2032	1935	97	5.0	1850	1700	150	8.8
ROU	539	461	78	16.8	2200	2041	159	7.8
ROW	156780	133691	23089	17.3	25153	23181	1972	8.5
RUS	14517	12405	2112	17.0	1393	1300	93	7.2
SVK	598	539	58	10.8	452	405	47	11.6

SVN	267	231	36	15.7	5069	4748	321	6.8
SWE	5359	4783	576	12.0	9389	8526	863	10.1
TUR	1338	1145	193	16.8	9043	8086	957	11.8
TWN	26071	20998	5074	24.2	243387	222305	21082	9.5
USA	70103	61033	9069	14.9	222605	201609	20996	10.4

Note: the absolute difference is calculated as a1-b1 and a2-b2, respectively; the relative difference is calculated as (a1-b1)/b1*100 and (a2-b2)/b2*100, respectively.

Table 3 The trade balance in terms of value added generated by final demand (original table vs. table with distinguished DPN)

Unit: million dollars

Country	Trade balance c1 (c1=a2-a1)	Trade balance c2 (c2=b2-b1)	Absolute difference	Relative difference
AUS	2737	2950	-214	-7.2
AUT	1383	1370	13	1.0
BEL	1645	1546	99	6.4
BGR	521	461	60	13.1
BRA	1940	2297	-356	-15.5
CAN	16178	15630	548	3.5
CYT	323	296	26	8.8
CZE	1962	1875	88	4.7
DEU	6651	8313	-1663	-20.0
DNK	966	961	5	0.5
ESP	11994	11115	879	7.9
EST	385	368	17	4.7
FIN	320	445	-125	-28.0
FRA	14782	14277	506	3.5
GBR	17590	16848	742	4.4
GRC	2962	2747	215	7.8
HUN	989	940	49	5.2
IDN	-107	323	-430	-133.3
IND	17035	16806	228	1.4
IRL	1676	1744	-68	-3.9
ITA	9857	9827	29	0.3
JPN	-1456	3323	-4779	-143.8
KOR	-1531	-220	-1311	597.0
LTU	245	222	24	10.7
LUX	-289	-222	-67	30.1
LVA	232	220	12	5.4
MEX	11012	10085	926	9.2
MLT	-11	-20	9	-44.1
NLD	3836	3065	771	25.2
POL	5239	4955	284	5.7
PRT	-182	-235	53	-22.5
ROU	1661	1579	81	5.1
ROW	-131627	-110511	-21117	19.1
RUS	-13124	-11106	-2018	18.2
SVK	-146	-134	-12	8.6
SVN	4802	4517	285	6.3

SWE	4030	3743	287	7.7
TUR	7706	6941	764	11.0
TWN	217316	201307	16009	8.0
USA	152502	140576	11926	8.5

Note: the absolute difference and relative difference are calculated as c1-c2 and (c1-c2)/c2*100, respectively.