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Some notes on international transport margins in a balanced World Input-Output Tables

Martin Lábaj

Abstract

In this paper we analyze the international transport margins based on the data from World Input-Output Tables. First, we discuss the differences between national and international input-output tables. Then we analyze the share of international transport margins on total imports. Finally, we discuss the possibilities to make use of World Input-output tables for an analysis of illicit capital flows in the world economy. We conclude that we should be skeptical with respect to estimation of illicit capital flows from World Input-Output Tables but we suggest using World Input-Output Tables for an estimation of potential consequences of illicit capital flows obtained from other sources on real economy.

Keywords:

World input-output tables, International transport margins

JEL classification: C14, F10

1 Introduction

In this chapter, we deal with methodological aspects of the derivation and construction of consistent and balanced system of World Input-Output Tables (WIOT). These tables cover the most important economies in the world together with one specific region (Rest of the world – RoW) for other countries. They provide a detailed information on the flow of goods and services among the industries within a given economy, as well as on the trade with intermediate and final demand goods across the countries. Their construction was based on official statistics. National supply and use tables were used as the main data source for the information about the flows of goods and services in national economy. While United Nations (UN) trade statistics was the main data source for the bilateral flows of goods and services across borders. Though the focus of the construction of WIOT was to understand the global patterns of trade in goods and services that go beyond the simple statistics, the authors had to cope with the fact that there is a mismatch in the bilateral trade statistics of imports and exports. In World Input-Output Tables, the value of export of specific commodity from country A to country B must equal the value of import of this commodity in country B from country A. As will be apparent later, this equality must hold because of the nature of WIOT. This transaction is captured in WIOT as one element of the bilateral trade matrix, so it must have the

same value. To obtain balanced WIOT, several balancing steps must be accomplished. International transport margins then balance the overall production of given industry in particular country.

2 World Input-Output Database

World Input-Output Tables are part of wider World Input-Output Database (WIOD) that was originally prepared by a group of researchers from several institutes and financed by the European Commission by a 7th Framework project. The first version was released in 2013¹. The release of WIOD from 2013 covers 40 countries and a model region for the rest of the world, for the period 1995 – 2011. Data are classified according to the International Standards of Industrial Classification (Rev. 3) into 35 sectors and tables adhere to the 1993 version of the System of National Accounts (SNA). Updated release from 2016 covers 43 countries and one region for the rest of the world. Data are classified according to International Standard of Industrial Classification (Rev. 4) and tables adhere to the 2008 version of the SNA.

3 Input-Output Tables: from national to world systems

Multiregional input-output tables extend national input-output tables in several dimensions. Their key contribution consists in detailed and balanced statistics on trade with goods and services across borders, with focus on country of origin and final destination. In national input-output tables, these flows are aggregated into the total imports and exports by industries. Typical national input-output table is shown in Table 1. It consists of three main blocks which are: i) intermediate consumption matrix, ii) final use matrix and iii) value added matrix. Intermediate consumption matrix captures the flows of domestic intermediate goods and services across industries in national economy². Final use matrix shows the final destination of goods and services. They can either be consumed domestically by households, non-profit organizations, government, or they can be invested. The rest is exported abroad. The imports are tracked in two separate parts. The first part is an input to production. These are the imports of firms for further processing and production of goods and services. The rest of imports are direct imports for final consumption. The value added consists of payments to primary factors and shows the wages, profits and consumption of fixed capital by industries. The sum of rows and columns in national input-output table equals total production. By definition, the sum in each row must equal the sum in corresponding column.

¹ World Input-Output Database is freely available at <http://www.wiod.org/home>.

² There are two versions of intermediate consumption matrix. The one described above is usually labeled as an intermediate consumption matrix in Version B and captures solely the flow of domestic goods and services as described above. Intermediate consumption matrix in Version A consists of elements which capture the value of domestic and imported goods and services used as intermediate products for further processing.

Table 1 Schematic national input-output table

	Industry	Final use		Total
Industry	Intermediate consumption	Domestic final use	Exports	Total output
	Imports	Imports		
	Value added			
	Total output			

Source: Author.

In national input-output tables, the trade with goods and services captures only its industrial structure without the information on country of origin or destination. Thus, the vector of exports consists of goods and services exported by domestic economy to the whole world. Detailed international trade statistics has to be used in order to construct international input-output tables. It allows us to break down the information on exports and imports by countries of origin and destination. Because of the nature of input-output tables, one more step is necessary in order to construct international input-output tables and that is a detailed information on the use of imported and exported goods and services. Some of them are imported (exported) for further processing and thus belong to intermediate consumption matrix. Other goods are traded directly for final use in particular countries. Schematic world input-output table is shown in Table 2. There are three regions Country A, Country B and rest of the world (RoW) that trade with each other with intermediate consumption goods and services and final goods. This table provides detailed information on trade with intermediate goods and final goods. Intermediate consumption matrix traces the use of domestic goods in matrices on the main diagonal. Other elements represent the trade with intermediate goods and services. More formally, it is the flow of goods and services from industry i originated in region r to industry j in destination region s . Similarly in final demand matrix we can distinguish between the use of the final products in domestic economy and in particular foreign regions. The income of primary factors entered in the vector of value added by industries and regions. In order to derive balanced tables, one has to take into account that imports are valued in cif prices and exports are valued in fob prices. International transport margins represent the differences between them. Detailed procedure used in WIOD project in order to derive the vector of International transport margins can be found in (Timmer et al, 2012).

Table 2 Schematic world input-output table

		Country A Intermediate Industry	Country B Intermediate Industry	RoW Intermediate Industry	Country A Final domestic	Country B Final domestic	RoW Final domestic	Total
Country A	Industry	Intermediate use of domestic output	Intermediate use by B of exports from A	Intermediate use by RoW of exports from A	Final use of domestic output	Final use by B of exports from A	Final use by RoW of exports from A	Output in A
Country B	Industry	Intermediate use by A of exports from B	Intermediate use of domestic output	Intermediate use by RoW of exports from B	Final use by A of exports from B	Final use of domestic output	Final use by RoW of exports from B	Output in B
RoW	Industry	Intermediate use by A of exports from RoW	Intermediate use by B of exports from RoW	Intermediate use of domestic output	Final use by A of exports from RoW	Final use by B of exports from RoW	Final use of domestic output	Output in RoW
		Value added	Value added	Value added				
		International transport margins	International transport margins	International transport margins				
		Output in A	Output in B	Output in RoW				

Source: Author.

The procedure used in order to derive international transport margins in a balanced World Input-Output Tables is based on several steps. Each step requires some methodological assumption and modelling techniques with a focus to derive balanced international IO tables. It is based on manipulating original data from official data sources with standards techniques and assumption made in similar studies. Thus, one should not try to get some new insights on illicit capital flows between countries based on the differences in bilateral export and import statistics among trading partners.

4 International transport margins

The share of international transport margins on total imports in Slovakia as well as corresponding values for international transport margins from the trade with intermediate goods and final goods are presented in Table 3. Total international transport margins increased from 752 mil. USD in 2000 to 5074 mil. USD in 2014.

Table 3 International transport margins in Slovakia, WIOT, 2000 – 2014

	TOTAL International Transport Margins, mil. USD	International Transport Margins, trade with intermediates, mil. USD	International Transport Margins, trade with final goods, mil. USD	International Transport Margins, share on imports %
2000	752,1	499,4	252,7	7,18
2001	906,7	549,0	357,7	7,19
2002	1057,8	641,5	416,3	7,34
2003	1373,8	869,6	504,3	7,00
2004	1848,0	1161,1	686,9	6,71
2005	2233,3	1399,7	833,6	6,71
2006	2916,0	1934,3	981,7	6,90
2007	4036,6	2757,4	1279,2	7,14
2008	5494,1	3894,3	1599,8	8,00
2009	3919,7	2818,2	1101,5	7,42
2010	4147,3	2970,0	1177,4	6,95
2011	4132,4	2855,5	1276,9	5,70
2012	4226,8	2979,0	1247,8	6,04
2013	4681,3	3345,2	1336,1	6,32
2014	5074,5	3678,5	1395,9	6,77

Source: World Input-Output Tables, author's calculations.

The total increase in international transport margins was in line with an increase of overall imports to Slovakia. The share of international transport margins was quite stable with a peak in 2008 at 8 %. It decreased from values above 7 % at the beginning of 2000s to 5,7 % - 6,32 % in 2011 – 2013 period. In 2014 it represented 6,77 % of total imports in Slovakia.

Table 4 International transport margins, % of imports, WIOT

	2000	2005	2010	2014
AUS	7,08	7,26	7,46	6,71
AUT	6,25	5,80	6,06	4,90
BEL	6,50	6,86	5,93	4,81
BGR	6,05	5,58	6,09	5,49
BRA	6,07	6,39	5,83	6,14
CAN	6,89	6,81	6,71	6,52
CHE	5,41	5,32	5,19	4,37
CHN	7,62	8,41	7,91	8,04
CYP	5,33	4,33	4,47	3,57
CZE	6,96	6,90	6,78	6,62
DEU	5,57	5,89	6,17	5,72
DNK	5,36	5,17	5,02	4,61
ESP	5,42	5,69	6,70	6,93
EST	6,31	5,73	5,76	5,09
FIN	6,12	5,61	4,94	5,00
FRA	6,75	6,27	6,09	5,60
GBR	5,80	5,46	5,96	5,61
GRC	5,73	5,93	6,98	7,07
HRV	7,29	6,75	6,20	6,71
HUN	6,74	6,36	5,32	5,49
IDN	6,95	5,97	7,13	7,20
IND	6,42	5,96	8,38	8,86
IRL	3,45	3,22	2,40	1,94
ITA	6,32	5,33	6,32	5,59
JPN	7,16	6,27	8,03	8,06
KOR	7,90	7,31	8,23	8,14
LTU	5,46	6,41	8,52	7,85
LUX	2,56	2,16	1,44	1,10
LVA	5,74	6,08	5,32	4,60
MEX	9,46	8,73	8,66	7,47
MLT	4,18	3,47	2,28	1,54
NLD	4,16	3,41	3,99	5,04
NOR	6,27	5,92	5,63	5,34
POL	4,62	6,05	5,82	6,14
PRT	6,46	6,30	6,85	6,35
ROU	8,25	7,63	8,06	6,34
RUS	5,71	5,03	6,47	5,81
SVK	7,18	6,71	6,95	6,77
SVN	6,59	6,57	6,41	5,61
SWE	5,35	5,40	5,19	4,87
TUR	4,51	7,42	7,60	7,37
TWN	7,19	7,18	7,87	7,73
USA	5,42	6,29	5,95	5,34

Source: World Input-Output Tables, author's calculations.

International transport margins for chosen years for other countries included in World Input-Output Tables are presented in Table 4. With some exceptions, international trade margins are in a range from 4 % - 9 %. This is in line with general notion of typical international trade margins. On the other side, these data do not shed new light on illicit financial flows among countries.

5 Summary

In this paper, we analysed the World Input-Output Tables with a specific focus on international transport margins. The aim of the paper was to contribute to the discussion held under the project APVV with a special focus on illicit financial flows in global economy and its consequences for a Slovak economy. Brief analysis of World Input-Output Tables showed that international transport margins in these tables are derived from other primary data sources after several steps of manipulation in order to derive balanced international input-output tables. Further considerations are analysed in Streicher – Stehrer (2013). Thus, we should not expect to get new insights about illicit financial flows from these tables. On the other side, they provide a useful tool for an analysis of real consequences of capital flows on Slovak economy considering the linkages with other economies via trade with intermediate products and final goods and services.

6 References

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