

Implementation of ESA 2010/SNA 2008 into Czech Input-Output Tables

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Abstract

The paper deals with the implementation of new national accounts' standards ESA 2010 and SNA 2008 into Czech input-output tables. The revision of EU member states' national accounts is planned for 2014 and since September 2014 all published figures should be based on the new methodology. Input-output tables are significantly affected by major methodical changes such as processing in foreign trade, capitalisation of expenditures on research and development and military assets. We joined the changes from the methodology with significant improvements of recording services in foreign trade, mainly resident and non-resident purchases. All changes are implemented into supply and use tables and finally reflected in symmetric input-output tables. Deflation techniques have to be altered in order to follow changes in methodology and provide reliable time series in constant prices. Unfortunately, the changes given by the new or updated methodology are rather important and it means that input coefficients are affected significantly.

1. Introduction

The implementation of the changes given by the update of the System of National Accounts 2008 (SNA 2008) and its European modification European System of Accounts 2010 (ESA 2010) represent the most important change in economic statistics in recent years. These changes affect all parts of national accounts covering both sector accounts and input-output tables. Theoretically very well prepared concepts are very hard for practical implementation and it would have need time for statistical authorities. Nevertheless, it was decided to implement ESA 2010 in the EU by September 2014. Since not all issues are deeply investigated, preparation of countries for ESA 2010 is very different country to country. Moreover, not all European countries have implemented ESA 1995 fully and have many other difficulties. The difference between theoretical foundations and practical possibilities of majority statistical agencies around the world is going to increase sharply. This will probably lead to higher inconsistencies between countries' gross domestic product and other indicators.

Unfortunately, input-output tables (IOTs) are very affected by the update of statistical systems. This is very unpleasant situation for the researchers that use IOTs for their studies and research. The positive feature of the updated system is that the consistency between supply and use tables (SUTs) and sector accounts remained. It means that symmetric input-output tables (SIOTs) that are based on SUTs will be significantly changed due to several important changes. From the SUTs/SIOTs perspective, the most important changes contain:

- a. Ownership principle of foreign trade
- b. Capitalisation of expenditures on research and development (RaD)
- c. Capitalisation of military expenditures

All three categories will have impact on technical coefficients (both input and output coefficients). There are also other methodological points that may influence SIOTs like insurance services but the impact is not significant.

Besides the changes given by ESA 2010, the Czech Statistical Office (CZSO) has decided to improve statistics of consumption of non-residents within the Czech Republic. Since we prefer compilation of

SUTs/SIOTs¹ in national concept, consumption of non-residents is an important part of export of services.

2. Ownership Principle in Foreign Trade

The change of the concept of foreign trade covers three main categories – re-exports, processing and merchanting. The concept that originally lies behind these changes is the complete adoption of the principle change of ownership between residents and non-residents. Unfortunately, it was not prepared very well for SUTs/SIOTs. All three categories will lead the decrease of quality of SUTs/SIOTs because of neglecting technical issues and emphasizing accounting principles.

Re-exports have to be a part of SUT/SIOTs. It means that exports of selected products can exceed their output. Since this has an important for deflation, we calculate all matrices (output, output for domestic use, imports for domestic use etc.) without re-exports. The results including re-exports are prepared at the final steps and therefore we are able to provide SUTs without re-exports. It is assumed that imports for re-exports are recorded in inventories and subsequently these inventories are exported with trade margin (output of a trader).

The updated concept of processing means that there will be no imputation of foreign customers' material into intermediate consumption and into output. Only processing fee is exported or imported. In practice it means that output can occur without intermediates. For example, if a non-resident owner of oil orders production of fuel in the Czech Republic, Czech refinery industry will produce services (transformation of crude oil into fuel) without consumption of crude oil. This has significant impact on import matrix and different interpretation of input coefficients has to be taken into account.

Recording of merchanting is completely confusing for SUTs/SIOTs users. According to SNA 1993 / ESA 1995, trading services abroad are recorded as exports of trade margin that was in line with domestic concept of trade. According to SNA 2008 / ESA 2010, trading activities abroad will be recorded on the export side of traded products. For example, the purchase of fruits in Italy by Czech company is recorded as negative exports of agriculture products in Czech SUTs/SIOTs. Subsequent sale of the products in Germany is recorded as positive exports in SUTs/SIOTs. Practically, exports can be negative now and the users will have to get use for different interpretation of foreign trade that is far from the physical movements of goods.

The impact on aggregated intermediate consumption matrix (ICM) for 2011 describes following Table 1. The main difference in intermediate consumption is observed for textiles, clothes and footwear. The reason is clear; a decrease is caused by exclusion of imputed intermediates connected with processing. Similarly decline in intermediates of CPAs CI, CJ and CK is associated with processing. Changes in other products are not so significant.

Table 1: Impact of changes on intermediates in manufacturing, 2011, %

CPA	Label	Change
CA	Food and tobacco products	6.0
CB	Textiles, clothes and footwear	-23.9
CC	Wood and paper products	-1.2
CD	Coke and petroleum products	1.4
CE	Chemical products	-3.5
CF	Pharmaceutical products	2.6
CG	Rubber, plastic and glass products	-1.7
CH	Basic and fabricated metals products	-3.0
CI	Computer, electronic products	-5.1
CJ	Electrical equipment	-9.3

¹ More details can be found in Sixta (2013)

CK	Machinery	-15.9
CL	Transportation equipment	-0.4
CM	Furniture and other manufactured good	-9.6

Source: Own elaboration

New categories of foreign trade are being estimated now. Table 2 shows provisional estimates for 2011. Export of merchanting is 9 mil. EURs though purchases and sales are not neglected (e.g. purchases are 9 739 mil. EURs in 2011). Moreover, export of merchanting is negative in some years (purchases are higher than sales) that causes negatives in export. It leads to negative output of trade margin in supply table however there is no negative element in output matrix because standard (positive) output of trade margin of other uses prevails. On the other hand import of merchanting (also called negative merchanting) is positive it means that non-residents generate positive trade margin. We suppose that this service is used in intermediate consumption. The amount of re-exports is significant because of developed warehousing services and territorial location of the Czech Republic.

Table 2: Provisional estimates, 2011, mil. EUR

Category	Export	Import
Merchanting	9	298
Processing	509	105
Re-exports	8 882	8 598

Source: Own elaboration

3. Capitalisation of Research and Development

Recording of intellectual products will be changed with the update of SNA/ESA significantly. The most important are expenditures on RaD that are currently regarded as investments. There are two main impacts on SUTs/SIOTs. The first consists in the change of recording of purchased RaD services, they are moved from intermediate consumption into gross fixed capital formation. The second consists in capitalization of own-produced RaD. Together both effect are reflected in SIOTs in a following way:

- a. Decrease of intermediates of CPA 72 and increase of GFCF. The increase of GFCF is higher than decrease of IC because GFCF includes also own-account production of RaD.
- b. Decrease of government consumption of education services. Since lots of government owned universities provide both education and research, their output will be split between education services (other non-market output) and output of RaD (output for our final use in GFCF).

Beside ICM and government consumption, it has an impact on export and import of services. Purchases and sales of the sole right to use RaD results (classified as an asset in national accounts) should be recorded as export and import of services (RaD). The over impact on Czech GDP is more than 1.5 % in 2011.

4. Capitalisation of Military Expenditures

Military expenditures are classified as investment according to updated national accounts standards. The theory behind suppose that weapons (even stored and not used in the battle) provide services of defence. Therefore depreciation (consumption of fixed capital) represents the part of this non-market service. Weapons are usually purchases by government and therefore this issue has two impacts on SUTs/SIOTs. At first, government intermediate consumption will be decreased and in the same way both government output and final consumption expenditures. The purchases of weapons will be treated as gross fixed capital formation. The second effect is connected with consumption of fixed capital (CFC). Since CFC for government sector is a part of output, it will lead to increase of GDP. This change will probably slightly change international comparisons between countries because bigger and more powerful countries usually invest more into weapons than smaller ones like the Czech Republic.

5. Non-resident Consumption Expenditure

The statistics of non-residents purchases is important for complex recording in national accounts; the consumption of non-residents in the Czech Republic affects export of goods and services (ESA 2010). The data on exports of goods services of non-residents are divided into two categories – purchases of foreign workers (business travel) and individual tourism (personal travel). This breakdown allows for closer links with tourism satellite accounts as well as SUTs. (IMF, 2009).

Non-resident workers represent economic entities, living and working in the Czech Republic less than one year. This category also includes the cross-border workers, seasonal workers, foreign students studying in the Czech Republic, foreigners working at the Czech embassies abroad (Šimková and Sixta, 2012). The CZSO distinguishes the foreigners by economic activity (employees, entrepreneurs, economically non-active persons) and by country of origin. This breakdown is crucial because of slightly different behaviour even within each group (e.g. a difference between students or between foreigners from EU and third countries).

Business travel covers goods and services acquired for personal use by persons whose primary purpose of travel is for business (IMF, 2009). These consumption expenditures are estimated according to the structure of the expenditures of Czech households within the Czech Republic (COICOP classification) and subsequently expertly adjusted for each group. New approach is being prepared now. It is obvious that structure of expenditures of non-residents may be a bit different to structure of households in the Czech Republic therefore structure has to be adjusted. Previously this adjustment was based on expert's opinion. This method has been improved and adjustment is now based on data from the research project that was conducted in 2010 with the aid of the Institute of Sociology of the Academy of Sciences of the Czech Republic (ISAS). This project was focused on labour migration, incomes, consumption expenditures, savings and remittances of several nationalities in the Czech Republic (Leontiyeva, Tollarová, 2011). Consumer behaviour of migrants from other countries has to be expertly estimated on the basis of similarity with selected countries. On this basis, groups of countries were created representing clusters with similar behaviour in terms of consumption.

Exports of services of personal travel comprise expenditures of foreign persons arriving to the Czech Republic for purposes different to business. Their transactions were carried out in Koruna (Czech currency). Data on purchases of foreign tourists are taken over from the Balance of Payments compiled by the Czech National Bank. The CZSO estimates of purchases for each group individually broken down by CPA classification.

Table 3 shows the structure of non-residents' consumption expenditures in 2011 and the share on GDP. Tourism takes the largest part but even business travels and employees' expenditures form significant part, as well.

Table 3 Non-resident's consumption expenditures in 2011 (mil. EUR)

2011	Consumption expenditures	% of GDP
Total non-residents	5 338	3.43
Business travels	695	0.45
Employees	507	0.33
Students	178	0.11
Personal travels	4 643	2.99

Source: Own elaboration

6. Conclusion

Revision of national accounts standards (SNA 2008 and ESA 2010) brought extremely large changes to the measurement of economy. Besides the mentioned changes covering foreign trade, research and development and military expenditures, lots of other issues will significantly change the level and structure of GDP and that will be reflected in SUTs/SIOTs. One of the changes consists in the different approach to fixed assets that will cause increase of GDP. The over impact on GDP is assumed between +4-5% in 2011. Changes in SUTs/SIOTs structures will cause problems to our users. Technical coefficients based on updated SIOTs (according to ESA 2010) and derived multipliers may have slightly different interpretation mainly because of change in recording of processing.

Like other statistical institutes, implementation of ESA 2010 by September 2014 provided us a opportunity to improve and update other national accounts estimates. With respect to our users, we do not want change published figures very often². The most important changes in internal procedures comprise mainly estimates of non-resident consumption expenditures, dwelling services and changes in non-observed economy.

One of the key problems of implementation of ESA 2010 in the EU is that not all countries will implement updated standard immediately. It means that some countries will provide new figures based on ESA 2010 but older figures will be based on ESA 1995 by 2020. After 2020, time series for all countries should be fully based on ESA 2010 but by this date, the international comparability will be reduced.

7. References

Eurostat. European System of Accounts – ESA 1995. Luxembourg, Eurostat, 1996.

European Commission. European System of Accounts ESA 2010. Luxemburg: Eurostat. 2013.

IMF. *Balance of Payments and International Investment Position Manual*. Sixth Edition (BPM6). Washington, D.C.: International Monetary Fund, 2009.

Leontiyeva Y., Tollarová B.. „Šetření cizinců o jejich příjmech, výdajích a remitencích. Závěrečná zpráva z výzkumu.“ Projekt finančně podpořený Českým statistickým úřadem (č. s. 113/2010) Praha: Sociologický ústav AV ČR, v.v.i. 2011.

Sixta, Jaroslav. Development of Input-Output Tables in the Czech Republic. *Statistika*, 2013, 93, n. 2, pg. 4–14.

Sixta, J., Vltavská, K., Fischer, J. The Development of Gross Domestic Product in the Czech Republic and Slovakia between 1970 and 1989. *Ekonomický časopis*, 2013, 61, n. 6, pg. 549–562.

Šimková, M., Sixta, J. The development of the consumption of pensioners in the Czech Republic. In: *Applications of mathematics and statistics in economy*. Liberec, 30.08.2012 – 01.09.2012. Praha: *Oeconomica*, 2012, s. 1–12.

United Nations. *System of National Accounts 1993 – SNA 1993*. New York: UN, 1993.

United Nations. *System of National Accounts 2008 – SNA 2008*. New York: UN, 2010.

² Revisions of standards and their impacts on the measurement of Czech economy is discussed in Sixta et al. (2013)