

**27th International Input-Output Conference**  
**Glasgow, Scotland, June 30 – July 05, 2019**

**Compilation of foreign trade data having regard to the impact of globalisation in Hungarian SUT**

Mária Forgon and Éva Varga

[maria.forgon@ksh.hu](mailto:maria.forgon@ksh.hu) and [eva.varga2@ksh.hu](mailto:eva.varga2@ksh.hu)

Hungarian Central Statistical Office

**Abstract**

The SUT is an integrated part of the National Accounts compilation in Hungary. In the frame of this integrated system special attention is made to the compilation of export and import data having regard to the impact of globalisation. The aim at this paper is to describe the most recent improvement in this field. An integrated approach has been worked out to construct the export and import of goods and services using the data from different and incomplete sources. The main used data sources are the databases of the foreign trade flows of goods at the most detailed level of Combined Nomenclature (CN) and of services by EBOPS nomenclature cross classified with the exporting and importing industries and with the different type of transaction (normal flows, foreign trade reported by non-resident VAT registrations, subcontracting, re-imports, re-exports, merchanting, factoryless production).

The first part of our paper gives an overview on the methodological aspects and the data sources.

The second part of our paper focuses on the solutions of problems raised during the estimation of exports and imports according to the national concept.

This improvement has an important role following the principle of change of economic ownership as required by ESA 2010 in national accounts.

### ***Main feature of the new compilation system***

The most recent improvement in the field of SUT integration was the “Integration of SUT/IOT (SUIOTs) framework into the National Accounts (NA) compilation” has been concluded.

The integration was one of the strategic elements of NA developments. The aim of this project was improving the quality of the National Accounts and reducing processing risk of compilation. The integration of SUT into the National Account compilation process has got a lot of methodological and practical advantages. Consistency and coherency for production and expenditure approaches are achieved through an integrated supply and use framework. The main characteristic feature of this system is the detailed product breakdown and the different layers of valuation.

In our system there are 822 product groups (rows). The economic activity classification applied in the system is an aggregated version of NACE Rev.2 at two or three digit level, specifying 137 industries. In the use side the Final consumption expenditure of households is grouped by COICOP containing 119 headings. Final consumption expenditure of government is divided into three categories: the value of goods and services produced by general government itself other than own-account capital formation and sales; purchases by general government of goods and services produced by market producers that are supplied – without any transformation – to the households (as social transfers in kind); collective consumption expenditure. Final consumption expenditure of NPISHs is subdivided into two groups. The breakdown of the gross fixed capital formation is based on the types of asset.

### ***The main data sources***

#### **The most important sources of the Supply table at current prices:**

- a) the data of the ‘KABtár’ that is Common Database for SBS (Structural Business Survey) statistics and NA estimation (in this database the data from statistical survey and tax data from administrative sources are reconciled),
- b) sales composition data of questionnaires of the structural business statistics survey,
- c) PRODCOM survey data of industrial production, production and sales (domestic and export) data by detailed product level,
- d) agricultural production data from the Economic Accounts for Agriculture (EAA) and the commodity balances,

- e) data of the annual statistical survey of construction activity, data on construction output by purpose (investments, reconstruction) and by type of constructions,
- f) data of the following activities: telecommunication, tourist accommodations and services, computer and related services, research and development services, cultural activity, sewage and refuse disposal services, water supply, district heating,
- g) survey data of research and development services,
- h) output of the government sector broken down by functional tasks in details,
- i) output of the financial corporations sector,
- j) data of the sector of the non-profit institutions,
- k) estimation of the output of the household sector,
- l) data on imports from database of foreign trade in goods (Extrastat and Intrastat - database by CN code of product and by importer classified to branches), imports of services from the statistical survey by EBOPS,
- m) administrative data sources (corporate tax declaration, profit and loss accounts and VAT return).

**The most important sources of the Use table at current prices:**

- a) input data on the structure of the intermediate consumption from statistical survey,
- b) the structure of the expenditure of government institutions from the budgetary reports,
- c) data collection of branch statistics related to the intermediate consumption structure of the agricultural activity,
- d) statistical questionnaire for the cost structure of the financial corporations (estimation for the cost structure of intermediate consumption of the own-account construction of dwellings by households and for the imputation of the own-account housing services by owner-occupiers,
- e) the energy consumption data from the energy balance,
- f) household final consumption in detailed groups of commodities (household final consumption expenditure, the agricultural production for own final use, social transfers in kind, the balance of tourism expenditure),
- g) tourism expenditures of residents abroad and non-residents in Hungary,
- h) collective consumption at detailed level,
- i) data of the investment statistics by main types of asset and by investor activities, data of annual survey of investment structure detailed by product type of assets,
- j) data on the inventory statistics broken down into own produced and purchased goods,

- k) data on exports from database of foreign trade in goods (Extrastat and Intrastat - database by CN code of product and by exporter classified to branches), export of services from statistical survey by EBOPS,
- l) data on the needed value added components (compensation of employees, other taxes on production, other subsidies on production, consumption of fixed capital),
- m) internet sites of big enterprises, of supervisory bodies, authorities, professional associations and chambers.

**The most important sources of the valuation matrices:**

- a) the turnover data on the trade activities, the turnover data of multi-yearly survey according to SBS broken down by the CPA classification of trade at 6 digit level (CPA 45 Wholesale and retail trade of motor vehicles and motorcycles; CPA 46 Wholesale trade services except 45; CPA 47 Retail trade services except 45, retail trade with breakdown by traded goods,
- b) data of the survey on the transport of goods in the field of railway, waterway, pipeline and air transport, in the case of road transport of goods the use of data of the transport performances report in natural terms,
- c) VAT and excise duty rates by the law and items by corresponding commodities, other taxes on products and customs data from administrative sources for the calculation of the matrices of taxes and subsidies on products.

***The special feature of the SUT balancing process***

After checking, completing and correcting the data available from different basic sources, Supply and Use tables are filled up with primary data. At first the supply and use sides are not balanced. The central part of the SUT compilation is the balancing process that means a process of searching, finding and correcting errors in initial data. Balancing requires the compilation of additional matrices – trade and transport margins, taxes on product, subsidies on product, VAT - beyond the basic tables, because the supply side of the balances in general are filled with basic price data, whereas the use side with purchasers' price data. During the balancing process a lot of plausibility, consistency checking, checking of movement of the variables over time and different cross-checking are made depending on the characteristics of products and the level of inconsistency. The applied working balancing procedure is the column-row-column method. First step is to fill up the initial input data into the system column-wise. In the second step the data are 'adjusted' in row-wise only, and at the same time, the data in column-wise are 'untouched'. The large discrepancies between the supply and use side in row-wise are

analysed and discussed between the integrator and statisticians responsible for the data under discussion. In case of bigger inconsistency the possible errors and estimation problems discussed with the statistician responsible for preparing the basic data. The balancing means mainly manual balancing with technical support. When a variable is changed by the integrator all dependent variables are recalculated automatically by the software. The balancing procedure is repeated in an iterative manner in it each of iterations uses the result from the preceding one as a starting point. In principle every cell - any variables except the conceptually balanced items - in the tables can be changed in the balancing process. The row-wise balancing by product could result an unacceptable changes in column-wise. The third step is checking and correcting these changes in the columns that resulted in unacceptable changes in GVA by activity. At the very last step when only minor mathematical imbalances remain the RAS algorithm are used to make the “fine-tuning”.

**Special feature of the balancing process** is that some part of cross-checking is carried out at individual reporting unit level. These are the following:

Comparison and analyses of data on net sales coming from different data sources at enterprise level and estimation of sale structure by product,

Check on the items including the transition from private accounting and administrative concepts to ESA concepts in the ‘KABtár’ (Common SBS-National accounts database) for the big enterprises,

Comparison and analyses of the data on export sales and structure available from different sources at enterprise level (Export sales from database of foreign trade statistics (goods by CN and services by EBOPS); Export sales from Annual statistical survey of industrial production (export of own produced product by ITO (classification of industrial products and services) export from other activity together; total export and from them separately the inward processing work; Export sales from tax reports; Export sales from VAT declarations),

Comparison and improvement of structure of intermediate consumption (IC) based on questionnaire with structure of direct imports by product at reporting unit level taking into account that import can used for own purposes (IC, GFCF) or can be sold or stored as well,

Iterative analysis and validation of ratio of the intermediate consumption to the output by activity after row-wise balancing by products,

For cross-checking purpose some data from branch statistics are used for validation of household final consumption expenditure figures especially when the questionnaires contain information about the direct sale to households (electricity, gas, water supply, sewerage, district heating and hot water),

For cross-checking of household consumption expenditure figures additional data sources on products subject to excise duties are used for example: administrative natural quantity data on alcoholic beverages, tobacco, fuels from National Tax and Customs Administration of Hungary; administrative data on excise tax revenue from the budget; administrative data on excise tax amount payed by enterprises at individual level,

For cross-checking of GFCF especially its assets' structure detailed data are used from annual survey of investment structure and they are confronted with data on import and output for domestic market for capital goods,

Confronting data on supply for domestic uses (output+imports-exports) and the corresponding domestic expenditure by detailed product level taking into account the valuation (both side are valued at same valuation concept),

Comparison of supply data on trade margin with the amount calculated from expenditure side applying the estimated trade margin ratio,

Comparison of initial taxes and subsidies by product with the taxes and subsidies estimated from expenditure side.

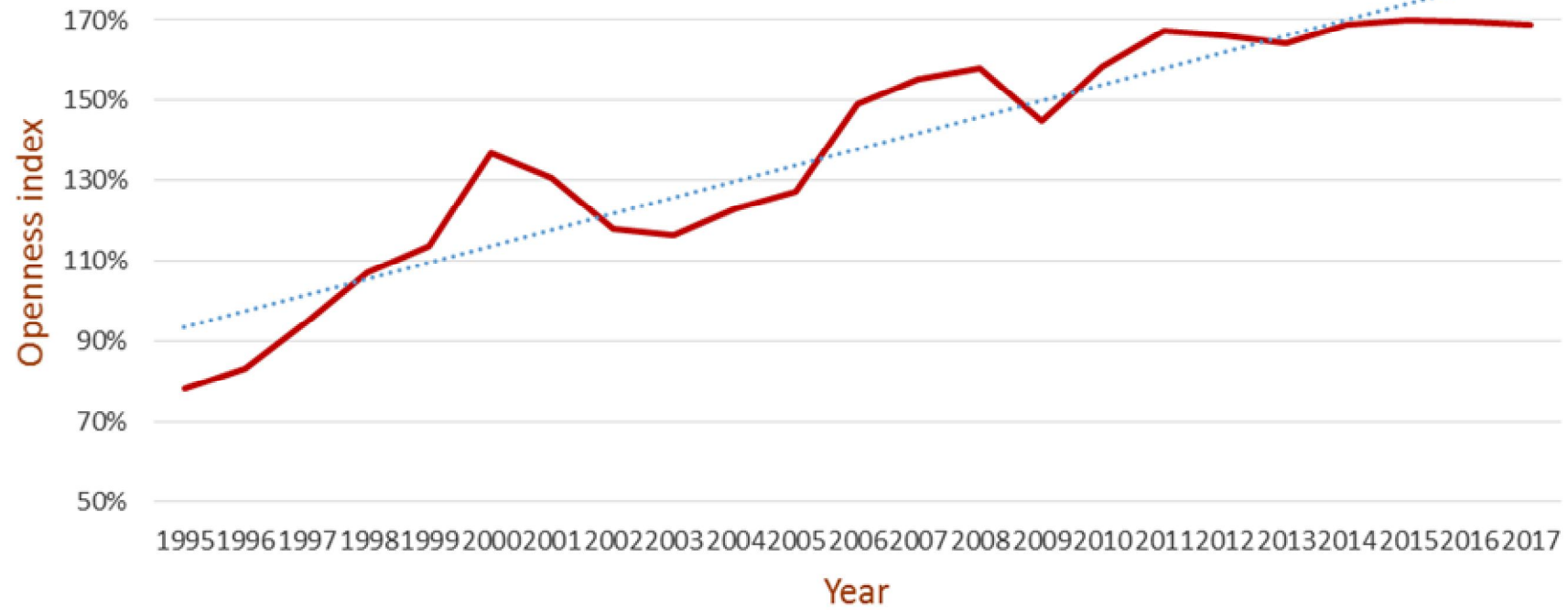
During the balancing process we realised a relatively big discrepancies between the supply and use side compering the domestic output and foreign trade data. By the balancing of several product rows of the SUT there was found that the value of export is much higher than the value of output in the production side (taking into account the trade margin on exports and the re-exports and merchanting as well). The export figures reported in foreign trade showed a very dynamic increase, but the production statistics did not reflect that growth. These inconsistencies drew attention to examining the foreign trade data in a greater detail.

### ***The impact of globalisation in measuring and balancing of the foreign trade data by national concept in SUT***

Globalisation means the growing interdependence of the world's economy, enhancing interconnectedness and integration by increasing cross-border trade in goods and services, technology transfer and flows of investment and information. The impact of globalization is very complex and wide-ranging. Globalisation has had the effect of increased international trade. Hungary is a small and open economy. By now Hungary has achieved a high degree of globalization.

The following diagram describes the trade openness index for Hungary, from 1995 to 2017.

Openness index, Hungary 1995-2017



The trade openness index is calculated as a ratio of total trade (the sum of exports and imports) to the GDP. This index is a very simply variable but it indicates the level of integration because it captures all outgoing and incoming transactions. It is said that the higher the index the larger the influence of international trade on the domestic economy. In this paper we focus on the statistical measuring problems due to the globalization only. Globalisation affected the national accounts also by changing the availability, quality and completeness of data sources used for estimating the export and import figures based on changes of economic ownership concept.

The main data source of exports and imports figures in NA is the foreign trade statistics produced by External Trade Statistics Department of HCSO (Hungarian Central Statistical Office). Foreign trade in goods statistical database contains the all data collected through Intrastat and Extrastat systems. The main data source for exports and imports of goods between members States of EU is the Intrastat data collection. For the estimation of exports and imports of goods with third countries the customs declarations are used (Extrastat system).

Foreign trade statistics data on exports and imports of goods are available for SUT at the individual level of reported units broken down by:

- main activities of the unit at four-digit level of NACE Rev.2 classification;
- traded goods at eight-digit level of Combined Nomenclature (CN),
- nature of transaction code (NoT: determining the different characteristics of international flows of goods ) at two digits,
- partner country code.

The main data sources of exports and imports of services are the quarterly survey on international trade in services (except tourism). For tourism there are two border surveys - one for non-residents visiting Hungary and another one residents travelling abroad - and the tourism demand quarterly survey. Originally the foreign trade statistics are based on cross-border movements and are compiled according to the "Community concept", containing the 'quasi transit trade' as well. Several adjustments are made in order to estimate the data according to national concept (change of economic ownership concept) needed in the NA. Implementing the new standards – ESA 2010 - for compiling NAs there were some changes related to globalisation. Two of them concern the recording of international trade transactions: goods sent abroad for processing and merchanting.



### ***Goods sent abroad for processing***

In the case of goods sent abroad for processing raw materials and/or semi-processed goods are sent by a (principal) unit in country A to a (processor) unit in country B, where they are transformed in a substantive way. Minor transformation such as packaging, repackaging of goods or relabelling of the good in other official language are not regarded as processing. Over the course of the transformation process, the principal maintains the economic ownership of the raw materials / semi-processed goods and final products. The principal pays the processor a fee for the processing work. In the new treatment – following the ESA 2010 rules - no cross border flows of goods are imputed for goods sent abroad for processing. Goods sent abroad for processing are no longer included in the import and export of goods. The processing fee is treated as a service and accounted under the manufacturing services on physical inputs owned by others. In the traditional way the final goods (processed goods) all returned to the principal. Nowadays the final goods are often sold abroad from the processing country and do not return to the country of origin. Goods sent abroad for processing may:

- return to the country of origin, where they may be further processed or sold by the principal,
- remain in the country of processing, sold by the processor in this country,
- exported further to the third country by the principal,
- combination of these main possibilities.

In Hungary the main data sources to measure the inward and outward processing is the trade in good statistics. In the external trade the processing is valued at gross method, in the National accounts only the processing fee is accounted as export and import services, namely manufacturing services on physical inputs owned by others. To identify the inward and outward processing the NoT code is used. In the case of processing of goods the codes 4 (Operations with a view to processing under contract (no transfer of ownership to the processor)) and 5 (Operations following processing under contract (no transfer of ownership to the processor)) provide useful information. The second digit gives information on the (expected) return of the goods after processing.

In case of NoT 4 this means:

- NoT 4.1: Goods expected to return to the initial country of export after processing;
- NoT 4.2: Goods not expected to return.

In case of NoT 5 this means:

- NoT 5.1 Goods returning to the initial country of export;
- NoT 5.2: Goods not returning to the initial country of export.

In the trade in goods statistics database the invoice values contains the manufacturing fees separately. Because of the various combination of the processing work in some cases the reported data on processing fee is incomplete. Both the two flows is analysed by the external trade statisticians and these data are corrected and completed at micro level. In the case of inward processing there is a possibility to compare the reported manufacturing fee from the external trade statistics with the manufacturing fee reported by the processor in the PRODCOM survey as exported manufacturing services to examine the similarities and differences between the two amounts.

In the case of outward processing the typical problem is the classification. The import of goods returned after processing is registered under the wrong CN code, namely that of the material inputs instead of the final goods.

In Hungary the inward processing is more important than the outward processing. In Hungary the following industries are affected by inward processing:

Processing fee by products and industries in case of inward processing, Hungary (2015)																
million HUF																
Industries	CA	CB	CC	CD	CE	CF	CG	CH	CI	CJ	CK	CL	CM	Other	TOTAL	
Products	10-12	13-15	16-18	19	20	21	22-23	24-25	26	27	28	29-30	31-32			
A	2	96												9	159	265
C10	3 383	1												9	7 205	10 598
C12	2 264															2 264
C13	8	8 315					159				1	259	464	6		9 213
C14		23 588					719						60	402		24 769
C15		14 479					25					289	50			14 843
C16-18	4	1	10 579						4	1	5		48	161		10 801
C19-20		192		336	10 491	2 889		2				13	18	8 419		22 360
C21					73	6 142									17	6 232
C22		191	223		1		3 202	69	41	21	3	1 039	358	92		5 239
C23		13					4 111				1	1 116	2			5 244
C24							1	1 150	17		186	608	12	86		2 060
C25		94			1		24	11 727	379	46	370	5 981	157	423		19 204
C26		26					17	122	30 596	452	4	492	5	4 068		35 782
C27		4					936	316	15 905	20 889	1 856	6 846	85	213		47 051
C28							103	7 958	2 229	3 344	23 620	4 078	104	1 648		43 085
C29			305				372	1 372	256	3 045	1 376	80 161	878	49		87 814
C30							20	2 234				113	3			2 370
C31		148						4 766	68			9	10 225	1		15 217
C32		394					2 198		118	76			30 112			32 899
TOTAL	5 660	47 848	10 802	336	10 565	9 031	11 887	29 715	49 613	27 874	27 424	101 004	42 599	22 950		397 309

A part of processing is concentrated in the law-technology industry, with a relative high number of small processors, with a limited amount of processing fee/unit. In the other parts of processing the number of enterprises that undertake processing is relatively few with a high amount of processing fee/unit.

The new treatment of goods sent abroad for processing has a great impact of the SUT in the industry and commodity account as well. We deal with only the inward processing because of its important in Hungary.

**In the industry account** the level and the product composition of output has been changed in the industries that involve in processing. The level and the structure of cost also changed. In theory the value added (and the labour input and capitals) remained the same but the IC and GVA ratio to output changed significantly.

**In the commodity account** the raw materials and semi-processed goods and the final products (processed goods) related to the processing are disappeared from the commodity account and as a new item the processing fee is appeared as an output on the supply side and as an export services in the use side.

We have difficulties in estimating the output and IC structure in the industries where the traditional producers are mixing with processors. This is why we distinguish the processing fee from inward processing in the level of our product classification used in the detailed SUT and we compile an additional matrix with the goods sent for processing outside the SUT.

#### **Factoryless goods producer**

The factoryless goods producer (FGP) is the upgraded version of goods sent abroad for processing, where the physical transformation of the goods is fully outsourced. The principal owns the IPP (technology, know-how, product design, etc.) used in the production process but fully outsource the material transformation process including the purchase of material inputs as well. The principal controls the production process, provides design and production criteria to the manufacturer and responsible for marketing, logistic and selling the final goods.

#### ***Merchanting***

Merchanting is defined as the "process by which a good is purchased by a resident (of the compiling economy) from a non-resident and then subsequently resold to another non-resident. During the whole process the good does not enter or leave the compiling economy. In the old system in the NA the merchanting was recorded as a service but based on the ESA 2010 now the purchases of the merchanted goods by a resident enterprise from the non-resident is recorded as a negative export of goods and the subsequent sale of the merchanted goods to another non-resident is recorded as a positive export of goods. The merchanting margin is accounted in the production account in the industry of the merchant enterprise. Theoretically it is clear that the difference between the sales and purchases ('net exports') could be split into trade margin, holding gains and losses and changes in inventories. In practice it is very difficult the measure and identify the components of merchanting. The goods physically do not cross the border so it is not included in the ITGs statistics. The main source of the estimation of merchanting activity is the international trade in services. It contains the value of goods sold (exports) and the value of purchasing these same goods (imports). No product breakdown of the sales and purchases of merchanted goods. We tried to use the estimate the merchanting the triangular transaction (A- B- C deliveries) from the VAT

declarations but it is not exactly the same as the merchanting and it contains the A-B-C supply chain transactions within the EU. In the NA we have a list of enterprises that reported merchanting in the questionnaire on international services. For the bigger enterprises the product mix of merchanting is estimated based on the financial annexes (written text) or analysis of their data from statistical surveys where they give some information about their activities. For the others only one major product group is assumed based on the activity code of the enterprise.

### ***Re-exports***

Re-exports are defined as goods which have been imported into Hungary and leave the country with change of economic ownership after no further processing. These goods are owned by a Hungarian resident that is why it is included in NA imports and exports.

Re-exports are included in the international trading in goods and NA/BoP as well, because the Hungarian resident units first obtain ownership of a good before they export the same good. If the goods just simply cross the country and there is no ownership transfer at any stage this flows are belonging to transit trade. To balance the SUT is important to distinguish the re-exports from the domestically produced exports when comparing the output and the export. The substance of re-export is distribution and trading while the substance of domestically produced exports is the production process. They have different economic importance. While it is important to distinguish them it is difficult to identify the re-exports in practice. Distinguishing the re-imports is also difficult as the importer do not know exactly at the time of importation that the questioned imported products will be re-exported or not.

The treatment of re-exports can be made with the help of the following additional information:

- there is an extra code for re-exports in foreign trade statistical survey Intrastat,
- experiences of previous years (information about enterprises),
- the investigation of exported goods that could not be produced in Hungary at individual level (synthetic rubber, citrus),
- comparing the CN code at 8 digit level of the imported and exported products of the wholesaler company at individual level, and analysing the results with the help of taking into account the domestic purchases and domestic sales of the questioned company.

In the last five years the re-exports grow faster than the domestically produced exports showing the impact of globalisation on the economy.



***Foreign trade reported by non-resident VAT registrations***

There is a crucial problem that arises from the activities of a group of distributors called VAT registrations of foreign enterprises. These entities are registered in Hungary for VAT only, they are foreign traders of multinational companies seated in abroad and do not operate physically in resident economy of Hungary; they have no employees and no production activities. Consequently they are not resident in national accounts of Hungary. Based on the single market rules these foreign traders (VAT registrations) can trade freely within each Member State’s economy or across all Member States regardless of borders. This trade could be cross-border movement of goods without any change of economic ownership between residents and non-residents. And the goods could be changed between residents and non-resident without cross-border movements.

If these non-resident VAT registrations physically move the goods into or out of the compiling economy this flows are reported in the ITGS. When compiling foreign trade data for NA these physical movements should be excluded because of the strict application of the change of economic ownership concept.

If these non-resident VAT registrations sell or purchase the goods to or from residents in the compiling economy these transactions are made between residents and non-residents so these transactions should be included in the NA foreign trade data. These

flows are not reported in the ITGS because there are now cross-border movements of goods.

We tried to use the VAT returns and the VAT recapitulative statements (containing the trade partners with VAT identity numbers) to solve the problems concerning the VAT registrations. The information gains from these administrative sources is not enough further analysis is needed involving other data sources as well.

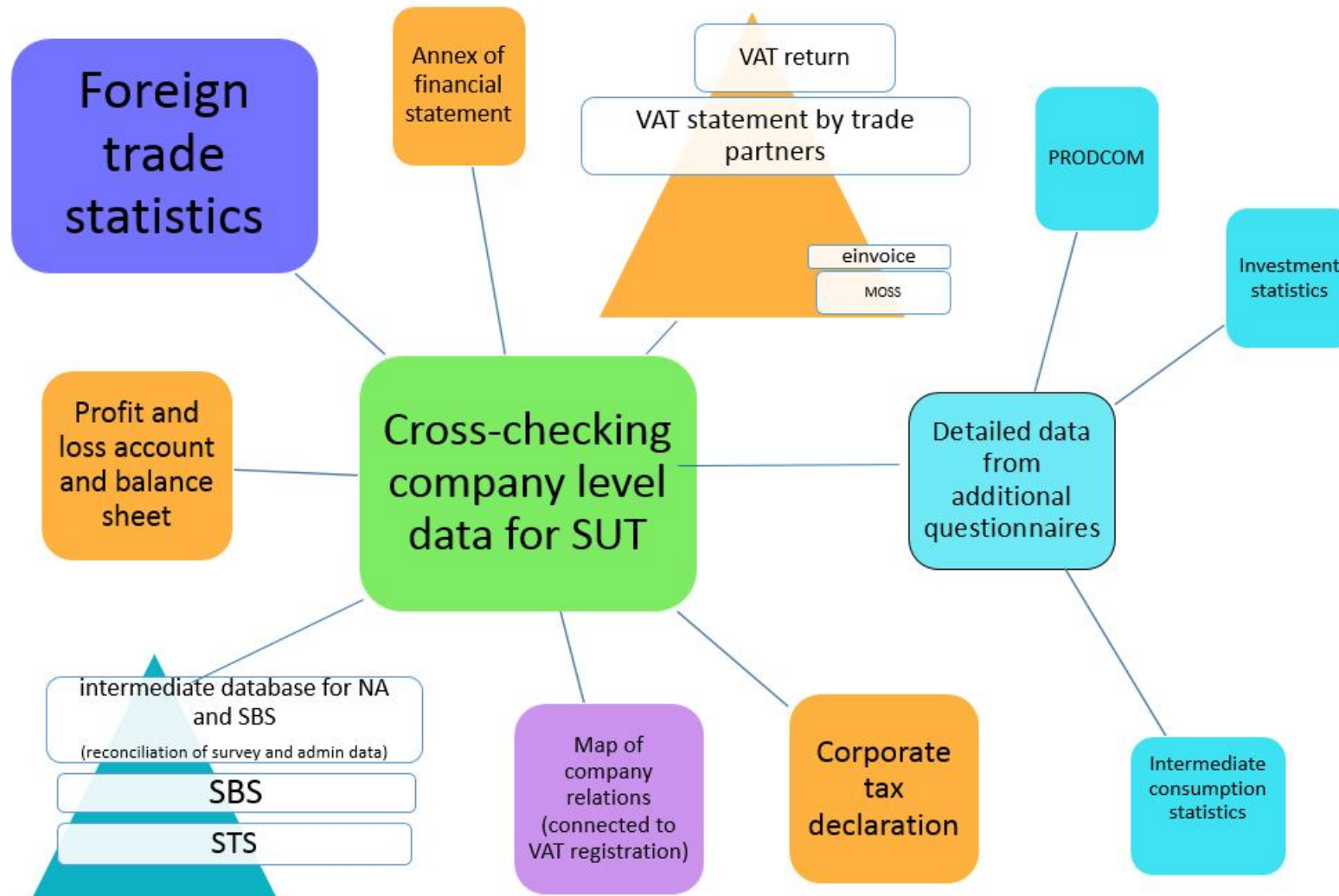
In order to achieve balance between the foreign trade and production figures, a general correction method was worked out by external trade statistics and introduced in 2008 into the national accounts and balance of payments statistics. This correction of VAT registrations means that the foreign trade transactions of VAT registrations are adjusted by applying an average coefficient and in the case of biggest differences additional individual adjustments were made.

During the SUT balancing process further imbalances were found as consequence of detailed investigation at product level. For these purposes the groups of enterprises with connection to VAT registrations were examined at individual level by the most detailed product breakdown. The VAT declaration was also used as additional information to investigate the relationship between the residents and non-resident VAT registrations. As a result of the detailed cross-checking there was a further adjustment on imports and exports of goods by VAT registrations. The import of VAT registration is increased and the export is decreased mainly due to the elimination of quasi-transit trade and the price gap.

#### ***Micro-data based cross-checking system***

For the detailed SUT examination purposes the following cross-checking system has been worked out. This cross-checking system contains company level data from statistical and administrative sources as well. It is served the better understanding the business logic and the relationship between the companies in the new global economy. The micro-data linking system gives us a better insight into the impact of globalisation and the business motivation factors.

## Micro-data based cross-checking system



In the near future we can involve two additional administrative data sources into the micro-data linking system. These are the real-time invoice reporting and the MOSS system.

### ***Real-time invoice reporting***

On 1 July 2018 the real-time invoice reporting (RTIR) obligation came into force in Hungary. The RTIR system affects all businesses registered in Hungary for VAT purposes. Hungarian enterprises as well as foreign companies registered for VAT purposes in Hungary (using Hungarian VAT ID) are obligated to submit specific information contained in their outgoing invoices to the Hungarian tax authorities without delay. The new obligation will require that any taxpayer registered for VAT purposes in Hungary, issuing an invoice with a VAT amount exceeds or equal to HUF 100,000 (approx. EUR 320), to report the invoice data automatically, electronically - through the secure channel -, immediately and without human intervention to the Hungarian tax authority. Connection with the Hungarian tax authority will take place via the web service. The main reason for introducing this new system is to reduce tax fraud and allow the National Tax and Customs Administration of Hungary (NAV) to make effective risk analysis and to identify attempted tax fraud sooner. This database containing the large volume of invoicing data is very useful for statistical purposes as well. This newest development enables us to investigate the relationship the businesses established outside Hungary but registered (only) for VAT in Hungary with the Hungarian resident businesses.

### ***MOSS (Mini One Stop Shop) scheme***

The Mini One Stop Shop (MOSS) offers a simple, effective one stop shop electronic method of administration for taxpayers who provide telecommunications, broadcasting and electronic services at a distance in the member states of the European Community for non-taxable persons.

The Mini One Stop Shop (MOSS) scheme applies to the new rules of determining the place of supply for VAT on B2C digital sales. From the start of 2015, foreign providers based in the EU had to start charging the VAT rate of their consumers, and paying the VAT to the relevant authorities. To eliminate the need to require in multiple EU states, the MOSS portals were introduced. The providers can pay the total VAT through the portal when they registered (MSID), and it is then distributed by the tax authorities to the countries of consumption (MSCONs).

Although the MOSS is an administrative data source with taxation purposes it can be used for statistical purposes as well. This new data source provides a good opportunity to improve the estimation of HFCE from cross-border of telecommunications, broadcasting and electronically supplied services.