Institute of Statistics

Supply, Use and Input-Output Tables

in Albania: 2009-2011

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Supply, Use and Input-Output Tables in Albania:
2009-2011

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1. Foreword

The System of National Accounts contains a wide range of macroeconomic indicators that need to be integrated in time and concepts. One of the most important National Accounts indicators is the Gross Domestic Product (GDP) which can be estimated by three different methods known as production, expenditures and income approaches. Each method is based on a different view of the economic system using different indicators and offering in this way an overview of logical relationships within the national system. Reliability of the methods depends on the quality of respectively data sources used. It is the goal of balancing process to determine the sources and methods reliably in order to decide which one is the best estimation of GDP.

The balancing process is an integral and important part of the methodology used. This process tends an optimal use of the existing information in order to have an accurate estimation. In other words the balancing process requires equality of the statistical data produced by each one of the existing methods. This equity is frequently known as the system of supply and use tables (SUT) which gives detailed information on usage of each product. The final product of the balancing process should be a set of accounts completely balanced and articulated with a single estimate of GDP.

The system of SUT is set up by two main tables, supply and use table. A supply table shows the supply of goods and services by product and by type of supplier, distinguishing output by domestic industries and imports. By adding information on taxes less subsidies on products, trade margins and transport margins we transform the supply from basic prices to purchaser prices. The same value for each product must be recorded in terms of uses. A use table shows the destination of each product in an economy by type of use for intermediate consumption, final consumption expenditure by household or government, gross capital formation, export or changes in inventories.

If these tables are balanced, it means that the goods and services collected or the whole economy will be balanced. Supply and use tables provide an ideal framework for checking the consistency of statistical data on flows of goods and services obtained from different sources. The SUT framework allows the incorporation of information at different levels of aggregation. For example retail sales may only be available at industry level, but using foreign trade data at product level we can manage to estimate data on household consumption. These detailed data can be useful for users who want to make product-level analysis of the economy and may also help to improve the quality of used indices.

The balancing process should be done in current and constant prices, in order to provide an integrated and stable set of accounts. In this way can be achieved the optimization of the use of data on prices and a coherence of economic development. Balanced SUT compilation at constant prices enables a single value estimated for the economic growth despite the method used. In the same time this matrix gives the opportunity to estimate the growth for each component. Another advantage of SUT compilation is related to the fact that this system enables a significant improvement of volume terms estimation. This is because the product level is much more detailed than the breakdown used in the direct estimates of GDP. The breakdown of goods and services produced or consumed, in homogeneous products enables the application of proper price indices.

2. Supply and Use Tables

The supply and use table offer the most detailed portrait of an economy. They provide a detailed analysis of the process of production and the use of goods and services (products) and the income generated in that production. Supply and use tables provide, in addition, a consistent framework for balancing national accounts. The compilation of SUT tables is a complex process and represents a challenge for any country.

First studies in economic analysis at a detailed level of commodity flows have been developed since the late 1930's, where Professor Wassily Leontief founded the first Input-Output Tables (IOT) for USA for the period 1919-1929. IOT are the consequence of SUT but needs as condition that SUT to be balanced. In addition, in 1968 United Nations published the "System of National Accounts, Studies and Methods" where it was treated the integration of these tables in the system of national accounts improving the empirical analysis on the economy. The concept of SUT was treated separately in the System of National Accounts, 1995, and the first steps for a specific manual related to the compilation of this tables by Eurostat was launched in 2002, to be concluded in 2008 with a full manual on SUT compilation. The newest updated manual on these tables is the System of National Accounts, 2010.

For compilation of SUT is important to collect, verify and analyze a large set of indicators that enable the synthesis of the system of national accounts. These tables provide the most detailed portrait of the economy, because they present a detailed analysis of the production processes, the use of goods and services and generation of income in a country. Their compilation at more detailed level and more accurate quality requires detailed information on product levels. The quality of the data collected has a direct affects on the process of balancing the flow of each product in the economy. It is important that SUT have to be estimated at current and constant prices simultaneously, showing in this way the shift of the economy on time. Estimation of SUT at constant prices has another advantage because they give the opportunity to evaluate each component of GDP by production approach at constant prices separately. This procedure is known as double deflation method.

Table 1 shows the SUT framework where are presented its constituent components. On the left side are total resources of a country, produced or imported at product level, while on the right side are presented the uses for each product. The last part of the table contains components of GDP by income approach and their allocation in the economy by categories and by industries. In order to balance SUT tables it is mandatory to estimate GDP by production and expenditure approach. Those two methods are essential in the process of balancing. The GDP by income approach and is allocation in the SUT system is included in the framework in order to reflect the full economic cycle

Table 1: Supply and Use Table

Activity (NACE) / Product (CPA)	Output of Industr (NACE)							Imports in CIF	Valuation	Total	Inputs of industries (NACE)							Total uses	Total
	1	2	…	…	m-1	m	Total				1	2	…	…	m-1	m	Total		
1	Production Matrix						Domestic output of products	Import matrix	Valuation matrix	Total supply at purchasers prices	Intermediate consumption matrix at basic prices						Total IC by products	Final Demand at purchasers prices	Total uses at purchasers prices
2																			
…																			
…																			
…																			
n-1																			
n																			
Total	Total output of industries at basic prices										Total intermediate consumption of industries								
											Gross Value Added								
											Income components								

2.1. The Supply Table

A supply table shows the supply of goods and services by type of product of an economy for a given period of time. It consists on the production matrix which in itself is divided into two main parts; by the domestic production and imports of goods and services, the matrix of transport and trade margins and the matrix of net taxes (taxes less subsidies on products). The second group of matrices enables the transformation of supply from basic prices to purchasers' prices, which allows in this way the comparisons with the use of each product in economy.

The transformation process beside the economical importance it is a mandatory of ESA 1995 and 2010 which requires the supply table at basic prices including a transformation into purchasers' prices. The supply table contains three main matrices:

- Production matrix,
- Import matrix,
- Adjustment matrix.

The matrices have a structure in rows by category of products, allowing the horizontal aggregation of all elements by the total output of industries at basic prices, to the total supply at purchaser prices. Firstly domestic product at basic prices and imports in CIF[1] value are aggregated to the total supply at basic prices.

In the second step of the evaluation vectors of trade and transport margins and net taxes on products are added to the total supply at basic prices in order to obtain the total supply at purchaser prices. The output of an industry at basic prices corresponds to the total output of an industry at the supply table.

[1] Cost Insurance and Freight

Table 2 provides an overview of the supply table at aggregated level of products and industries. In reality the level of aggregation is much more detailed in order to give a full picture of homogeneous products.

Table 2: Supply table

Industries NACE / Products (CPA)	Production of industries NACE							Import	Total supply at basic prices	Valutation		Total supply at purchasers' prices
	1	2	…..	…..	m-1	m	Total	Imports CIF		Trade and transport margins	Taxes less subsidies on products	
1	Production Matrix						Domestic output	Import matrix	Total supply at basic prices	Valuation matrix		Total supply at purchasers' prices
2												
…												
…												
…												
…												
n-1												
n												
Total	Total output of industries at basic prices							Imports CIF				
CIF/FOB adjustments on imports												
Direct purchases abroad by residents												
Total	Total output of industries at basic prices							Imports FOB		Total		
Market output												
Output for own final-use												
Other non-market output												

In the supply table, if it is possible the total output of industries should be divided into market output, output for own final use ore non-market output. This division is mainly related with different purposes of production of the economic sectors.

2.2. The Use Table

A use table shows the use of goods and services by product and by type of use for intermediate consumption by industry, final consumption expenditure, gross capital formation or exports. The use table also shows the components of gross value added by industry for compensation of employees, net operating surplus, other taxes less subsidies on production, and consumption of fixed capital.

The use table has two main objectives, firstly, it reveals by column the input structure of each industry and secondly, it describes in the rows the use of different products and primary inputs (labor and capital). The use table is valued at purchasers' prices otherwise the supply which is valued at basic prices. For this reason except the transformation of supply at purchases' prices can be transform the use table at basic prices. In order to enable this transformation it is necessary to deduct trade and transport margins and net taxes from the use table. In Table 3 is presented the use table by its main components where it can be noticed that the intermediate consumption matrix is equivalent to the production matrix while final demand components are vector matrices with the same number of products as well as other matrices.

Table 3: Use table

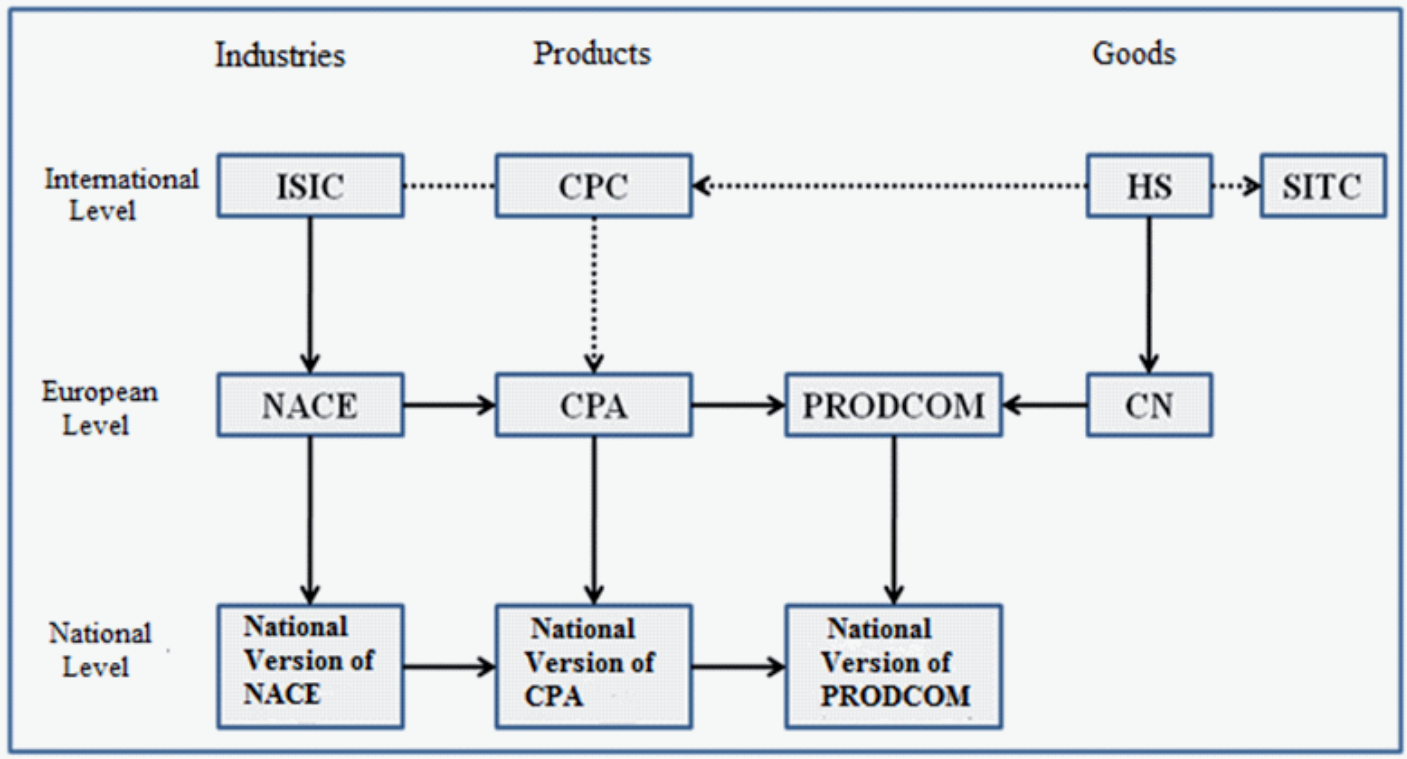
Industries (NACE) / Products (CPA)	Input of industries (NACE)							Final uses						Total use at purchasers' prices
	1	2	…	…	m-1	m	Total	Export	Final consumption by households	Final consumption by government	Final consumption by non-profit organizations	Gross fixed capital formation	Changes in inventories	
1	Intermediate consumption at purchasers' prices						Total intermediate consumption of products	Final demand at purchasers prices						
2														
…														
…														
…														
…														
n-1														
n														
Total	Total intermediate consumption of industries													
Cif/ fob adjustments								Adjustment						
Direct purchases abroad by residents														
Domestic purchases by non-residents														
Total														
Compensation of employees	Gross value added at basic prices													
Other net taxes on production														
Consumption of fixed capital														
Operating surplus,net														
Gross Value added at basic prices														
Output at basic prices														

At this table, in the final demand part may also be submitted additional information on direct purchases abroad by residents and domestic purchases by non-residents reflecting the relationship with the rest of the world economic sector.

3. Nomenclature System

Before talking about the evaluation of SUT in Albania, it is very important to give an overview of the nomenclatures used in this system and their correspondences. Figure 1[1] shows a schematic representation of nomenclatures used internationally for the transition at European level but also the correspondences with the nomenclatures used by each country. Often these nomenclatures do not have a direct correspondence with each other because of the level of aggregation and their primary goal. However many studies at a detailed level were developed to enable their relationship.

Figure 1: Nomenclatures relationship



Regarding the international nomenclatures ISIC[2] represents the classification for productive activities while CPC[3] for goods and services products. HS[4] nomenclature is the most detailed international nomenclature and is the reference nomenclature for CPC and SITC. At European level NACE is the most aggregated level which is derived from ISIC and has the same categories but most detailed level as the first one. At the same time NACE serves to derive CPA[5] which is the nomenclature of products at European level.

[1] Eurostat,"NaceRev.2, Statistical classification of economic activities in the European Community", Methodologies and working paper, pg 13.
[2] ISIC is the United Nations' International Standard Industrial Classification of all Economic Activities.
[3] CPC is the United Nations' Central Product Classification
[4] HS is the Harmonized Commodity Description and Coding System, managed by the World Customs Organization
[5] CPA is the European Classification of Products by Activity

In case of European nomenclatures CPA and CN[1], which is a derivation of HS, the most detailed level of goods is PRODCOM[2]which is a nomenclature only for goods and has a level of aggregation of 8 digits, from 6 digits for CPA.
Each country at the same time develops national nomenclatures in coherence with those mentioned above but representing the most important products and activities for the country. In case of Albania they are a derivation from the European nomenclatures.

4. Elaboration of supply and use tables in Albania

Although SUT compilation is done relatively long time ago, their framework system is not yet finished by many developing countries. Regarding to Albania SUT application is an innovation on the system of national accounts. This is the first publication although some efforts have been made since 2005 but luck of information prevented further evaluations for Albania. In framework of IPA 2007 Multi-beneficiary Statistical Cooperation Programme, Project 5 National Accounts project has been achieved to compile balanced SUT at current prices for years 2008- 2009 and not balanced SUT at constant prices for year 2009 in experimental way.

In the following years the work was focused mostly on analysis of multiple data sources in order to improve the evaluation of these tables and achieving a satisfactory quality level for publication. As a consequence, in the Structural Business Survey (SBS) in 2010 was collected information on cost structure of enterprises at CPA 2-digit level of aggregation. This information is taken for three consecutive years in order to improve the quality of this indicator, which is one of the poorest data sources used in these tables because it is collected at much aggregated level. In SBS 2012 it was made a breakdown in CPA 2 and 3-digit and a detailed operational expenditure used by enterprises. However information of cost structure continues to be much aggregated to enable a detailed analysis at product level. To consolidate the information collected from enterprises, multiple analyses are done to foreign trade data where the information is by product and by enterprise, for imports and exports. The analysis also relied on other data sources as those of General Directorate of Taxes or other agencies in Albania.

The works for evaluation of these tables have been made at a very detailed level, which for some components goes more than 1000 products while balancing analysis are done at NACE 2-digit level. Product level analyses are based on commodity flow method (CFM) where all components are at the most detailed level of supply and their corresponding possible uses. The differences between SUT and CFM is that the second one does not treat intermediate consumption and output by industries but only at product level as total and enable in this way a more detailed form of treatment by products.

[1] CN stands for the Combined Nomenclature, a European classification of goods used for foreign trade statistics
[2] Prodcom is the classification of goods used for statistics on industrial production in the EU

Evaluations of SUT in Albania in addition to the level of valuation at 60 products * 60 industries (NACE 2-digit) are also done at other levels of aggregation as 25 * 25 and 13 * 13. These levels have been developed to enable the consistency with other publications of national accounts in Albania. All classifications and nomenclatures used are consistent with those of Eurostat, enabling a comparative view of these tables in the international arena. A very important point related with SUT system in Albania is even the estimation of them in constant prices. The advantage of this process is the deflation of each product with corresponding price at the most detailed level. Referring again to the level of products treated, determination of price indexes is much more coherent than that used in the relevant industry.
The SUT framework consists even in other matrix, which significantly enhance the quality of their evaluation. Among these matrices can be mention:

- Intermediate consumption matrix of imports
- taxes on products matrix
- matrix of trade and transport margins
- vector matrices of imports for final demand components

Compilation of these additional tables enables a full analysis of the product flow and in the same time defines better the components of an aggregate. These matrices are important to evaluate the use table at basic prices, which is a transformation of use table at purchaser's prices.

5. The results achieved

This is the first publication of SUT for Albania. In this publication are included only the production and expenditure approach of estimation as the income approach is still impossible for our country. The published tables are for years 2009-2011 at current prices at 25 products *25 industries level. All the estimations as has been mention above are based on much more detailed information. The advantage of using SUT is to provide a single value of GDP despite of the method used and to give a picture of secondary activities and inputs used by industries.

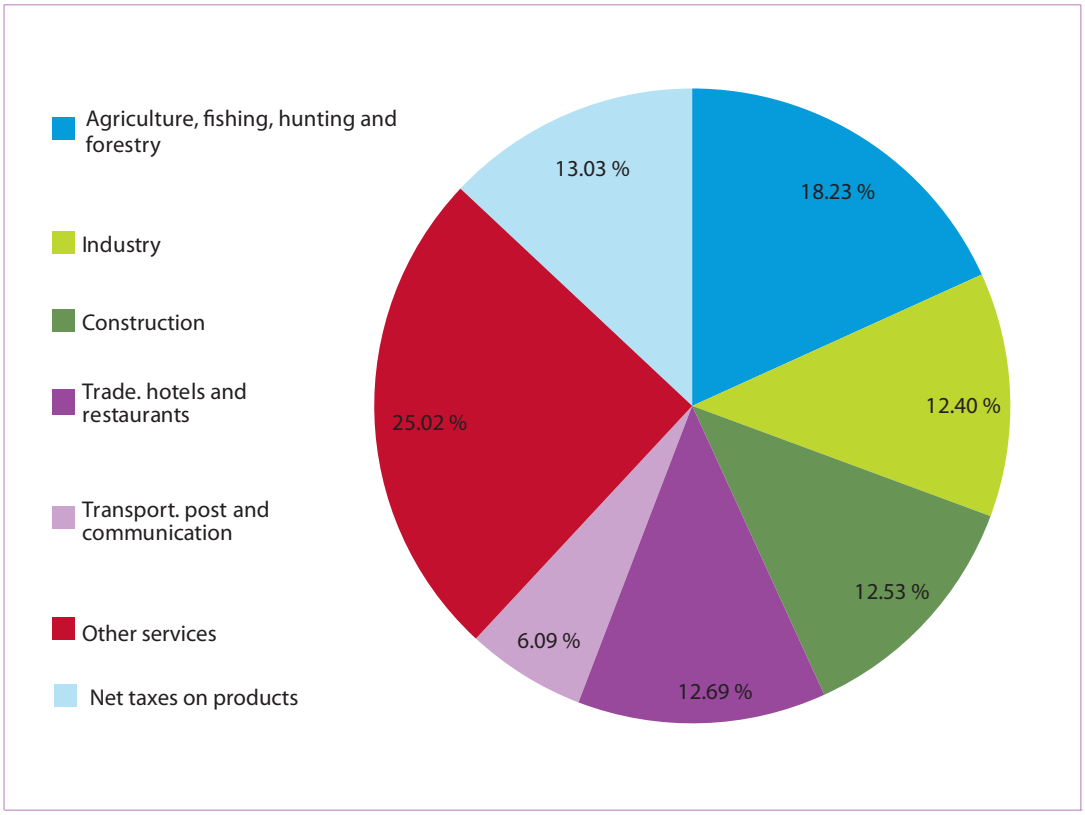
In table 4 is presented an aggregated level of results for Albania where it can be seen the equality of two methods used to estimate GDP for years 2009-2011. Results from the production approach are presented separately in the output components and intermediate consumption for some main industries of the economy. GDP by expenditure approach is presented by its main components by rows in the second part of the table.

Table 4: GDP by expenditure and production approach from SUT (in million ALL)

Description	2011			2010			2009		
	Output	Intermediate Consumptions	Value Added	Output	Intermediate Consumptions	Value Added	Output	Intermediate Consumptions	Value Added
Agriculture, fishing, unting and forestry	333,019	95,958	237,062	312,470	89,882	222,589	274,993	82,875	192,117
Industry	422,737	261,497	161,240	375,415	221,049	154,367	301,490	187,120	114,371
Construction	473,733	310,729	163,004	441,000	283,662	157,339	556,818	387,367	169,451
Trade, hotels and restaurants	266,655	101,553	165,102	259,741	100,380	159,361	244,600	93,040	151,561
Transport, post and communication	209,905	130,637	79,268	178,319	104,669	73,649	175,947	98,819	77,129
Other services	484,078	158,633	325,444	472,155	161,974	310,181	431,548	146,289	285,259
Net taxes on products			169,503			161,702			154,141
GDP by production approach			1,300,624			1,239,187			1,144,029
Imports			738,093			657,316			614,965
Eksports			442,390			402,141			333,404
Household Final Consumption Expenditure			1,021,965			960,232			881,859
Government Final Consumption Expenditure			144,869			140,387			128,998
Gross Fixed Capital Formation			390,592			360,288			388,550
Changes in Inventories			38,902			33,456			26,183
GDP by expenditure approach			1,300,624			1,239,187			1,144,029

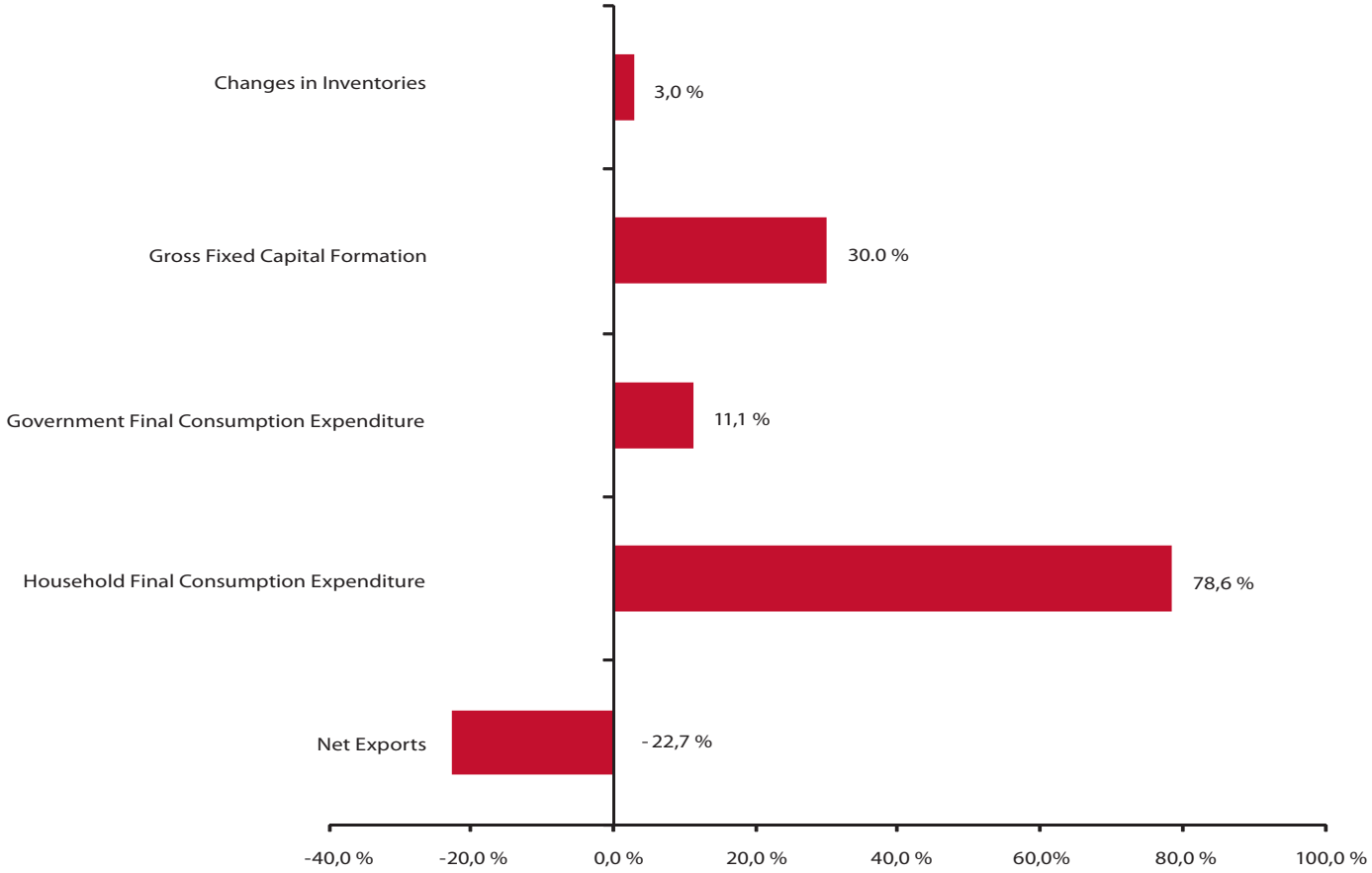
In figure 2 is presented the weight of main sectors of economy divided by total GDP in 2011. As is shown Other services registering the highest share 25 % followed by Agriculture, fishing, hunting and forestry with 18.2 %. The sector with the smallest influence in GDP by production approach is Transport, post and communication with 6.1 %.

Figure 2: GDP structure by production approach



In figure 3 is made a presentation of GDP by expenditure approach according to its main components, the share of Household final consumption constitute the largest part of GDP at 78.6% while Changes in inventories is the lowest weight component only 3 %

Figure 3: GDP structure by expenditure approach



In table 5 is presented an aggregated SUT at three main groups (agriculture, industry and services) for the year 2011 as the last year of estimations. In the left side of the table we have the country's supply, which then go as uses to the right side. In the last row of intermediate consumption matrix is presented the value added of industries, which is a single value despite which method of GDP estimation is referred.

Table 5: Supply and Use Tables in current prices for 2011 (in million All)

Industries (NACE) / Products (CPA)	Agriculture	Industry	Services	Output of products	TTM*	Total Supply	Agriculture	Industry	Services	Intermediate consumption of products	FD**	Total Uses
Agriculture	242,902	0	0	242,902	84,081	326,982	68,954	24,954	13,403	107,310	219,672	326,982
Industry	89,891	824,400	6,491	920,782	861,757	1,782,539	20,658	485,047	200,532	706,237	1,076,302	1,782,539
Services	227	72,070	954,147	1,026,444	- 38,241	988,203	6,346	62,225	176,889	245,460	742,743	988,203
Total	333,019	896,470	960,638	2,190,127	907,597	3,097,724	95,958	572,226	390,823	1,059,007	2,038,718	3,097,724
Value Added							237,062	324,244	569,815	1,131,121		

* *Trade, transport margins and net taxes on products*

** *Final demand components (household and government consumption, export, GFCF and changes in inventories)*

In order to complete analysis of results in table 6 is presented the supply table at 6 industries and products level of disaggregation. In this table it is possible to note secondary activities for each industry. So agriculture sector has secondary activities like industry and trade. If we refer to the most disaggregated levels of these tables this secondary output in the agriculture sector comes by the food industry because in many cases have a mixture of the agriculture output with agro-industry. In the table it also can be noticed that construction sector is the one with most activities, while as most homogeneous industries are other services which generally consists of financial activities, public administration, etc.

Table 6: Supply Table in current prices for 2011 (in million All)

Industries (NACE) / Products (CPA)	Agriculture fishing, hunting and forestry	Industry	Construction	Trade hotels and restaurants	Transport, post and communication	Other services	Total output of Products	Imports (CIF)	Net taxes on Products	Trade and Transport Margins	Total Supply
Agriculture, fishing, hunting and forestry	242,902	0	0	0	0	0	242,902	24,434	7,005	52,641	326,982
Industry	89,891	401,230	73,138	800	2,300	12	567,372	486,407	148,375	221,619	1,423,773
Construction	0	2,498	347,534	1,111	98	2,170	353,411	389	4,967	0	358,766
Trade, hotels and restaurants	227	13,119	6,849	260,313	2,257	1,962	284,727	55,452	543	-220,511	120,211
Transport, post and communication	0	5,015	7,801	4,113	201,740	245	218,915	89,377	1,619	54,466	255,445
Other services	0	875	38,411	318	3,510	479,688	522,802	82,035	6,994	716	612,547
Total output of industries	333,019	422,737	473,733	266,655	209,905	484,078	2,190,127	738,093	169,503	0	3,097,724

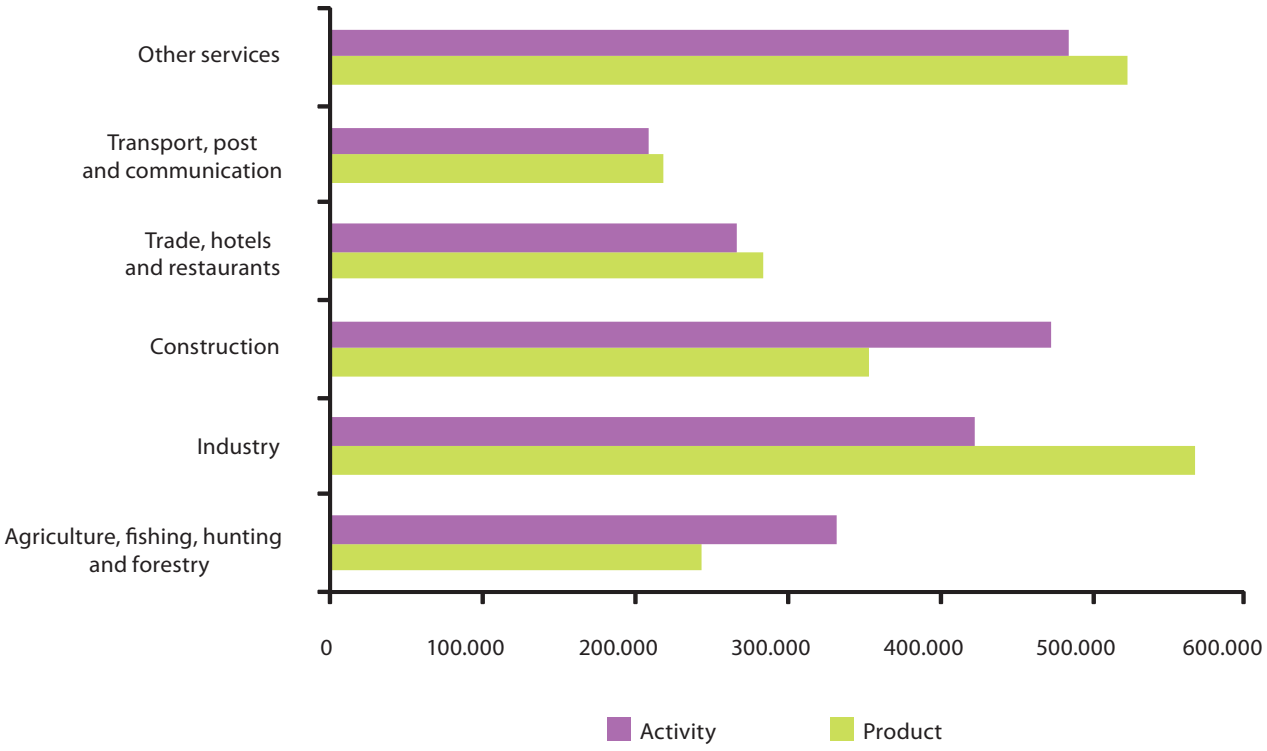
Table 7 shows total supply of products at basic price for years 2009-2001 according to their origin dependent on domestically produced goods and imports, also the structure of domestic production and imports for years 2009-2011 to compare the structural change of economy. One of most clear effect is decrease of impact of construction in domestic production after 2009.

Table 7: Supply of products at basic prices according to origin

		Domestic production		Imports	
PRODUCTS (CPA)	Year	million ALL	%	million ALL	%
Agriculture, fishing, huting and forestry	2009	201,734	10	19,423	3
	2010	226,535	11	22,539	3
	2011	242,902	11	24,434	3
Industry	2009	425,630	21	383,890	62
	2010	501,435	25	424,919	65
	2011	567,372	26	486,407	66
Construction	2009	439,319	22	1,793	0
	2010	331,096	16	878	0
	2011	353,411	16	389	0
Trade, hotels and restaurants	2009	252,713	13	50,600	8
	2010	276,025	14	52,902	8
	2011	284,727	13	55,452	8
Transport, post and communication	2009	193,609	10	81,158	13
	2010	196,522	10	79,171	12
	2011	218,915	10	89,377	12
Other services	2009	472,390	24	78,102	13
	2010	507,488	25	76,907	12
	2011	522,802	24	82,035	11
Total supply	2009	1,985,396	100	614,965	100
	2010	2,039,101	100	657,316	100
	2011	2,190,127	100	738,09	100

In figure 4 is made a presentation of homogeneous products and economic activities. The chart shows a greater fluctuation for industry and construction which makes us realize that these sectors are more heterogeneous at the production process.

Figure 4: Production of homogeneous products and economic activities



It is important to pay attention when analyzing the structures of SUT because the shares by industries might be different by the shares by products and requires the proper interpretation. In table 8 it is presented the share of products and in table 9 the share of industries.

Table 8: Share of products in supply table for year 2011 (%)

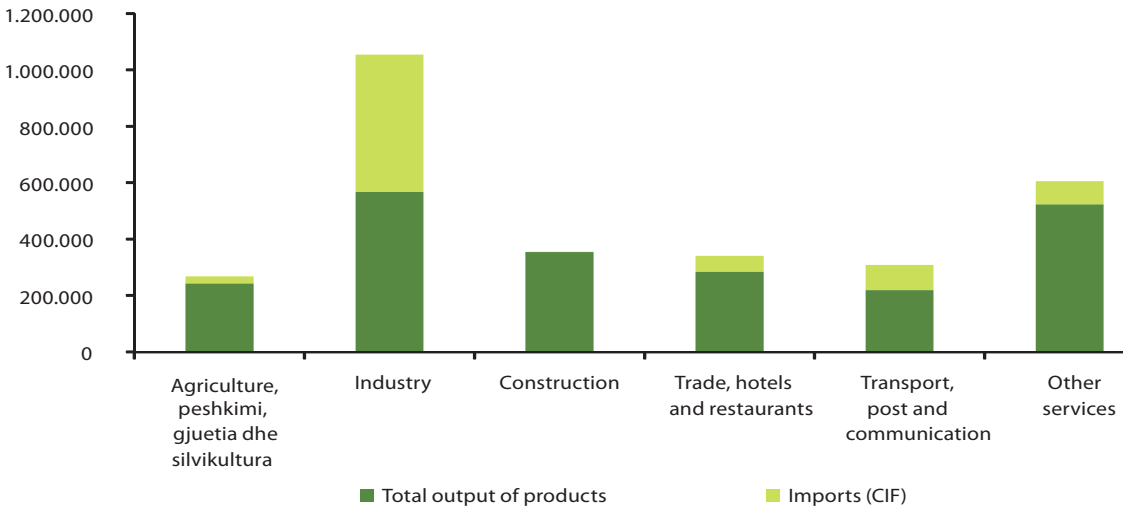
Industries (NACE) / Products (CPA)	Agriculture, fishing, hunting and forestry	Industry	Construction	Trade, hotels and restaurants	Transport, post and communication	Other services	Totali i prodhimit sipas produkteve
Agriculture, fishing, hunting and forestry	100	0	0	0	0	0	100
Industry	15.8	70.7	12.9	0.1	0.4	0	100
Construction	0.0	0.7	98.3	0.3	0.0	0.6	100
Trade, hotels and restaurants	0.1	4.6	2.4	91.4	0.8	0.7	100
Transport, post and communication	0	2.3	3.6	1.9	92.2	0.1	100
Other services	0	0.2	7.3	0.1	0.7	91.8	100

Table 9: Share of industries in supply table for year 2011 (%)

Industries (NACE) / Products (CPA)	Agriculture, fishing, hunting and forestry	Industry	Construction	Trade, hotels and restaurants	Transport, post and communication	Other services
Agriculture, fishing, hunting and forestry	72.9	0	0	0	0	0
Industry	27.0	94.9	15.4	0.3	1.1	0
Construction	0	0.6	73.4	0.4	0	0.4
Trade, hotels and restaurants	0.1	3.1	1.4	97.6	1.1	0.4
Transport, post and communication	0	1.2	1.6	1.5	96.1	0.1
Other services	0	0.2	8.1	0.1	1.7	99.1
Total output of industries	100	100	100	100	100	100

Regarding to supply by categories they vary by certain products. In figure is made an analysis for main products of economy.

Figure 5: Supply by categories



In agricultural most of these products are domestic production and a small portion are imported, while in the industrial products there is a relatively large proportion of imported supply. Construction products appear differently, they are almost all domestic production. This is due to the fact that their import means to have inputs of the construction labor force from other countries. Other sectors have a relatively small proportion of imported supply and this is mainly related to imports of services by our country.

On the other hand the use table provides a clear view of inputs used in the production process of each economic activity. From table 10, we note that larger values are no longer diagonal for all activities. It is because economic activity may consist of a variety of inputs which can be classified in other product groups of CPA. The advantage of this table as mentioned earlier is related to the possibility for a better estimation of intermediate consumption at constant prices. Detailed structures of inputs used in production enables determination of price indexes by products and not by primary activity of the enterprise.

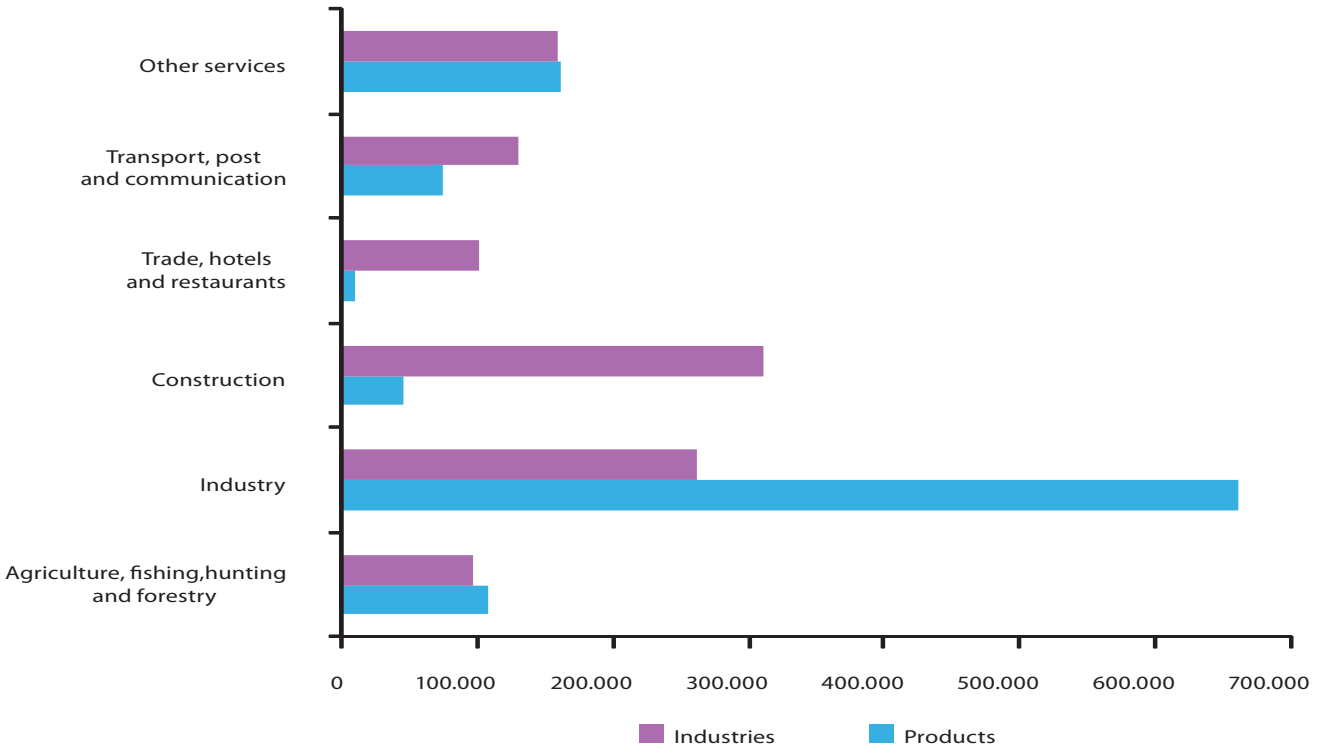
In the use table it is noticed that industrial products have a higher value than industrial activity. This comes as a result of using these products by all other economic activities in their production process. A reverse phenomenon is noticed in trade and hotels industries, where intermediate consumption is much higher than the commercial product. In this case the reason is because the trade product (trade services) cannot be used as intermediate consumption by other economic activities.

Table 10: Use Table in current prices for 2011 (in million ALL)

Industries (NACE) / Products (CPA)	Agriculture, fishing, hunting and forestry	Industry	Construction	Trade, hotels and restaurants	Transport, post and communication	Other services	Total IC products	Exports FOB	HFCE and Govemment	GFCF and Changes in Inventories	Total Uses
Agriculture, fishing, hunting and forestry	68,954	24,181	773	12,669	8	726	107,310	4,021	206,245	9,406	326,982
Industry	20,478	198,092	253,795	65,646	59,715	63,638	661,3631	193,153	456,794	112,463	1,423,773
Construction	180	4,282	28,878	754	2,788	7,992	44,873	8,519	532	304,843	358,766
Trade, hotels and restaurants	321	525	2	256	1,806	5,569	8,773	57,904	53,534	0	120,211
Transport, post and communication	2,098	14,496	7,439	4,175	32,375	15,072	75,654	94,969	84,822	0	255,445
Other services	3,926	19,920	19,550	18,053	33,945	65,637	161,033	83,825	364,907	2,782	612,547
Total Intermediate Consumption of industries	95,958	261,497	310,729	101,553	130,637	158,633	1,059,007	442,390	1,166,834	429,494	3,097,724

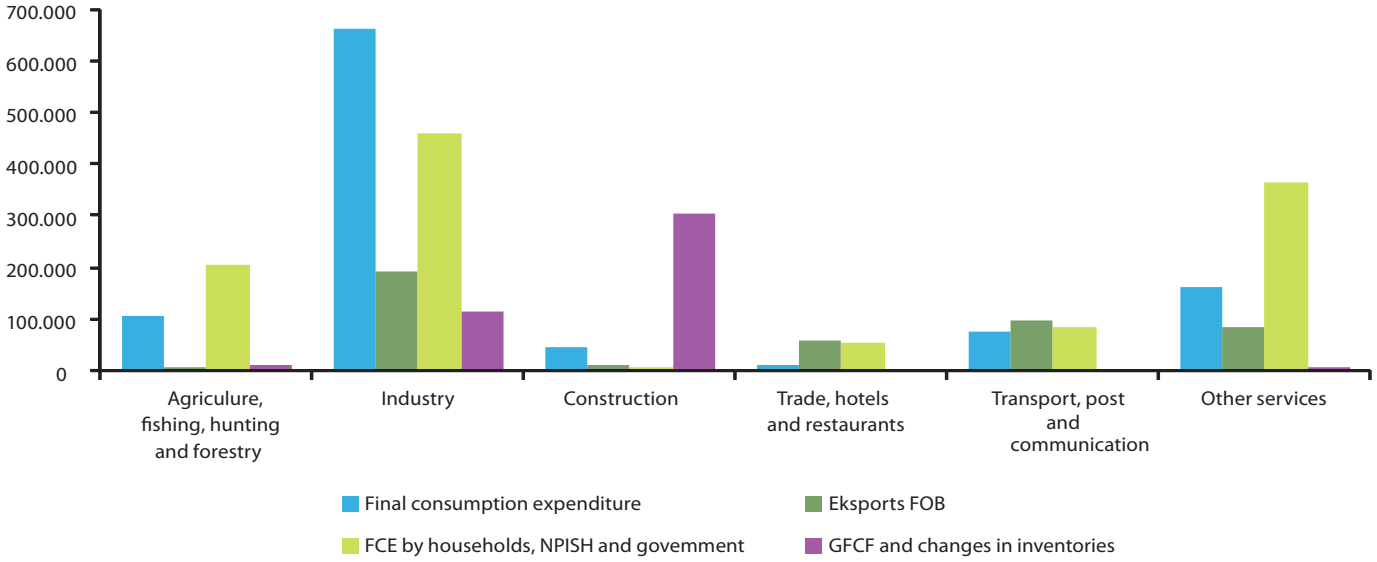
The concept of product activity is much more recognizable in intermediate consumption matrix. If at the production matrix values were positioned on the diagonal, this might not be true in the intermediate consumption matrix. This analysis is noticed clearly at the figure 6 where is presented intermediate consumption by main economic activities and homogeneous products used as intermediate consumption.

Figure 6: Intermediate consumption by homogeneous products and economic activities



The use table consists of all components of economy demand. Of interest would be an analysis of uses of each product by categories of demand. If we refer to figure 7 we see that household component is the most important for agriculture products, industrial products are mostly used for intermediate consumption, and construction products mostly used for capital formation. Other products in the economy have a more balanced diversification of their use in the economy.

Figure 7: Uses by categories



The same analysis made for the structure of production matrix might be developed even for the intermediate consumption matrix. This table gives a clear view of the use of products by industries as intermediate consumption (table 10) and from the other hand gives a clear picture of inputs needed by an industry during the production process (table 11).

Table 11: Share of Uses by product for 2011 (%)

Industries (NACE) / Products (CPA)	Agriculture, fishing, hunting and forestry	Industry	Construction	Trade, hotel and restaurants	Transport, post and communication	Other services	Total intermediate consumption of products
Agriculture, fishing, hunting and forestry	64.3	22.5	0.7	11.8	0.0	0.7	100
Industry	3.1	30.0	38.4	9.9	9.0	9.6	100
Construction	0.4	9.5	64.4	1.7	6.2	17.8	100
Trade, hotels and restaurants	3.7	6.0	3.4	2.9	20.6	63.5	100
Transport, post and communication	2.8	19.2	9.8	5.5	42.8	19.9	100
Other services	2.4	12.4	12.1	11.2	21.1	40.8	100

Table 12 is useful for the economy researchers as it gives a clear view of the distribution of production factors by various sectors. So for example, if we analyze the construction sector we note that 81.5% of costs are industrial products and the rest are other products, mainly in services.

Table 12: Share of Uses by activity for2011 (%)

Industries (NACE) / Products (CPA)	Agriculture, fishing, hunting and forestry	Industry	Construction	Trade, hotels and restaurants	Transport, post and communication	Other services
Agriculture, fishing, hunting and forestry	71.9	9.2	0.2	12.5	0.0	0.5
Industry	21.3	75.8	81.7	64.6	45.7	40.1
Construction	0.2	1.6	9.3	0.7	2.1	5.0
Trade, hotels and restaurants	0.3	0.2	0.1	0.3	1.4	3.5
Transport, post and communication	2.2	5.5	2.4	4.1	24.8	9.5
Other services	4.1	7.6	6.3	17.8	26.0	41.4
Total intermediate consumption of industries	100	100	100	100	100	100

The above analysis is focused only on the results of year 2011. As mentioned earlier these tables are evaluated for the period 2009-2011 and are available at a more detailed matrix level.

Consolidated Supply and Use Tables are the base from where can be derived Symmetric Input-Output Table (SIOT). In principle input-output table describe the same transactions as supply and use tables but have two notable differences:
Firstly, the intermediate part of input-output table in the way of compilation is square n*n size, the number of rows is equal to the number of columns.

Secondly rows and columns of intermediate have equal dimensions, can be either product-by-product or industry-by-industry, from product perspective moving secondary output left or right across the product row obtain homogeneous products and from industry perspective by moving secondary output up or down obtain homogenous industries.

A summary of Input-Output table is shown in table below where the transformation of supply and use table into input-output table is based on M4 model compiling the industry table (assumption of fixed products sales - each product has its own specific sales structure, irrespective of the industry where it is produced. The term "sales structure" indicates the proportions of the output of a product in which it is sold to the respective intermediate and final users). This approach does not require assumptions that are at odds with what is actually known about the economy from observed data and use only SUT data. Unlike supply and use tables where the analysis is realized linking products to industries, in input-output table are analyzed the linkage between industries.

Table 13: Input-Output Tables for 2011 (million ALL)

Industries (NACE) Products (CPA)	Agriculture	Industry	Services	Total output of products	Final Demand	Total use
Agriculture	57,835	23,750	21,549	103,134	254,320	357,454
Industry	15,141	375,340	144,645	535,125	848,140	1,383,266
Services	18,682	123,905	187,548	330,135	857,366	1,187,502
Total	91,659	522,995	353,742	968,395	1,959,826	2,928,221
Net taxes on products	4,299	49,231	37,082	90,612	78,891	169,503
Total Intermediate consumption/ Final use at purchasers price	95,958	572,226	390,823	1,059,007		3,097,724
Value added at basic price	237,062	324,244	569,815	1,131,121		
Output at basic price	333,019	896,470	960,638	2,190,127		
Imports CIF	24,434	486,796	226,863	738,093		
Supply at basic prices	357,454	1,383,266	1,187,502	2,928,221		

Input-Output table is a powerful statistical tool, showing the structural change in the economy. Structural changes are measured by using the direct requirements coefficients (technical coefficients) or total requirements coefficients (inverse matrix). The input-output table, therefore, can illustrate two kinds of effect:
Firstly when a industry increase its production a corresponding increase in production occurs to the supplier of inputs of that industry hence an increase in the output of one sector creates a linkage or cyclical effect in a great number of industries.

The second effect is when an industry is when an industry increase its production, a corresponding increase in output from other industries occurs to supply the needs of an increased production.

The linkages between industries measure the relative importance of a sector in relation with entire sectors of economy. In the following formula the input coefficient are defined as:

$$a_{ij} = \frac{x_{ij}}{x_j}$$

Were:

a_{ij} = linkage coefficients
x_{ij} = output from industry i used I industry j
x_{ij} = output of industry

Input-Output analysis has often been used to study the impact of final demand on output (quantity model) and value added changes on prices (price model). Appropriate extensions of the input-output system allow also to evaluate the direct and indirect impact of economic policies. Price Cost Analysis.

This analysis determine the effect or repercussion of a proposed price increase e.g., oil price, on the production/cost of commodities or services. Price cost analysis is premised on the assumption that all the increases in direct and indirect cost are passed on, thus, each sector raises the price of its output by just the increment of increase in the price of its primary inputs plus the rise in the price of inputs purchased from other industries

Impact Analysis. Input-Output table provides a link between the final demand and industrial output levels. It determines the effect of changes in the level of the final demand on the outputs of all the sectors in the economy.

6. Methodological Material

Evaluation of SUT requires collection of a large number of data at a more detailed level. Data sources used for this framework are various and in many cases they are secondary but may have an important role in balancing commodity flows. The following material will be focused on a detailed analysis of the data sources and methods used for each SUT component in the case of Albania.

6.1. Supply and Use Tables in current

SUT framework at current prices in Albania is evaluated at a level of 60 products and 60 industries corresponding to NACE rev 1.1 2-digit level. Analyses were conducted according to CPA 2, 4 and 6-digit classification enabling a clear view of a commodity flow at the economy. To compile SUT in Albania are conducted a series of analyzes and studies in order to provide an efficient use of the statistical and administrative data sources.

These analyzes have provided a definition of a better potential information as well as their statistically usage at a greater accuracy. A special attention is dedicated to the detail level of the data to arrive at the highest level possible. These tables are compiled for three years including the period 2009-2011 enabling timely treatment of product structures.

6.1.1. Output

The first element of the supply table is the production matrix which reflects the production activity of industries in economy. The main data source for output distribution in the supply table is SBS. Total output of industries at 2-digit level of NACE is taken by estimations of GDP with production approach. For each of the industries covered by SBS, is treated the structure of turnover at enterprise level. The initial information is taken for each enterprise and is treated at a detailed level for each industry corresponding to 2-digit NACE rev 1.1 classifications as presented in table 14.

Table 14: Share of Turnover

No.	Industry	NACE 4-digit	Total Turnover (Thousand ALL)	Average Numbre of Employees
1				
2				
3				
4				

In addition to handling at 4-digit level for industrial products, from SBS is also used a more detailed information at 6-digit level, corresponding to CPA nomenclature, which is related to products produced by an enterprise in economy. This information is available at enterprise level at it is shown in table 15.

Table 15: List of industrial products

No.	PRODOCOM cade	Product description	Unit of measure	Quantity			Sale excluding VAT (in thousand all)
				Production	Sale	Balance in the end	
1							
2							
.....							
....							
n							

Before distributing output value by products for each industry previously are done controls at enterprise level to enable the equalization of corresponding values.

$$T_{P_i} = \sum T_{P_{ij}} \text{ dhe } T_{P_{ij}} = \sum T_{P_{ijk}} \qquad \text{(ek. 1)}$$

Where:

TPi – Total value of output for each enterprise classified at industry "i".
TPij – Output value for each 4-digit level industry "j" with primary activity at i.
TPijk – Output value for each 6-digit level product "k" with primary activity at "i" and secondary activity at "j".

In this way for each enterprise are examined declared values on products manufacture to be equal to the activity which they belong and the sum of all activities to be equal with total declared by the enterprise. Next step for enterprises classified at the same 2-digit level industry is determination of the share of products. This structure is then used to distribute the total output of industries by corresponding products.

$$V_{P_{ijk}} = \frac{T_{P_{ijk}}}{\sum T_{P_{ijk}}} * T_{P_D} \qquad \text{(ek. 2)}$$

Where:

VPijk – Total value of output for product "k" by industry "i".
TPD – Total value of output for industry "i".

Based on these evaluations carried out at enterprise level is possible the unification of information for each industry and to estimate total domestic output of homogeneous products regardless of the primary activity that has produced this product.

The method described above is used for all industries where the primary source of information is SBS. For other industries which are not covered by this survey is used the same logic but according to the detail level of information that is available from alternative sources. Also it should be noted that besides the basic information used for output distribution of enterprises, mainly as presented in Table 11 and 12, is used even the information from imports and exports database at enterprise level. This information is used to improve the distribution of output by products since there are cases when a manufacture enterprise has declared the turnover value but not the list of products produced (table 13). Given the information declared at the exports database becomes possible to distribute the output of enterprises as appropriate. At table 14 is given a summary of data sources used for the output distribution of products by each industry.

From the table is noticed that some of the sectors are not covered by SBS. From these sectors we can mention:

- Agriculture Sector – Data are taken from the agriculture sector at product level and then classified according to products nomenclature (CPA), whose structure is used to distribute the total value of output for this sector;
- Financial Activity – For financial activities information is gathered from financial statements of second level banks and is treated at enterprise level (banks in this case). This structure is used for all financial activity since second level banks constitute the main component of this activity;
- For public administration, health and education data are taken from the Ministry of Finance at institution level. Non public health and education since there is a kind of market output, is treated as other activities for market output. Information is taken from the SBS and financial statements of enterprises.

Table 16: Data sources used for output distribution by industries

Description	NACE Rev1.1 2 digit	Data source
Agriculture	01,02	Agriculture and Environment Statistics Directory at INSTAT
Fishing	05	SBS
Industry	10-40	SBS
Energy	41	SBS
Construcion	45	SBS
Trade, hotel and restaurants	50-55	SBS
Transport	60-64	SBS
Financial Activity	65-67	Financial Statements of Banks.
Imputed Rent and other business activities	70	Output of 70 (NACE) industry consists of imputed rent and other business activities. The value of imputed rent is placed diagonally because it's a homogeneous product, while the rest output of industry 70 is distributed by the structure coming from SBS.
Rental and operatinal leasing of equipment and research and development	71-73	For NACE division 71-73 is used the structure coming from SBS, but for division 73 the value is placed diagonally because of missing information.
Other professional activities	74	SBS, Financial Statements and researches from alternative data sources.
Public Administration, Health and Education	75, 80, 85	Ministry of Finance, SBS and Financial Statements.
Services	90-99	Financial Statements and researches from alternative data sources.

6.1.2. Imports

The other component of the supply table is the imports matrix, which is a vector matrix. Total imports are composed by two main groups, imports of goods and services. An import of a good occurs when there is a change of ownership from a non-resident to a resident, this does not necessarily imply that the good in question physically crosses the frontier. While import of services consist of all services rendered by non-residents to residents.

Source of information for import of goods are foreign trade data classified at 11-digit level of Combined Nomenclature (CN) enabling a comprehensive treatment. After that by using correspondences CN-CPA this information is passed to the desired level of aggregation which is the same level of aggregation as for the output.

Information to estimate import of services is taken by Balance of Payments (BoP), valuated by Bank of Albania. BoP information is taken by categories as in table 15 and then relying on conceptual relationship that exists between ESA and BoP, some structures are used to derive at specific products by categories as presented in the second column of table 15.

Table 17: Level of aggregation for import of services

Group		Production Code (CPA)
1.	Transport services	
1.1.	Water transport services	61.10
1.2.	Air transport services	62
1.3.	Road transport services	60
1.4.	Rail transport services	60
2.	Travel services	
2.1.	Business travel	
2.1.1.	Expenditure by seasonal and border workers	55, 52, 60, 63
2.1.2.	Other business travel	64, 92, 93
2.2.	Personal travel	
2.2.1.	Health-related expenditure	85
2.2.2.	Education-related expenditure	80
2.2.3.	Other services	55, 52, 60, 63, 71, 92, 64, 65
3.	Communications services	64
4.	Construction services	45
5.	Insurance services	66, 67
6.	Financial services	65
7.	Computer and information services	72, 92, 74
8.	Royalties and license fees	
8.1.1.	Franchises and similar rights	74
8.1.2.	Other royalties and license fees	74
9.	Other business services	
9.1.	Merchanting and other trade-related services	50, 51
9.2.	Operational leasing services	71
9.3.	Miscellaneous business,professional and technical services	
9.3.1.	Business and management consulting, and public relations services	74, 73, 90
9.3.2.	Personal, cultural and recreational services	80, 85, 92, 93
9.3.3.	Government services	75

Given that the import of goods data are at the most detail level by using correspondences between different nomenclatures the information can be used for analyses and studies on other components of SUT. An example is also the use of CN-BEC classification (table 21) to find out the final goal of imported goods. By using the identification number of importing enterprise it can be analyzed the share of imported goods that goes for intermediate consumption, household final consumption and gross fixed capital formation. Given that imports are at CIF values it is important to make the transformation at FOB[1] values.

Customs statistics estimate the import of goods at CIF values, which means that the price of shipping and insurance is charged at the border of the importing country. To evaluate the import of goods at FOB values it must be deducted the value of insurance and transport service between border of the exporting country and the importer. In order to see the possibility of a better CIF-FOB adjustment and at a more detailed product level were used administrative data on import of goods for the year 2010, from the General Directory of Customs.

In the study are included only those 8-digit CN group of product with a number of transactions greater than 30 (to have a normal distribution) and who have fulfilled the information on transport and insurance at customs statements. Form the data at product level outliers were eliminated according to the BOX-PLOT method of John Tukey[1]. After applying this method for transport were taken into study only 2,305 products at CN 8-digit level, and for insurance 2,636 products. Coefficients are estimated at 2-digit level of CPA 2002.

6.1.3. Trade margins

The trade margins represent one of the components to derive supply table from basic price to purchasers' prices and use table from purchasers' prices to basic price. The value of trade margins represents the output of wholesalers and retailers. Since the traders are treated as supplying services, their output is measured by the total value of the trade margins realized for resale. European system of accounts (ESA 2010) defines trade margin is the difference between the actual or imputed sale price realized on a good purchased for resale, and the price that would have to be paid by the distributor to replace the good at the time it is sold or otherwise disposed of.

[1] Free on board

Trade margins evaluation is a difficult task and this is due to the wide range of products, different product margin ratio in trading establishments as well as different product distributive channels. Thus plausible assumptions should be made in order to achieve realistic view also creating connections to use different data source in order to evaluate trade margins. Using the reported data from enterprises through balance sheets and SBS can evaluate the trade output which is equal to the amount of output of the enterprises that are classified as trade establishment wholesale or retail (NACE 50, 51, 52) adding the trade output of enterprise that have trade as secondary activity. The equation[3] to evaluate the margin trade is the following:

$$M_t = \sum_i Ts_i - Pr_i + \Delta I_i \qquad \text{(ek.3)}$$

Where:
i = 1, … ,n, represents the n products that a commercial firm sells
Mt – trade margins
Ts – represents the value of sales (that is a part of the total turnover)
Pr – is the value of goods purchased for resale
ΔI – is the value of changes in inventories of goods for resale (final inventories minus initial inventories).

To assess the percentage of trade margins is calculated the output of commercial enterprise (is equal to total margin of n products that enterprise sells) divided by total turnover.

$$\% \text{ Mt} = \frac{\text{Mt}}{\text{Ts}} \qquad \text{(ek.4)}$$

The starting point of this method for trade margin estimation by product for the entire economy is the trade margin of commercial enterprises. Used method is explained below in four main steps.

The first step is assessment of trade margin percentage for commercial enterprise. Enterprises involved in the study are classified in three divisions, NACE 50 (sale, maintenance and repair of motor vehicles and motorcycles, and retail sale of automotive fuel, NACE 51 (wholesale industries) and NACE 52 (retail industries). From annual commercial enterprise data (SBS and balance sheets) we have taken into account 7,592 enterprises that have reported data. For this enterprises was defined the trade margin ratio, studied the interval and concluded that most of enterprise were stationed in [3% : 50 %] and these enterprise were taken for evaluation of trade margins.

[1] John W. Tukey, Exploratory Data Analysis.Addison-Wesley, 1977

[2] (Eurostat, 2013, p. 62)

[3] Roberta PIERGIOVANNI, Stefano PISANI. (1998). The Impact of Trade Margins Matrix on the Statistical Sources., (p. 3).

The second step consist in trade margins allocation by group of products CPA 2-digit, for i product that commercial enterprise has for resale. Commercial enterprise are taken in study at a detailed level NACE 4-digit, so are detailed level and enterprises within the same class tend to specialization so trade the same group of products. From Import database we have taken all product imported for resale by commercial enterprise and defined the ratio that each group of product is traded in a specific trading class.

The next step is transformation of output and turnover matrix, by multiplying ratio that each group of product is traded in a specific trading class with output and turnover of this class. After we defined the classes and the ratio that a group of products is traded in a trading class, this ratio are multiplied by output and turnover and obtained the trade margin for each group of product in specific trading class. Allocation of output and turnover by the weight that a group of products is traded in a specific class of trade leads to different impacts in trade margin ratio as a result of product weight and division weight.

The last step is the determination of distributive channels of products that a commercial enterprise sells. This if one of most difficult task together with definition of ratio that each group of products is traded in a specific trading class. Distributive channels are clearly the unknown component of required information for constructing trade margin matrix. Usually, buyers are not interested and do not know whether a product has been sold through retailers or wholesalers. In studies[1] conducted in trade field are defined the most frequent type of distributive channels that a product circulate to its final destination.

For this purpose are distinguished 11 distributive channels that products circulate, which have a significant impact in trade margin. Considering the product circulation we distinguished four different situations:

- a product cannot circulate through commercial enterprise and in this case we have not added trade margin (channels 1, 2 and 11)
- can circulate through one commercial channel (channels 3,8 and 9)
- can circulate through two commercial channels (channels 5,6 and 7)
- can circulate through three commercial channels (channels 4 and 11)

[1]Ceh, 1990

Table 18: Products distributive channels

No.	Channel	
1	Imports	Imports → Consumer
2	Production	Producer → Consumer
3	Production	Producer → Retailer → Consumer
4	Production	Producer → Wholesaler → Wholesaler → Retailer → Consumer
5	Production	Producer → Wholesaler → Wholesaler → Consumer
6	Imports	Wholesaler → Retailer → Consumer
7	Production	Producer → Wholesaler → Retailer → Consumer
8	Imports	Wholesaler → Consumer
9	Production	Producer → Wholesaler → Consumer
10	Imports	Wholesaler → Wholesaler →Retailer → Consumer
11	Production	Producer → Exsports

From the distributive channels through which the product circulate to the final consumer which can be households, enterprises, central or local government progressively accumulate and the trade margin in purchasers price. For all distributive channels of products below present formulas for calculation of trade margins for retail and wholesale trade.

Table 19: Trade margin determination for each distributive channels

Channels	% trade margins (r + w)	Retail	Wholesale
1	0	0	0
2	0	0	0
3	ri	ri	0
4	ri+wi (1-ri)(2-wi)	ri	wi (1- ri)(2 - wi)
5	wi (2 - wi)	0	wi i(2 - wi)
6	ri+ wi - ri wi	ri	wi – ri wi
7	ri+ wi - ri wi	ri	wi – ri wi
8	wi	0	wi
9	wi	0	wi
10	ri+ wi (1 - ri)(2 - wi)	ri	wi (1 - ri)(2 - wi)
11	0	0	0

From SBS data we have taken the table that detail sales by main customers, this data are taken for 7,206 enterprises. From this data are defined product distributive channels which have a significant impact in the total product price.

Once defined the distributive channels for each group of products from the income by main customers, we distributed total output and import by channels percentage. In this way by multiplying the trade margin ratio for a product in a specific distributive channels with total output and import of this channel obtain the trade margin for each distributive channel. The total trade margin of distributive channels through whom a product circulate is equal to total trade margin for this product.

6.1.4. Transport margins

Transport margins[1] include transportation costs paid separately by the purchaser and included in the use of products at purchasers' prices but not in the basic prices of a manufacturers' output or in the trade margins of wholesale or retail traders. Such transport margins include in particular:

- transport of goods from where they are man¬ufactured to where the purchaser takes deliv-ery of them, in the event that the manufacturer pays a third party for the transport and pro¬vided that this amount is invoiced separately to the purchaser;
- transport of goods arranged by the manufacturer or by the wholesale or retail trader in such a way that the purchaser has to pay separately for the transport costs even when the trans¬port is carried out by the manufacturer or the wholesale or retail trader themselves;
- All other costs of transporting goods are not recorded as transport margins.

As a base for transport margin estimation are taken data for enterprise transport expense from balance sheets and SBS also Imports-Exports database from General Directory of Customs. In table 20 is given the column matrix of trade and transport margins and their integration within SUT framework.

Table 20: Trade and transport margins — supply

Industries (NACE) Products (CPA)	Wholesale trade	Retail trade	Transport	Trade and transport margins
1 2 … … … … n-1 n				Trade and transport margins on total supply by product
Total	Total wholesale trade	Total retail trade	Total transport	Total margins on supply by product

The first step is evaluation of foreign transport margin, from Imports-Exports database. In customs declaration enterprises are obliged to declare transport cost, from which are taken imported products from enterprises at a detailed level CN 8-digit and transport cost for each product, and in this way by dividing transport cost with CIF product value obtain the trade margin percentage for each product.

For products at a detailed level CN 8-digit is analyzed the distribution of transport margins and outlier elimination, were taken into study 395,000 transactions which are grouped by CN 8-digit into 6,501 products. Based from the relationship that exists through CPA and CN, data were derived at a CPA 2-digit level, for which we defined transport margin ratio by dividing transport cost by product CIF value for each product.

[1] ESA 2010, (p. 283)

The second step is evaluation of domestic transport margin from transport expense that enterprise report in SBS and balance sheets. In analysis were taken 1,733 enterprises which were related with Imports database. From total transport expense reported SBS and balance sheets reduced foreign transport expense and the residual were treated as domestic transport expense. Enterprise in analysis were grouped at 2-digit NACE level by summing output and transport expense. By dividing transport expense for each group with output of group we received the domestic transport margin ratio for each 2-digit NACE group.

The last step is evaluation of total transport margin which is equal to the amount of foreign and domestic transport margin. Foreign transport margin is evaluated by multiplying corresponding margin ratio with imports of this product and for domestic margin multiply domestic margin ratio by output and import of this product but firstly we deduct the part that enterprise use for intermediate consumption. The amount of foreign and domestic margin gives the total transport margins.

6.1.5. Taxes and subsides on products

The transition process of SUT framework from basic prices at purchasers ' prices requires not only the trade and transport margin distribution but also integration of taxes and subsides on products. Net taxes (taxes less subsides) on products are involved in transition matrix (valuation matrix) part of supply table and includes:

- VAT on domestic products
- VAT on imported products
- Excise on domestic products
- Excise on imported products
- Other taxes on domestic products
- Customs duties on imported products
- Subsides on products

Data sources for evaluation of net taxes on products are Ministry of Finance, General Directory of Taxation for domestic production and traded commodities and General Directory of Customs for imported products. Evaluation of net taxes on products for imported products is done at the most detailed level, at transaction level for commodities by CN 8-digit using customs extended procedure and then by nomenclature relationship this data are transformed at 2-digit CPA as in supply table. Whereas for domestic production and traded commodities data on taxes are much more aggregated, VAT and subsides have 4-digit breakdown level according to NACE classification and other taxes have a 2-digit level breakdown according to CPA classification.

6.1.6. Intermediate Consumption

Intermediate consumption is one of the most relevant components of use table. The main problem consists of distributing intermediate consumption of industries by products. For each enterprise we should have information on raw materials that it uses in manufacturing process at product level also the ratio of intermediate consumption on total expense. It should also taken a detailed information on operating expense that enterprise incurs as electricity, rent, transportation, telecommunication, etc. The evaluation of intermediate consumption matrix requires from enterprise to report a detailed balance of their expense.

The main data source for intermediate consumption distribution by products is SBS. Specific information if obtained from cost structure table in SBS at 2-digit level CPA breakdown. Also to enables a more complete information for each enterprise are checked the types of reflected expenses in income statement (statement of revenue & expense) reported in SBS and balance sheets. Another controlling analysis is done with imports database by checking commodities that the enterprise has imported for intermediate consumption and not stated in cost structure table in SBS. For the activities not covered by SBS as in the case of production matrix are used alternative data source according to relevant industries. Table 19 provides an overview of the used source.

Table 21: Used source for intermediate consumption distribution

Description	NACE 2	Data Source
Agriculture, hunting and forestry	01; 02	Agriculture and Environment Statistics Directory INSTAT
Fishing	05	SBS
Manufacture industries	10-37	SBS & Balance Sheets
Energy and water supply	40-41	SBS & Balance Sheets
Construction	45	SBS & Balance Sheets
Trade , hotels and restaurants	50-55	SBS & Balance Sheets
Transport	60; 61; 63; 64	SBS & Balance Sheets
Air transport	62	Balance Sheets
Financial activities	65-67	Balance Sheets
Imputed rent and other business activities	70-74	SBS and study from alternative source
Public administration, health and education	75; 80; 85	Ministry of Finance and Balance Sheets for non-public health and education
Other services	90-99	For industries 91 and 92 are used information from Ministry of Finance on the distribution of expenditure by institutions, and for other services in absence of information is used the structure of similar industries and SBS data.

The cost structure distribution for industries not covered by SBS are used other source were can mention:

- Agriculture, hunting and forestry industries – Data for output and used inputs in agricultural production are taken at product level from Agriculture and Environment Statistics Directory INSTAT. Based on the nature of product is classified at corresponding CPA code.
- Financial activities – For financial activities are used the information form second level banks balance sheets. Given that second level banks represent the main part of this activity the structure derived cost is used for all financial activities.

- Public Administration, Health and Education – Data are taken from Ministry of Finance for each institution
  at a detailed level on conducted government expense for intermediate consumption. Each category of expense is classified at corresponding CPA code to enable the integration of this information in SUT framework.

There are also some products for which there is reliable information on their values as electricity consumption or financial expense, for this product it is possible to determine the exact value that goes for each industries, government or households. In this situation the treatment is done independently, data are taken from Balance of Electric Power or from Bank of Albania financial data

6.1.7. Households final consumption expenditure

Household final consumption expenditure covers expenditures incurred by households to acquire consumption goods and services. Household final consumption expenditure can be subdivided into three large components:

- purchases of goods and services;
- goods and services produced as outputs of unincorporated enterprises owned by households that are retained for consumption by the members of the households (own-consumption of goods and services);
- remuneration in kind

The primary estimation of household consumption in National Account Directory is performed by Institutional Sectors Accounts. Source for the distribution of household final consumption expenditure by products is the Households Budget Survey (HBS) also an estimation of household consumption is done using commodity flow method which is explained below. Data on household consumption are collected according to Classification of individual consumption by purpose (COICOP)[1] where products are grouped according to the purpose of use and SUT framework is according CPA classification, for this reason COICOP-CPA bridges should be derived. Since there is not a complete correspondence between these nomenclatures, is constructed a bridge matrix using weights to enable the relationship at 6 and 4 digit level according to CPA 2002.

[1]Classification of Individual Consumption According to Purpose

Estimation done for this component at GDP by expenditure approach, are followed by the assessment and analysis made after applying Commodity Flow Approach[1]. The basic idea of this method is that the amount of a product for use in an economy should be supplied either by domestic production or imports, and the same amount that is supplied in an accounting period should be used as intermediate consumption, final consumption, capital formation (including changes on inventories) or as exports. The summary equation for Commodity Flow Approach is:

$$HFCE = (O + I) - (IC + G + GFCF + CI + E) \qquad \text{(eq.5)}$$

Where:
HFCE - Households final consumption expenditure,
O - Output,
I - Imports,
IC – Intermediate Consumption,
G – Government and NIPSH[2],
GFCF- Gross fixed capital formation,
CI - Changes on inventories,
E - Export.

This analysis provides a more accurate estimation of household consumption especially for some commodities for which information is very difficult to be collected through surveys.

[1] Commodity Flow Approach
[2] Non-Profit Institutions Serving Households

6.1.8. Exports

Exports are a column matrix in use table. As for imports, data for exports are taken from Foreign Trade Sector, for exported goods, and from Balance of Payment for exported services. Exports of goods and services are evaluated at 'free on board' (FOB) prices. Their integration in SUT framework is based on the same classification and level of breakdown as in the case of imports. For exported goods is used CN 8-digit classification, then by using the CN-CPA relationship data are aggregated in 2-digit level of CPA, which is used in SUT framework. Data for exported services are taken from Balance of Payment and then classified at product level.

6.1.9. Gross fixed capital formation

Gross fixed capital formation (GFCF) in national accounts is equal to the concept of investment used in business accounting. This component includes domestic and imported products for capital formation as tangible assets (buildings, machinery, transport equipment, etc.) and intangible assets (subsoil assets, software assets, entertainment, literary and artistic originals), as well as improvements to non-produced assets (land). The primary information for this component is taken from GDP by expenditure approach then are done analysis on product level to enable a complete estimation. The initial information is detailed in several groups as presented in table 22.
For each item in the table detailed analysis are done to have a distribution at product level. Construction, which is the main component of GFCF, is mostly domestic production. Machinery and equipments and Transport means are mainly imported, the distribution is done using external trade data according to CN 8-digit level.

Table 22: GFCF classification

Description
1. Agriculture
1.1. Livestock
1.2. Orchards & Vineyards
1.3. Forestry
2. Geological Prospecting
3. Construction
3.1. Dwellings
3.2. Non residential buildings
3.3. Civil engineering works
4. Machinery and equipments
5. Transport means
6. Software & Databases

Using the existing correspondence between CN-BEC[1] it is possible to know the final purpose of the imported goods. According to BEC classification (see table 23) imported products are divided in 4 main groups. Using type 3 of BEC, can find imported commodities for purpose of capital formation, this data are then aggregated according CPA 2-digit. In some case it is important to make studies at product level to determine more precisely the purpose of its use. This is due to the fact that some product may have more than one purpose of use in this case it is important to determine the weight of each product according BEC.

Table 23: Imported goods according BEC nomenclature

Bec	Bec type	Bec description
111	2	Intermediate consumption (+taxes)
112	1	Consumption goods(+taxes)
121	2	Intermediate consumption (+taxes)
122	1	Consumption goods(+taxes)
210	2	Intermediate consumption (+taxes)
220	2	Intermediate consumption (+taxes)
310	2	Intermediate consumption (+taxes)
321	4	Unclassified
322	2	Intermediate consumption (+taxes)
410	3	Capital
420	2	Intermediate consumption (+taxes)
510	4	Unclassified
521	3	Capital
522	1	Consumption goods(+taxes)
530	2	Intermediate consumption (+taxes)
610	1	Consumption goods(+taxes)
620	1	Consumption goods(+taxes)
630	1	Consumption goods(+taxes)
700	4	Unclassified

Machinery and equipment are distributed by this structure and attached to the other components of gross fixed capital formation. For unclassified product groups according to BEC, is made a distribution in one of three main categories by studying for each product which is the importing industry. This study enables a complete distribution of imported products by categories.

Total estimation of GFCF is done by incorporating all the information from different data sources as SBS, financial statements of enterprises, agriculture sector and foreign trade data.

[1] Broad Economic Classification

6.1.10. Government final consumption expenditure and NPISH

Government final consumption expenditures include all final expenditures on goods and services performed by institutions involved in the government sector. Government final consumption expenditures are composed by expenditures for individual and collective consumption. Collective government expenditures include public administration expenditures, defense, security, improvements in general medicine, etc. Individual government expenditures include health and education, in kind contribution, etc.

Same concepts used for institutional sectors are used even for NPISH, because their production is a non-market output. NPISH are serving to household they have only individual expenditures. Information used for their integration at the SUT framework is taken from Ministry of Finance at institutional level and classified by 2-digit level products of CPA, considering expenditures purposes.

6.1.11. Changes in Inventories

In the SUT framework one of use side components are changes in inventories. This is one of the most problematic components to handle because the information is collected at aggregated level. The SUT framework requires changes in inventories by products, that implies even the information collected must be at the same level of detail. In case of Albania this information is not available, for this reason is used an alternative method of estimation. The main problem is evaluation of the total changes in inventories in the economy. For this evaluation we are based on data from SBS and Financial Statements of enterprises.

To improve the information of a given year (example year t) is taken the information from the previous year (t-1) and the following year (t+1) for each of data sources. For each enterprise is taken the value of stock at the beginning and end of period. Information is aggregated as shown in table 24.

Table 24: Changes in Inventories classification

NACE 2 digits	Opening stock						Closing stock					
	Raw materials	Work in progress	Finish hed goods	Goods for Resale	Prepayments for supplies	Total	Raw materials	Work in progress	Finish hed goods	Goods for Resale	Prepayments for supplies	Total

Evaluation of the total value for different categories of changes in inventories is done only in situations when we had information in two consecutive years (previous and following). Only four components of inventories are included in the calculations (raw materials, work in progress, finished goods and goods for resale), while prepayments for supplies are excluded because are not related to the physical state of products. Primary information is based on Financial Statements for those enterprises that have fulfilled statements, for the rest of enterprises information from SBS is used. Existing information in the above mentioned data sources are collected as shown in table 25.

Table 25: Inventory

	Inventary	Fiscal year t	
		Opening stock	Closing stock
1	Raw materials		
2	Work in progress		
3	Finished goods		
4	Goods for resale		
5	Prepayments for supplies		
6	Total		

It is important to emphasize that beside the information shown in table 25, there is also information used to check if the enterprise has or hasn't had changes in inventories, which is located at income statements and consists in:

- Changes in inventories of finished products and work in progress (+/-) which corresponds to the sum of items 2 and 3 in the inventory table.
- Changes in the stock of materials which must be equal to the sum of raw materials and work in progress from the inventory table.
- Changes in the stock of commodities (+/-) which must equal to work in progress plus goods for resale.

Even in this case as well as SBS, information taken from income statements of enterprises can be used as a comparison, imputation or analysis purposes. The only difference is that at the income statements the distinction may not always be well specified. There are cases when changes in finished products are included as a separate item, but there may be cases when it is included even the work in progress. In this case a detailed analysis is done to the information declared by the enterprise to determine better the nature of changes in inventories.

For the evaluation of changes in inventories beside the valuation of their absolute value, it is important to do the adjustments with respective prices. This is necessary because changes in inventories are calculated as difference of two different period values which are not valuated at the same price level. For this reason are used several methods where we can mention:

- Last in – first out (LIFO[1]): the cost of sold or consumed commodities during a given period is evaluated by assuming that prices remain the same as if they were sold or consumed at the time of their purchase;
- Average method: the cost of a commodity is evaluated by applying a weighted average of costs of all goods available for sale during a period of time;
- First in – first out (FIFO[2]): the cost of commodities during a given period is evaluated by assuming that prices remain the same as if they were sold or consumed at the time of their most recent purchase;

In case of Albania is used the average method where for each category of changes in inventories are taken respective price indices.
As we mentioned earlier one of the main problems remains the breakdown level of information which makes it difficult the involvement of this component at the SUT framework. For this reason it is used an indirect method based on some basic assumptions. After the evaluation of all components for changes in inventories for the total economy, an alternative method is used for their distribution by inventory categories:

- In order to distribute the share of raw materials by services is used the total structure of intermediate consumption. While the share of raw materials by manufacture industries are used the structures of intermediate consumption of the respective industry.
- For the distribution of work in progress at product breakdown is used the structure of output from the product list, only for those enterprises that have declared work in progress and have fulfilled the product list.
- Finished products are distributed by the total structure of output.
- Goods for resale are distributed by the total trade margins structure.

These assumptions are based on a set of analysis done for the nature of each of categories of changes in inventories enabling a better distribution at product breakdown. Also for products destined only for exportation, checks are made with foreign trade data to compare evaluations between structural distribution and the real values for these products.

[1] Last In First Out
[2] First In First Out

6.2. Balancing process

The balancing of supply and use table is a very important process. After a detailed processing for each product, all the supply of a country must equal to uses. In many cases this is difficult to be reached since the first step of using data sources, for this reason the analysis are done at product level.

Before we look at product discrepancies, is analyzed the statistical discrepancies between two different approaches of GDP estimation. In the supply and use framework this discrepancies are eliminated and therefore is required to be achieved this macroeconomic balance. For this purpose, based on detailed information of products, it is seen the possibility for changes at absolute values of components of production or expenditure approach. Only after is achieved a macroeconomic balancing of the absolute values of different approaches of GDP estimation, is passed in analysis of statistical discrepancies of products between the supply and use.

In cases where the discrepancies between the supply and use are greater than 5%, is used an automatic balancing based on the distribution of the existing discrepancies ratios. When the discrepancies are between 5% and 10%, it can be relied on manual analysis and balancing of the discrepancies. If discrepancies are greater than 10% the situation requires adjustment of the primary data sources. It is necessary to check the data sources to better understand what has inflicted the discrepancies.

It may be necessary for a revaluation of different component of the supply or use table, which would lead to a circular cycle of evaluations. This cycle will be continuous until all the discrepancies arrive within acceptable intervals enabling a full consistency between different approaches of GDP estimation.

6.3. The Supply and Use Tables at constant prices

The SUT framework at current and constant prices for a country it's important to be compiled as in current and constant prices. Their compilation at constant prices enables an evaluation of the economic growth despite of the approach used. As SUT is usually compiled at e detailed level of aggregation enables the application of specific price indices by products being closer to homogeneous products and prices. In order to compile these tables is necessary to evaluate and balance SUT at current prices for two successive years. These tables are compiled based on the principal that a change in value of a homogeneous product comes due to a change in volume or price. Based on this principal the final tables must be a balanced system at constant prices where changes in all their constituent components are due to a real change in the volume or change in the price of the respective product.

The methodology for estimation of SUT at constant prices is based on European standards of evaluations at constant prices (see Handbook on Price and Volume Measures in National Accounts). For each component were taken specific indices at the most detailed level of aggregation. Used indices are:

- Producer Price Index (PPI),
- Consumer Price Index (CPI),
- Construction Cost Index (CCI),
- Unit Value Index (UVI),
- Average wage index ,
- Indices of agricultural and fishery products.

These indices are used at product level in order to deflate independently each SUT component.
Producer Price Index (PPI) – measures the change in the prices of products at the first point of sale after production. Producer prices of industrial products are calculated according to CPA at 6-digit level and are composed by two sub-indices:

- PPI for domestic suppliers which measures the level of changes on the production prices of industrial products, produced and sold by producers in the domestic market;
- PPI at external market (Export Price Index) which measures the level of changes on the production prices of industrial products sold from producers at foreign market;

Producer price index is a combination of producer price index for domestic suppliers and export price index. The main source of information is SBS and weights are renovated every year.
PPI is used by many products and components at the SUT framework. This index is used for different analysis at 6-digit level according to CPA. At this situation the correspondence between products and prices is quite strong thereby ensuring a better quality. In the absence of such a level of detail is used the most aggregated product at 4 or 2-digit level of the respective group. Method of deflation also varies from SUT component. So for deflation of produced products, that means domestic products, is used PPI for domestic suppliers, while exports deflation is used Export Price Index. In this way, the consistency between products and prices is significantly increased.

Regarding to the use table components which are evaluated at purchaser prices, intermediate consumption matrix is divided into imported and domestic intermediate consumption. Imported uses are deflated using UVI (in absence of PPI for imported products) at product level (6-digit CPA), while domestic uses are deflated with PPI for domestic suppliers.

Consumer Price Index (CPI) – measures the change of the prices of a fixed basket of goods and services from base period to the current period. CPI is classified according to the international classification of consumption goods and services, COICOP. This index is used to deflate household final consumption expenditures at the most detailed level of COICOP. CPI is used even for services deflation on both sides, the supply and use, because the lack of a services production index in Albania.

Construction Cost Index (CCI) – measures the price development of the production factors raw materials, labour and other capital costs that are used in building projects. The expenditure classification is based on classification of EUROSTAT for Construction Cost Index. The new CCI have six main expenditure groups:

- Construction materials;
- Salaries expenditure;
- Machinery expenditure;
- Transport expenditure;
- Energy expenditure;
- Other costs;

CCI at the SUT framework is used to deflate construction products on the supply and use side.

Unit Value Index (UVI) – is an index, which measures the change in the average cost of goods. It is not price index since the changes may be due to price and quantity changes. UVI is used to deflate import of goods in the absence of an import price index which measures the rate of change over time in the prices of imported goods and services but it is very important to cover most of the products in detailed level. Many countries use a mix approach for deflating imports, which means a combination of UVI and MPI especially for goods that are not regular, or that are impacted from seasonal effects. UVI is estimated at 8-digit level of products according to CN nomenclature and is based on imports data. Information used from import data is listed below:

- date of importation (year and month);
- identification of importer;
- product classification at 8-digit CN;
- supplementary unit and net mass;
- value of imports (cif);
- custom duties, excise and value added taxes;

As Albania is a small country and there are not too many transactions, in this study are not taken in consideration the country of origin or mode of transaction. UVI estimation has been through several steps. Firstly, there are problems in fulfilling supplementary units and they are both taken into study for comparison (unit and weight). For a product of a specific year t was taken the unit fulfilled more by transactions. For comparisons reasons even at the successive year t-1 is used the same unit measure as in year t.

Second step of this method is the outlier elimination. Only those products with a transaction number greater ≥30 (normal distribution) were included in the study. Weight of products, after applying the method, is about 85% of the total import of goods. The same methods is applied in the previous year, but only for those products related to the current year, enabling consistency between two years.
In the third step for each product was created the unit value for both years for the whole list of linked products. The equation is presented as follows:

$$UV^{t}_{CN8_i} = \frac{V^{t}_{CN8_i}}{u^{t}_{CN8_i}} \quad \text{dhe} \quad UV^{t-1}_{CN8_i} = \frac{V^{t-1}_{CN8_i}}{u^{t-1}_{CN8_i}} \qquad (ek.6)$$

Where :
i Î {1, 2,.....,n }
t ® year
v ® value
u ® unit

After this control is decided which one must be used between net mass and supplementary unit. UVI by product is calculated following the formula below:

$$UVI_{t/t-1} = UV^{t}_{CN8_i} \Big/ UV^{t-1}_{CN8_i} \qquad (ek.7)$$

For deflation of products excluded from the study, as they have a relatively low weight, is used total UVI estimated according to the above method. This method has the advantage that we are changing the base every year which means that the product list is more representative for the current period.

Indices of agricultural and fishery products – for the estimation of agriculture and fishing products at constant prices were used price indices from the respective sector. In general, data on output and intermediate consumption in quantity and prices are available for each year at product level. Output and intermediate consumption estimations at previous prices are obtained by multiplying quantity at period t with prices of year t-1. Estimations are done at product level enabling a full consistency between prices and products.

Wage index for non-trading activities – For non-trading activities such as public administration, education and health were used respective average wage indices, reflecting changes in labour prices which are the main production factor for these sectors. For health and education activities is made a distinction between market and non-market production enabling in this way the use of specific indices for each case.

Taxes estimation at volume terms – for some of the SUT components is not possible to deflate by a specific price index. The same situation is even for taxes and subventions on products. They are directly related to the quantity or value of a good or service that is subject of a specific transaction. Taxes revenues of specific product are dependent by the quantity of products included in transaction, product prices and tax rate as %. So the estimation of taxes in volume terms is achieved by multiplying the product value at constant price of year t with the tax ratio of respective product at current prices of year t-1. In mathematical form it is expressed as:

$$T^{t}_{i_{kons}} = \frac{T^{t-1}_{i_{kore}}}{P^{t-1}_{i_{kore}}} \cdot P^{t}_{i_{kons}} \qquad (ek.8)$$

Where:

$T^{t}_{i_{kons}}$ → taxes at constant prices of product i for year t

$P^{t}_{i_{kons}}$ → product at constant prices for year t

$T^{t-1}_{i_{kore}}$ → taxes at current prices of product i for year t-1

$P^{t-1}_{i_{kore}}$ → product i at current prices for year t-1

For taxes on products this method is applied to the corresponding values of the products on which it is applied. In case of VAT this rate is applied on the value of household consumption expenditures because consumers are those who carry the total value of VAT. For import taxes are applied respective values of imported products, and so on for other tax categories. A change to the tax rate in the current year would reflect a change in price and not in volume.

Second category, taxes on domestic product is estimated in volume terms by applying product growth rate in current year to the previous year tax rates, at 2-digit of CPA. This is due to the low level of detail of taxes on domestic products. The method will be improved by applying the GDP growth rate of industries according to NACE classification.

Estimation of trade and transport margins in volume terms – is used the same logic as for taxes deflation in volume terms. As these margins are applied to the total supply, output and imports, the method mentioned above is applied to their amount. So the ratio of margins to the total output plus imports for period t-1, is multiplied by the total output plus imports at constant prices of period t.

After estimation of all SUT components at constant prices, next step is the balancing process. SUT tables at constant prices are based on balanced SUT at current prices, therefore is expected to have low discrepancies at product level on these derived tables. In case of presence of these differences is important to have a look at price indices used for a better specification.

7. Input-Output Tables

Supply and use framework is a key feature for the national accounts system and it is used as a balancing tool. Also they structure the data bases from which can be derived data for macroeconomic and impact analysis in the form of symmetric input output tables (IOT). Basically SUT are rectangular, so the number of products should not be necessarily equal to the number of industries. In practice, it is important a high level of detail in the products, so the number of products to be higher than the industries.

The conversion of SUT into IOT consists on removing secondary from the output matrix and respective inputs from the intermediate consumption matrix. The transformation from SUT to SIOT requires some additional tables of SUT at purchaser's prices and valuation matrices to convert into supply and use tables at basic prices, presenting separately imports and domestic production. Supply and use tables at basic prices are the base required to compile input output tables. In the SUT framework, imports are presented in the supply table at product breakdown but not divided by final demand in the use table. In these calculations the information of the origin of product used by each of the use components is not required. Final demand used by domestic producers in the production process should be assessed separately from imports.
The right method would be to derive from the SUT system tables for input-output of domestic product separately from input output tables of imported products.

7.1. Data base for the transformation

The data base for the transformation of symmetric input-output tables from supply and use tables comprises the following tables:

- Supply tables at basic prices
- Use table at basic prices
- Use tables for domestic output at basic prices
- Use tables for imports at basic prices

In a supply system at basic prices, the columns for trade and transport margins and net taxes on products become irrelevant in the supply table as the valuation matrices were deducted from the use table at purchasers' prices. However, non-deductible taxes less subsidies on products form an additional row in the use tables, as total uses continue to be valued at purchasers' prices.

The following will explain in detail four basic models of compiling symmetric input-output tables. These include two models that are based on the assumption of technology which generate input-output tables product-to-product. In this case the input-output tables are composed of homogeneous products by rows and homogeneous units of production (industries) by columns.
Two other models are based on the assumption of a fixed sales structure from where are derived industry-to-industry IOT. The results of these models are input-output tables with industries by rows and industries by columns. These two types of symmetric input-output tables are called product-to-product and industry-to-industry input-output tables.

The four basic transformation models used for compiling product-to-product or industry-to-industry IOT are based on the following assumptions:

a. Product technology assumption (Model A). Each product is produced in its own specific way, irrespective of the industry where it is produced. So technology used to produce a specific product is the same for all industries.
b. Industry technology assumption (Mode B) Each industry has its own specific way of production, irrespective of its product mix. In this model the economic activity does not change regardless the structure of the product that is producing.
c. Fixed industry sales structure assumption (Model C). Each industry has its own specific sales structure, irrespective of its product mix.
d. Fixed product sales structure assumption (Model D). Each product has its own specific sales structure, irrespective of the industry where it is produced.

There are two other transformation models that will be discussed:

a. The hybrid technology assumption. The hybrid technology assumption combines the product technology assumption and the industry technology assumption to avoid negatives in product-by-product input-output tables.
b. The Almon procedure. The Almon procedure is a mathematical algorithm designed for compiling product-by-product input-output tables which are based in essence on the product technology assumption but avoids by step-by-step procedure negatives in the derived input-output tables.

The two main purposes of compiling input-output and supply-use tables are: statistical and analytical analysis. They provide a control system to ensure the consistency between flows of products and services from different statistical data sources. Supply and use framework offers the integration and coordination of the economical statistics for the terminology, classifications used and numerical consistency of the data used in the system.

Input-output framework is appropriate for preparation of the national accounts economic data and point out the weaknesses of these data. in particular, this is important for price and volume measurements.
As an analytical tool, input-output data are integrated in macroeconomic models to analyse linkages between final demand and industries production levels. Input-output analysis can be used for other kind of analysis as impact analysis, employment impacts, analysis of bilateral structures and price change analysis.
A product-to-product table describes the technological relations between products and homogenous units of productions (industries). The intermediate consumption part describes, for each product, the amounts of products that were used to produce this product, irrespective of the producing industry.

Table 26: Input-output table at basic prices (product-to-product)

HOMOGENEOUS BRANCHES / PRODUCTS (CPA)		HOMOGENEOUS BRANCHES							FINAL USES								Total use at purchasers' prices
		Agriculture	Industry	Construction	Trade, hotels transport	Private services	Other services	Total	FCE by households	FCE by non-profit organisations	FCE by government	Gross fixed capital formation	Changes in inventories	Exports	Total		
No		1	2	3	4	5	6	7		8	9	10	11	12	14	16	17
1	Products of agriculture	Intermediate consumption at basic prices							Final demand at basic prices								
2	Products of industry																
3	Construction work																
4	Trade, hotels, transport services																
5	Private services																
6	Other services																
7	Total at basic prices																
8	Direct purchases abroad by residents																
9	Purchases on the domestic territory by non-residents																
10	Taxes les subsidies on products																
11	Total at purchasers' prices																
12	Compensation of employees	Value added at basic prices															
13	Other net taxes on production																
14	Consumption of fixed capital																
15	Operating surplus, net																
16	Value added at basic price																
17	Output at basic prices																
18	Imports CIF																
19	Supply at basic prices																

The final use part describes the uses of products in the economy without emphasizing if these are imported or domestic products. Also the quadrant below describes the components of value added are distributed over the production processes of the products in which the value added is actually generated. The total supply at basic prices can be derived by adding imports for each product.

7.2. Compilation of symmetric input-output table

The actual SUT framework is compiled from industries data which means that is used "top-down" model, so the total by industries is disaggregated by products. Models A and B product-to-product are excluded during the transition process of this system into IOT. Models C is based on industry-to-industry tables based on the assumption that each industry has fixed sale structure, irrespective of the industry where it is produced and model D eliminates negatives which corresponds even with the model used to derive IOT in our case.

Symmetric input-output table is derived by multiplying IO coefficients with corresponding output levels.
Use table = IO coefficient matrix * Supply table.$^{-1}$
IO coefficient matrix is calculated as:
IO coefficient matrix = Use table*(1- Supply table)
Irrespective of the method chosen, symmetric input output tables are not fully consistent with balanced supply and use tables, because of this the model is modified and differences are distributed for the compilation of a new use table.
Use table = IO coefficient matrix *Use table* difference matrix.
Below is described the technical view of SUT transformation into input-output tables according to model D. Industry x Industry Input-Output tables, Fixed product sales structure (Model D)

- Formulas:
- B = D,Z, diag(g)
- F = D,Y
- Coefficients:
- D,Z

These symbols have the following meaning:

- U: Intermediate consumption (product x industry)
- V': Output (product x industry)
- Y: Final demand (product x transaction)
- y: Total final demand (single number or 1x1)
- W: VA components (transaction x industry
- w: Total value added (single number or 1x1)
- q: Total use (product x 1)
- qT: Total use (industry x 1)
- gT: Total output (1 x industry)
- g: Total output (1 x product)
- B: IO intermediate demand (industry x industry)
- F: IO final demand (industry x transaction)
- S: IO intermediate demand (product x product)
- E: IO value added (transaction x product)

The operator ' transposes the matrix; "product" stand for the numbers of rows, "industry" for the num-ber of columns, "transaction" stands for the number of final demand categories,
Define:
Z = U,inv(diag(g)) (matrix of industry intermediate input coefficients) (com x act)
L = W,inv(diag(g)) (matrix of industry value added coefficients) (com x act)
C = V', inv(diag(g)) (matrix of market shares) (act x com)
D = V, inv(diag(q)) (matrix of market shares) (act x com)

The diag() operator makes a matrix with non zero elements only on the diagonal out of a column; the inv() operator inverts the elements of a matrix,

Annexes:
Annex 1: Abbreviations and meanings

HBS - Household Budget Survey
SBS - Structural Business Statistics
BEC – Broad economic activities
BoP – Balance of payments
C – Final consumption of household
CN – Combined Nomenclature
COICOP – Classification of Individual Consumption by Purpose
CPA – Classification of Products by Activity
CPC – Central Product Classification
ESA – European System of Accounts
GFCF - Gross Fixed Capital Formation
FIFO – First in – First out
FISIM - Financial Intermediation Services Indirectly Measured
HS – Harmonised System
CPI - Consumer Price Index
PPI - Producer Price Index
CCI – Construction Cost Index
ISIC - International Standard Industrial Classification
IC – Intermediate Consumption
LIFO – Last in – Firs out
CFM – Commodity Flow Method
NACE - Statistical Classification of Economic Activities
NEA – Nomenclature of Economic Activities
PLA – Profit and Loss Account
GDP - Gross Domestic Product
PRODCOM - Production Communautaire
SITC - Standard International Trade Classification
SNA – System of National Accounts
SUT - Supply and Use Tables
IOT – Input-Output Tables
VAT – Value Added Tax
UVI – Unit Value Index
GVA – Gross Value Added

Annex 2: Supply, use and input-output tables for year 2011

Annex 2.1: Supply table at basic prices

Code	Industries (NACE)	Aktivitetet NVE											
		Agriculture, hunting and forestry	Fishing	Mining and quarrying of energy prod. materials	Mining and quarrying of except energy prod. materials	Manufacture of prod. based on cereals	Other manufacture of food products	Manufacture of textile and leather products	Manufacture of wood, paper, furniture, publishing and priting	Manufacture of coke, refined petroleum products and nuclear fuel	Manufacture of chemicals, chemical products, rubber and plastic	Manufacture of other non-metallic mineral products	Manufacture of basic metals and fabricated metal products
	Products (CPA)	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
A1	Agriculture, hunting and forestry	238.681	0	0	0	0	0	0	0	0	0	0	0
A2	Fishing	0	4.220	0	0	0	0	0	0	0	0	0	0
A3	Mining, quarrying of ener. prod. mat.	0	0	50.733	0	0	0	0	0	0	0	0	0
A4	Mining, quarr. of except ener. prod. mat.	0	0	0	35.257	2	0	0	5	0	0	40	81
A5	Manuf. of prod. based on cereals	88.493	1.357	0	0	49.777	0	3	0	0	0	0	0
A6	Other manufacture of food products	0	0	0	0	0	915	0	0	0	0	0	0
A7	Manuf. of textile and leather prod.	42	0	0	0	0	0	43.329	0	0	0	0	105
A8	Manuf. of wood, paper, furniture publishing and printing	0	0	0	95	0	0	92	49.524	0	344	0	34
A9	Manuf. of coke, refined petroleum products and nuclear fuel	0	0	0	0	0	0	0	0	17.291	0	0	0
A10	Manuf. of chemicals, chemical prod., rubber and plastic products	0	0	0	0	165	0	59	269	0	15.282	114	0
A11	Manufacture of other non-metallic mineral products	0	0	0	271	0	0	0	0	0	104	49.506	0
A12	Manufacture of basic metals and fabricated metal products	0	0	0	0	0	0	0	9	0	0	0	40.204
A13	Manufacture of machinery and equipment	0	0	0	0	0	0	0	0	0	0	0	0
A14	Electricity and water supply	0	0	0	0	0	0	0	0	0	0	0	0
A15	Construction	0	0	128	912	77	0	0	125	0	652	603	0
A16	Trade	0	17	0	284	2.553	0	272	4.155	0	456	459	4.863
A17	Hotels and restaurants	0	209	5	0	16	0	46	10	0	0	0	0
A18	Transports	0	0	0	45	145	0	0	0	0	175	56	4.593
A19	Post and communication	0	0	0	0	0	0	0	0	0	0	0	0
A20	Financial activities	0	0	0	0	0	0	0	0	0	0	0	0
A21	Real estate and business activities	0	0	0	0	37	0	16	506	0	0	0	14
A22	Public administration and defence, compulsory social security	0	0	0	0	0	0	0	0	0	0	0	0
A23	Education	0	0	0	0	0	0	0	0	0	0	0	0
A24	Health	0	0	0	0	0	0	0	0	0	0	0	0
A25	Other community, social and personal service activities	0	0	20	20	0	0	3	206	0	0	0	0
	Total output of industries	327.216	5.803	50.886	36.884	52.772	915	43.821	54.809	17.291	17.013	50.778	49.894

Annex 2.1: Supply table at basic prices (cont..)

Code	Industries (NACE)	Industries NACE												
		Manufacture of machinery and equipment	Electricity and water supply	Construction	Treade	Hotels and restaurants	Transport	Post and communication	Financi activities	Real estate and business activities	Public administration and defence, compulsory social security	Education	Health	Other community, social and personal service activities
	Products (CPA)	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25
A1	Agriculture, hunting and forestry	0	0	0	0	0	0	0	0	0	0	0	0	0
A2	Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0
A3	Mining and quarrying of energy producing materials	0	0	0	0	0	0	0	0	0	0	0	0	0
A4	Mining and quarrying of except energy producing materials	0	0	1.060	53	0	0	0	0	0	0	0	0	0
A5	Manufacture of products based on cereals	0	0	0	585	0	0	0	0	0	0	0	0	12
A6	Other manufacture of food products	0	0	0	0	0	0	0	0	0	0	0	0	0
A7	Manufacture of textile and leather products	0	0	0	25	0	0	0	0	0	0	0	0	0
A8	Manufacture of wood, paper, furniture, publishing and priting	0	0	78	50	0	0	2.300	0	0	0	0	0	0
A9	Manufacture of coke, refined petroleum products and nuclear fuel	0	0	0	0	0	0	0	0	0	0	0	0	0
A10	Manufacture of chemicals, chemical products, rubber and plastic products	0	0	4	3	0	0	0	0	0	0	0	0	0
A11	Manufacture of other non-metallic mineral products	0	0	71.997	36	32	0	0	0	0	0	0	0	0
A12	Manufacture of basic metals and fabricated metal products	0	0	0	18	0	0	0	0	0	0	0	0	0
A13	Manufacture of machinery and equipment	4.207	0	0	0	0	0	0	0	0	0	0	0	0
A14	Electricity and water supply	0	43.412	0	0	0	0	0	0	0	0	0	0	0
A15	Construction	0	0	347.534	1.066	44	98	0	0	215	0	0	1.946	9
A16	Trade	0	0	6.312	211.600	435	2.215	2	0	5	0	53	1.455	14
A17	Hotelsand restaurants	0	0	538	1.833	46.445	40	0	0	275	0	23	98	39
A18	Transport	0	0	7.801	4.113	0	121.721	0	0	0	0	84	0	0
A19	Post and communication	0	0	0	0	0	0	80.020	0	161	0	0	0	0
A20	Fnancil aktivities	0	0	0	0	0	0	0	50.983	0	0	0	0	0
A21	Real estate and business activities	0	0	36.811	292	13	4	3.506	0	166.891	230	887	0	3.632
A22	Public administration and defence, compulsory social security	0	0	0	0	0	0	0	0	0	74.028	789	302	6.947
A23	Education	0	0	189	1	0	0	0	0	0	0	57.457	2.249	5.566
A24	Health	0	0	13	4	0	0	0	0	0	0	3.258	41.172	0
A25	Other community, social and personal service activities	0	54	1.398	2	7	0	0	0	2	0	53	193	65.049
	Total output of industries	4.207	43.466	473.733	219.679	46.976	124.078	85.828	50.983	167.549	74.258	62.604	47.415	81.269

Annex 2.1: Supply table at basic prices (cont..)

Code	Industries (NACE)	Total	Imports (CIF)	Total supply at basic prices	Taxes less subsidies on products	Trade and transport margins	Total supply at purchasers' prices
	Products (CPA)						
A1	Agriculture, hunting and forestry	238.681	23.942	262.624	6.875	51.484	320.983
A2	Fishing	4.220	492	4.712	130	1.157	5.999
A3	Mining and quarrying of energy producing materials	50.733	3.369	54.102	1.643	1.438	57.182
A4	Mining and quarrying of except energy producing materials	36.498	1.446	37.944	695	5.395	44.034
A5	Manufacture of products based on cereals	140.228	54.114	194.342	22.309	46.887	263.537
A6	Industri të tjera të produkteve ushqimore	915	8.108	9.023	5.713	2.337	17.073
A7	Manufacture of textile and leather products	43.500	57.389	100.889	5.084	25.917	131.890
A8	Manufacture of wood, paper, furniture; publishing and printing	52.515	29.031	81.546	6.404	21.664	109.614
A9	Manufacture of coke, refined petroleum products and nuclear fuel	17.291	65.756	83.046	58.284	12.157	153.487
A10	Manufacture of chemicals, chemical products, rubber and plastic products	15.896	57.565	73.461	12.317	23.849	109.627
A11	Manufacture of other non-metallic mineral products	121.946	17.498	139.443	6.151	24.713	170.308
A12	Manufacture of basic metals and fabricated metal products	40.231	62.260	102.491	10.600	26.529	139.621
A13	Manufacture of machinery and equipment	4.207	108.685	112.892	22.324	30.734	165.951
A14	Electricity and water supply	43.412	21.187	64.599	-3.150	0	61.448
A15	Construction	353.411	389	353.800	4.967	0	358.766
A16	Trade	235.149	14.111	249.260	588	-220.511	29.337
A17	Hotel and restaurants	49.578	41.341	90.919	-45	0	90.873
A18	Transport	138.734	70.541	209.275	21	-54.907	154.388
A19	Post and communication	80.181	18.836	99.017	1.598	442	101.057
A20	Financial activities	50.983	15.570	66.553	266	0	66.819
A21	Real estate and business activities	212.839	13.400	226.239	1.320	489	228.048
A22	Public administration and defence, compulsory social security	82.066	1.305	83.371	10	0	83.382
A23	Education	65.462	4.969	70.431	13	0	70.444
A24	Health	44.446	11.498	55.944	91	0	56.036
A25	Other community, social and personal service activities	67.005	35.292	102.297	5.293	227	107.818
	Total output of industries	2.190.127	738.093	2.928.221	169.503	0	3.097.724

Annex 2.2: Use table

Code	Industries (NACE)	Industries NACE											
		Agriculture, hunting and forestry	Fishing	Mining and quarrying of energy producing materials	Mining and quarrying of except energy producing materials	Manufacture of products based on cereals	Other manufacture of food products	Manufacture of textile and leather products	Manufacture of wood, paper, furniture, publishing and printing	Manufacture of coke, refined petroleum products and nuclear fluer	Manufacture of chemicals, products, rubber and plastic products	Manufacture of other non-metallic mineral products	Manufacture of basic metals and fabricated metal products
	PRODUKTE (CPA)	A1	A2	A3	A4	A5	A6	A7	A8	A9	A10	A11	A12
A1	Agriculture, hunting and forestry	68.849	7	1	2	19.899	513	1.552	1.556	0	26	78	1
A2	Fishing	0	98	0	0	522	0	1	5	0	0	26	0
A3	Mining and quarrying of energy producing materials	11	0	348	89	0	0	0	3	13.632	84	2.172	1.511
A4	Mining and quarrying of except energy producing materials	3	0	489	3.901	19	0	27	129	1	227	4.334	519
A5	Manufacture of products based on cereals	1.372	1.684	3	168	6.688	0	41	89	1	13	1	0
A6	Other manufacture of food products	0	0	0	0	0	0	0	0	0	0	0	0
A7	Manufacture of textile and leathe products	0	311	8	36	323	6	13.165	934	0	400	59	41
A8	Manufacture of wood, paper, furniture; publishing and printing	29	55	202	2.176	1.216	20	1.167	20.236	0	582	4.262	3.325
A9	Manufacture of coke, refined petroleum products and nuclear fuel	2.334	1.157	505	5.107	747	36	444	706	1.225	344	5.921	3.879
A10	Manufacture of chemicals, chemical products, rubber and plastic products	9.476	12	725	1.034	3.728	24	798	2.259	177	8.212	1.211	3.141
A11	Manufacture of other non-metallic mineral products	2.468	4	0	1.648	636	5	12	78	25	932	11.986	139
A12	Manufacture of basic metals and fabricated metal products	14	7	3.930	3.847	1.756	12	83	4.932	234	535	1.096	19.102
A13	Manufacture of machinery and equipment	45	6	6.193	2.171	1.102	9	1.634	1.045	44	183	824	1.556
A14	Electricity and water supply	1.456	36	275	426	885	13	395	825	282	257	688	645
A15	Construction	176	5	6	29	57	7	120	184	0	129	2.450	15
A16	Trade	320	1	37	25	53	0	79	98	0	13	81	24
A17	Hotels and restaurants	0	0	6	0	32	0	10	9	0	0	0	0
A18	Transport	2.021	15	548	987	149	0	1.279	1.803	0	262	787	1.475
A19	Post and communication	0	62	134	152	124	4	102	285	0	64	537	94
A20	Financial activities	325	76	887	233	722	12	624	787	218	296	857	657
A21	Real estate and business activities	3.308	210	1.372	744	1.083	19	871	2.166	231	296	777	666
A22	Public administration and defence, compulsory social security	0	0	0	0	0	0	0	0	0	0	0	0
A23	Education	0	7	44	102	42	15	86	53	0	14	24	46
A24	Health	0	1	8	19	8	3	16	10	0	3	5	9
A25	Other community, social and personal service activities	0	0	0	0	0	0	0	0	0	0	0	0
	Total intermediate consumption of industries	92.205	3.752	15.723	22.897	39.789	697	22.505	38.192	16.070	12.872	38.177	36.845
	Value added of industries	235.011	2.051	35.163	13.987	12.984	219	21.316	16.617	1.221	4.141	12.602	13.049

Annex 2.2: Use table (cont..)

Code	Industries (NACE)	Industries NACE												
		Manufacture of machinery and equipment	Electricity and water shpërndarja supply	Construction	Trade	Hotels and restaurants	Transport	Post and communication	Financial activities	Real estate and business activities	Public administration and defence, compulsory social security	Education	Health	Other community social and personal service activities
	Products (CPA)	A13	A14	A15	A16	A17	A18	A19	A20	A21	A22	A23	A24	A25
A1	Agriculture, hunting and forestry	0	0	658	7.866	2.979	8	0	0	298	84	15	9	122
A2	Fishing	0	0	115	40	1.783	0	0	0	45	18	56	26	54
A3	Mining and quarrying of energy producing materials	0	0	3.210	38	0	13	0	0	0	0	0	0	0
A4	Mining and quarrying of except energy producing materials	7	3	17.686	1.005	0	569	0	0	8	0	0	0	50
A5	Manufacture of products based on cereals	0	0	104	7.858	9.330	1	24	0	71	1.556	540	973	2.213
A6	Other manufacture of food products	0	0	0	0	0	0	0	0	0	0	0	0	0
A7	Manufacture of textile and leathe products	1	1	2.745	1.850	286	280	26	0	2.540	741	195	146	556
A8	Manufacture of wood, paper, furniture, publishing and printing	130	106	5.436	5.755	471	924	6.186	215	3.826	2.666	1.674	443	4.693
A9	Manufacture of coke, refined petroleum products and nuclear fuel	9	1.329	33.575	19.055	622	30.503	317	67	5.963	2.260	977	1.038	2.410
A10	Manufacture of chemicals, chemical products, rubber and plastic products	135	237	6.356	2.703	317	1.421	397	106	650	698	778	7.105	1.710
A11	Manufacture of other non-metallic mineral products	16	80	132.101	4.958	498	159	51	0	116	0	0	0	42
A12	Manufacture of basic metals and fabricated metal products	336	1.065	38.036	1.587	34	63	657	30	863	80	519	147	915
A13	Manufacture of machinery and equipment	1.100	78	11.720	7.016	136	10.983	4.655	93	3.409	1.193	1.167	514	1.695
A14	Electricity and water supplu	40	111	2.827	1.428	699	1.494	993	343	1.436	962	770	980	1.498
A15	Construction	4	1.279	28.878	270	484	2.784	3	0	6.019	470	468	613	422
A16	Trade	6	37	152	197	5	391	16	47	14	129	11	59	5
A17	Hotels and restaurants	0	13	142	35	19	1.400	0	142	469	1.037	491	457	2.708
A18	Transport	87	984	4.201	2.341	222	14.788	1.682	69	2.793	895	583	204	1.735
A19	Post and communication	44	4.596	3.237	880	732	1.763	14.141	2.552	2.996	892	433	157	1.762
A20	Financial activities	87	2.050	6.358	9.048	1.256	3.581	530	4.804	1.369	917	1.023	1.029	2.973
A21	Real estate and business activities	161	3.433	8.199	5.225	2.220	6.458	22.211	8.638	15.836	847	900	413	10.362
A22	Public administration and defence, compulsory social security	0	0	0	0	0	0	0	0	0	4.972	1.068	282	1.097
A23	Education	94	45	1.114	143	113	396	585	362	1.987	656	88	21	937
A24	Health	18	9	210	27	21	75	110	0	375	171	24	8	318
A25	Other community, social and personal service activities	0	0	3.669	0	0	0	0	39	20	1.770	169	1.008	1.150
	Total intermediate consumption of industries	2.277	15.455	310.729	79.326	22.227	78.055	52.583	17.506	51.103	23.013	11.949	15.634	39.428
	Value added of industries	1.931	28.011	163.004	140.354	24.749	46.023	33.245	33.477	116.446	51.245	50.655	31.781	41.841

Annex 2.2: Use table (cont..)

Code	Industries (NACE)	Total intermediate consumption by products	Exports (FOB)	Final consumption expenditure by households	Final consumption expenditure by government and NPISH	Gross capital formation	Changes in inventories	Total use at purchasers' prices
	PRODUKTE (CPA)							
A1	Agriculture, hunting and forestry	104.521	3.777	202.787	493	9.406	0	320.983
A2	Fishing	2.790	244	2.949	17	0	0	5.999
A3	Mining and quarrying of energy producing materials	21.111	31.785	0	0	0	4.287	57.182
A4	Mining and quarrying of except energy producing materials	28.976	11.833	1.131	0	0	2.093	44.034
A5	Manufacture of products based on cereals	32.727	8.938	215.671	0	0	6.201	263.537
A6	Other manufacture of food products	0	38	16.843	0	0	192	17.073
A7	Manufacture of textile and leather products	24.650	65.951	37.803	0	0	3.486	131.890
A8	Manufacture of wood, paper, furniture; publishing and printing	65.795	6.949	30.880	427	2.126	3.436	109.614
A9	Manufacture of coke, refined petroleum products and nuclear fuel		3.283	27.679	0	0	1.995	153.487
A10	Manufacture of chemicals, chemical products, rubber and plastic products	53.411	2.863	50.576	0	1	2.776	109.627
A11	Manufacture of other non-metallic mineral products		6.571	2.860	0	0	4.924	170.308
A12	Manufacture of basic metals and fabricated metal products	79.878	40.254	7.318	0	5.231	6.939	139.621
A13	Manufacture of machinery and equipment	58.568	7.998	30.609	0	66.203	2.573	165.951
A14	Electricity and water supply supply	19.763	6.690	34.208	788	0	0	61.448
A15	Construction	44.873	8.519	518	13	304.843	0	358.766
A16	Trade	1.800	13.591	13.946	0	0	0	29.337
A17	Hotels and restaurants	6.973	44.313	39.588	0	0	0	90.873
A18	Transport	39.911	62.234	51.691	552	0	0	154.388
A19	Post and communication	35.743	32.735	32.579	0	0	0	101.057
A20	Financial activities	40.720	7.809	18.291	0	0	0	66.819
A21	Real estate and business activities	96.645	27.336	100.847	437	2.782	0	228.048
A22	Public administration and defence, compulsory social security	7.421	3.900	2.749	69.313	0	0	83.382
A23	Education	6.972	1.892	19.578	42.002	0	0	70.444
A24	Health	1.448	3.983	21.801	28.804	0	0	56.036
A25	Other community, social and personal service activities	7.827	38.906	59.062	2.023	0	0	107.818
	Total intermediate consumption of industries	1,059,007	442.390	1.021.965	144.869	390.592	38.902	3.097.724
	Value added of industries	1,131,121						

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