Structural Aspects of the European Union Economy

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Abstract:

The paper analyzes the input-output structure of European economy in 2010, based on six main economic sectors, for better characterizing the backward and forward linkages of inter-industrial economic flows. The changes of final demand and of sectoral production can be analyzed in the propagation processes, allowing to know the behavior at macroeconomic level of European economy. The common economic policies at European level can be undertaken to keep the equilibrium between different sectors, to stimulate the sectors with high levels of productivity, to ensure the efficiency of using the resources, and the sustainability of economic development, which are the purposes of a smart development.

Key Words: *input-output table, backward linkage, forward linkage, technological inter-linkages, output multipliers*

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1. Introduction

The transmission of National Accounts to Eurostat, in the field of Supply, Use and Input-Output tables, for each Member State of the European Union was established as compulsory by the European System of Accounts (ESA95).

The national Supply and Use tables (SUT) are annually required and the Symmetric Input-Output tables (SIOT) at every five years. The standardized format of reporting has 64 industries (NACE rev.2) and 64 products (CPA 2008).

The European Supply and Use tables and the Input-Output table, for each year, are obtained by aggregating the Supply and Use tables, at basic prices, of all EU Member States. The European Input-Output tables in NACE Rev.2 were first released for 2008, in October 2012. Eurostat established the transmission deadline for the data of every year, for EU States, at three years after the end of the reference year.

European System of Accounts 2010, a development of the ESA 2008, introduced an extension of the consolidated tables for environment; the environmental input-output tables by industries and private households considering certain types of air emissions ("Technical Documentation on the European consolidated tables for years 2010 and 2011", July 2014, European Commission, http://epp.eurostat.ec.europa.eu).

The European transmission of National Accounts according with ESA 2010 became mandatory for the year 2010. By the end of 2014, Member States of European Union should send the Supply, Use and Input-Output tables (ESA 2010), for the years 2010 and 2011.

2. Methodological Aspects about Aggregation of National Input-Output Tables at EU Level

Each EU member state transmits to Eurostat the Supply and Use tables in basic prices and purchaser prices. Problems of aggregation process are related to lack of the same basic prices for indicators of the Supply and Use tables reported to Eurostat by the EU member states. Another difficult aspect is that of transforming the indicators from Use tables in purchaser prices to basic prices and also the lack of public sources of data.
The Use table must separate the import use and the domestic use part. The total uses at basic prices have to be split into domestic and imports intermediate and uses of final demand. The imports and exports of each country must be separated from domestic supply and use. The recorded data of imports and exports are not separated for each member state. The usual data sources are the external trade data and the balance of payments data.

The Import Use table has separated the intra-EU import use table and an extra-EU import use table. By aggregation at EU economy level there are considered all domestic use tables, intra-EU import use, and extra-EU import use tables.

The sum of intra-EU import uses with the intra-EU export supply totals should be equal from the theoretical point of view, but in practice there are differences caused by the valuation methods and the reports of different countries. After checking and neglecting the intra-EU import use and intra-EU export supply, the data is rebalanced and the differences are considered to extra-EU level, as the rest of world.

The flows of *trade* sector must be corrected because the intra-EU trade is considered to be at EU level as EU internal inter-sectoral flows (Thalassinos and Pociovalisteanu, 2009, Pociovalisteanu et al. 2009).

The consolidated EU Supply and Use Table (SUT) for EU-27 was obtained by aggregating domestic SUT of each EU country and intra-EU import use and export supply tables.

The exports in the aggregate table are recorded in basic prices and the imports are valued in cost-insurance-freight prices. When merging the intra-EU import table and the domestic intermediate table of each country, they have to be in the same prices. The difference in valuation appears when the domestic table and the intra-EU exports in basic prices are balancing the intra-EU import table in c.i.f. prices. Between exports in basic prices and imports in cost-insurance-freight prices there are the following addings: taxes less subsidies paid in the country of export, trade and transport margins for transportation to the border of the exporting country, and international trade and transport margins for the transport to the border of the importing country.

The situation when the value of exporting country does not match that of the importing country for the same trade flow is called the *mirror trade statistics puzzle*. The exports in free-on-board prices imply structural differences when they become imports in cost-insurance-freight prices.
These structural differences envisage the international trade and transport margins added to the price of goods across national borders. For the exporting country (f.o.b.), the trade and transport services are recorded on row to the services sectors. For the importing country (c.i.f.), the trade and transit margins used to transport are included in the price of goods to the corresponding industry, respectively activity sector.

Even the balancing of the trade and transport margins recorded as exports by a country and that part included in imported goods by another country, there will be some differences when foreign carriers are doing trade and transport services. There are also other reasons as: methodological differences, statistical issues, different practices, lags, currency conversion rates which cause the difference between export

and import values at EU level. ("Technical Documentation eeSUIOT project: Creating consolidated and aggregated EU27 Supply, Use and Input- Output Tables, adding environmental extensions (air emissions), and conducting Leontief-type modelling to approximate carbon and other 'footprints' of EU27 consumption for 2000 to 2006", Eurostat &JRC, p. 23, http://ec.europa.eu/eurostat/cache/metadata/Annexes/naio_esms_an1.pdf).

Eurostat established aggregated SUT also for EU countries of Euro area. Eurostat calculated two Use tables: one for imports intra Euro area and the second for imports extra Euro area.

3. Condensed Input-Output Tables for EU Economy, in 2010 and 2011

The approach product-by-product is considered to be important for symmetric input-output table (SIOT), according to ESA 2010.

We have used the *Symmetric input-output table for domestic output at basic prices (product by product)* and *Symmetric input-output table for imports at basic prices (product by product)* for EU, at current prices, in millions euro, extracted from the archive of files from Eurostat databases. Summarizing data for six levels of aggregate branches of Classification of Products by Activity (CPA), as defined in "*Eurostat Manual of Supply, Use and Input-Output Tables*" (Eurostat, 2008 Edition, p. 480), there were obtained Table 1 for 2010 and Table 2 for 2011.

The condensed form of economic structure of European Union in 2010 and 2011, is considering the following six sectors, as in the Supply and Use Tables at basic prices of EU27 for the year 2000 at current prices, millions euro ("Technical Documentation eeSUIOT project: Creating consolidated and aggregated EU27 SUIOT", Eurostat, http://ec.europa.eu/eurostat/cache/metadata/Annexes/naio_esms_ an1.pdf):
- Agriculture: Products of agriculture, forestry, fisheries and aquaculture (A+B);
- Manufacturing: Products of mining and quarrying, manufactured products and energy products (C+D+E);
- Construction: Constructions and construction works (F);
- Trade: Wholesale and retail trade, repair services, hotel and restaurant services, transport and communication services (G+H+I);
- Business services: Financial intermediation services, real estate, renting and business services (J+K);
- Other services (L to U).

This condensed presentation form of the European Union economy can offer some insights of the structural aspects of the six sectors. The consideration of imports extra-EU and intra-EU, and also the exports intra-EU and extra-EU is solved by some adjusting balancing procedures ("Technical Documentation eeSUIOT project:

Creating consolidated and aggregated EU27 SUIOT", Eurostat & Joint Research Centre, http://ec.europa.eu/eurostat/cache/metadata/Annexes/naio_esms_an1.pdf).

European GDP was calculated for both analyzed years: 2010 and 2011, based on the condensed tables obtained from the input-output tables of domestic output and imports.

4. European Union GDP, in 2010 and 2011

The European GDP, valued at market prices can be determined in the three ways, based on the data from Table 1, for 2010 and from Table 2, for 2011 (http://ec.europa.eu/eurostat/web/esa-supply-use-input-tables/methodology/supply-use-tables):
- according to the production approach, as:
GDP = Output at basic prices - Intermediate consumption at purchasers' prices + Taxes less subsidies on products or
GDP = Output at basic prices – (Domestic products + Imported products for intermediates) + Taxes less subsidies on products for final uses
- according to the income approach, as:
GDP = (Compensation of employees + Other net taxes on production + Operating surplus, gross) + Taxes less subsidies on products = Value added at basic prices + Taxes less subsidies on products
- according to expenditure approach, as:
GDP = Final Uses – Imports = [(Private consumption + Government consumption) + (Gross fixed capital formation + Changes in inventories and valuables) + Exports] – Imports = Final consumption expenditure + Gross capital formation + (Exports – Imports) = Final consumption expenditure + Gross capital formation - Net Exports.

The calculated values of EU GDP are presented for the three approaches in both Table 1, for 2010 and Table 2, for 2011.

The evolution of European Union GDP at constant prices 2010, in millions euro ("GDP and main components", http://ec.europa.eu/eurostat/data/database) during the period 2000-2014 is presented in Figure 1. On the secondary axis there are shown the dynamic indices with fix base in year 2000.

The economic crisis from the end of 2008 is obviously seen in Figure 1; the falling year 2009 has changed the tendency of EU development, having to be recovered in a long period.

5. Input Coefficients for EU Economy, in 2010 and 2011

The indicators in quadrant I, of the two Input - Output tables, are the intermediates representing the inter-industry flows of goods and services from the row producer sector *i*, to the column consumer sector *j*.

The structure of production activity of each sector is described by the input coefficients and output coefficients, which can show the forward and the backward linkages between sectors.

The *input coefficients, a_{ij}*, are calculated by dividing each entry of the rows, x_{ij}, by the corresponding column total, x_j. The input coefficients for domestic intermediates of each sector are defined as: $a_{ij} = x_{ij}/x_j$, where:
a_{ij} = input coefficient for domestic goods and services of sector *j* from sector *i* (i=1, 6; j=1, 6)
x_{ij} = flow of domestic commodity *i* to sector *j*
x_j = output of sector *j*

The meaning of the *input coefficient a_{ij}*, is the value of the used products of sector *i*, to produce one unit of output *j*. The input coefficients, seen on the column of a sector, show the cost structure of the output of that sector, showing the shares of costs for goods and services of the other sectors, and for primary inputs.

The input coefficients on column, for each sector, show the direct requirements for EU intermediates from the other sectors, for obtaining one unit of final demand in that sector. These input coefficients are the "technical" coefficients of a matrix, *A*. The input coefficients on the diagonal of matrix are the intra-sectoral consumption, meaning the EU intermediates produced and consumed within each sector, as direct effects of intermediates. Table 3 and 4 contains the input coefficients for the analyzed years: 2010 and 2011.

The sectoral own consumption in Agriculture is the lowest face to the other sectors, in both analyzed years: 11.13% in 2010 and 10.48% in 2011. The internal consumption of Manufacturing is the greatest face to the other sectors, almost the same, around 33%, in both years. Business services had almost the same weight of 22%; in Construction, the internal consumption decreased from 18.3% in 2010 to 16.9% in 2011. The own consumption in Trade had the same tendency of decreasing from 16.8% in 2010 to 15.8% in 2011, and the sector Other services had kept at around 14%.

Agriculture sector had bought from Manufacturing sector the proportion of 18.7% of its output in 2010 and 17.5% in 2011. Only Construction sector had used around 19% of its output in both years, from Manufacturing sector, face to all other sectors which had the greatest proportions of output allocated for their own consumption.

The direct effects of EU intermediates in the sectoral output varied in 2010 between 33% in Other services and 59% in Manufacturing; in 2011, between 31% in Other

services and 58.5% in Manufacturing. Almost all sectors had recorded slowly decreasing of their input coefficients in 2011 face to 2010, except Business services, the only one which had a very low increase with less that 0.5%, in 2011 face to 2010.

At EU economy level, the intermediate proportion in the whole EU output was 46.4%, in 2010, and had decreased at 45.1%, in 2011. The decreasing of the production cost of EU sectors and at EU level represents a good aspect of saving resources.

6. Output Multipliers of EU Economy, in 2010 and 2011

The Leontief matrix *(I - A)*, where *A* is the *technological matrix* of input coefficients and *I* is the unit matrix, shows the input direct requirements for EU intermediates.

The ones on the diagonal of unit matrix, *I*, signify one unit of final demand of each sector. On the diagonal of Leontief matrix, there are the proportions of net output of sectors for all the other sectors. These proportions are calculated for each sector, as a difference between the one unit of its final demand and its intern consumption for obtaining it. The results have positive signs and represent the output produced for the other sectors and implicitly their revenues. All the other coefficients of Leontief matrix are negative, meaning costs for the input requirements.

The Leontief matrices for EU economy, in 2010 and 2011 are presented in Table 5 and Table 6.

The direct requirements for EU intermediate production are the highest for Agriculture, both in 2010 and 2011, of about 89%. Agriculture is the most important sector for all the others. The percentages on the diagonal were mostly the same for all sectors, in both years. After the highest level of Agriculture, the sectors can be mentioned, in descending order of their direct requirements: Other services with 85% - 86%, Trade with 83% - 84%, Construction with 81% - 83%, followed by Business services with 77% and Manufacturing with 66%.

If the *direct input requirements* are defined by matrix *I - A*, the inverse Leontief matrix $(I - A)^{-1}$, which is equal with the sum of power matrices of *A*, meaning: $(I - A)^{-1} = I + A + A^2 + A^3 + ... + A^n$, shows *the direct input requirements* plus the *indirect effects* from the previous stages of production.

The *direct and indirect input requirements* of the EU economy are presented for 2010, in Table 7 and for 2011, in Table 8.

An output multiplier of sector *j* is the sum of productions of all sectors of EU economy, from all stages of production in order to produce one unit of final demand

j. The *output multiplier* of each sector is the sum of direct and indirect requirements which can be read at the column sum of that sector, for both years, to compare them. For 1 million euro of final demand in Manufacturing, the total effect induced in EU economy was 2.1947 million euro, in 2010 and 2.1592 million euro, in 2011. The output multiplier of Manufacturing was the greatest, face to the other sectors, both in 2010 and in 2011. The other sectors, in descending order of their effects induced in EU economy, in 2010, were: Construction, Agriculture, Trade, Business services and Other services. In 2011, the two sectors: Trade and Business services, have changed their places between them.

As a conclusion of the comparison of the sectoral output multipliers in both years, we can notice that in 2011, all of them have decreased, showing a positive aspect of changing EU economic activity, face to 2010. The production requirements in 2011 are lower than those in 2010.

The intern values of the direct and indirect requirements of sectors from the diagonal of the inverse Leontief matrix represent own revenues: one unit of its final demand and their own direct and indirect requirements for EU intermediates products. The decreasing values on the matrix diagonal show that all sectors except Manufacturing, had diminished their own costs by decreasing their own direct and indirect requirements for intermediate production. This is a positive aspect of increasing the efficiency and productivity of sectors. The intern direct and indirect requirements of Manufacturing sector are the greatest, followed by Business services, Trade, Construction, Other services and Agriculture – the same order in both analyzed years.

The output multiplier represents the cumulative revenues of each sector: one unit of final demand of the sector and the direct and indirect requirements for intermediate production of the other sectors.

The results put in evidence that Manufacturing sector has the greatest requirements, but also it is generating the highest effects in EU economy.

The reduced direct and indirect production requirements of all sectors in EU economy in 2011 can be interpreted as an increasing of global economic efficiency at EU level.

7. Inputs of Production Activities in EU Economy, in 2010 and 2011

The input coefficients of *domestic production*, of *import*, of the *supply* calculated as sum of *domestic production, import* and *taxes less subsidies on products*, and the input coefficients of *income* and *gross fixed capital formation* – are presented for 2010 and 2011, in Table 9.

The sectoral input coefficients for domestic intermediates goods and services for production have decreased in almost all sectors, varying between the lowest value of 0.2% in Business services to the greatest of 3.5% in Agriculture. At EU level, the input coefficient of domestic production decreased with 1.2% from 46.3% to 45.1%.

The weights of imported goods and services have increased in almost all sectors; at EU level, the increasing of imports in 2011 was higher with 0.5% face to 2010.

The sectoral intermediate consumption at EU level have decreased in 2011, especially for Agriculture, with 3.05% face to 2010, amount which is found in favor of value added in Agriculture. Slowly increasing of value added were recorded, less in Business services, where the *Taxes less subsidies on products* have been increased from 1.8% to 2%. The investments - *Consumption of fixed capital*, have kept almost the same weights, at all sectors.

In order to find the direct and indirect effects of all the inputs, the vectors of input coefficients, *B*, for each input of production activities are multiplied by the inverse matrix Leontief, using the equation $z = B(I - A)^{-1}$, where z is the vector of output multipliers. Table 10, contains the output multipliers for EU production activities, in 2010. On the first row of Table 10, the coefficients of *final demand* are the ones, because the effects of inputs are calculated for obtaining one unit of final demand.

The sum of output multipliers of *Domestic intermediates*, *Imported goods and services* and *Taxes less subsidies on products*, gives the direct and indirect effects of *Intermediate consumption* of each sector, throughout economy.

The sector of *Other services* had the lowest value of direct and indirect effect throughout EU economy face to the other sectors, in 2010. For each final demand of 1,000,000 euro in this sector, the direct and indirect effects are of 1,604,400 euro. The requirements of 604,400 euro for the domestic intermediates, plus 44,000 euro for imports – the lowest value of all sectors, and plus the lowest taxes of 26,600 euro, are summing 674,900 euro for *intermediate consumption*. This sector generated the greatest *Value added* of all sectors, of 929,500 euro, from which a *Net operating surplus* of 250,600 euro, with 161,200 investment and compensation for employees of 512,700 euro. The sum of 674,900 euro for *intermediate consumption* and the *value added* of 929,500 euro gives 1,604,400 euro. This value includes the direct effect of 367,100 euro (input coefficients in Table 9, Other services, in 2010).

The greatest value of direct and indirect effect throughout EU economy, face to the other sectors, in 2010, belongs to the Manufacturing sector, where for each 1 million euro in EU economy 2.1947 million euro was generated. In order, Construction, Agriculture, Trade and Business services were followed by Other services.

Concluding about the sectors with the greatest value added, the order of sectors reverses and the sectors of services bring over the highest values, Manufacturing being on the last place.

Applying the *model of input-output analysis*: $Z = B \cdot (I - A)^{-1} \cdot Y = z \cdot Y$, the vector z, of output multipliers is multiplied by the diagonal matrix of sectoral *final demand, Y*; the theoretical values of all inputs are obtained, in Table 11. These theoretical values can be compared with the corresponding real indicators and some structural deviations face to the calculated values, using the *input-output model*, can be noticed.

The sectors of Agriculture, Manufacturing and Business services have had greater outputs than the theoretical expected; the other sectors recorded lower values than the theoretical ones.

The mentioned sectors have had also domestic intermediates and imports higher than planned through the input-output analysis model, and as a consequence, also the intermediate consumption was greater in these three sectors. For Manufacturing sector, the value added was less than its theoretical value. The highest value added and also greater than the theoretical ones, were in order for: Other services, Trade, Business services and Agriculture. The sectors of Manufacturing and Construction were below their theoretical values.

In 2011, the output multipliers of inputs in production activities of all sectors, presented in Table 12, were lower than those of 2010, in favor of the import multipliers in increasing for all sectors.

In 2011, the same sector of Other services had the lowest value of direct and indirect effect throughout EU economy face to the other sectors. For each final demand of 1,000,000 euro in this sector, the direct and indirect effects are of 1,561,100 euro. The requirements of 561,100 euro for the domestic intermediates, plus 47,300 euro for imports – the lowest value of all sectors, and plus the taxes of 29,800 euro, greater than those for Manufacturing, Agriculture, and Construction - totalized 638,200 euro for *Intermediate consumption*. As a consequence, this sector had the greatest *Value added* in 2011, of 922,900 euro, from which the *Net operating surplus* of 249,800 euro, which is lower face to that of 2010. The investments of this sector were approximately the same as in 2010, but the compensation for employees of 505,100 euro is lower than in 2010. The sum of 638,200 euro for *Intermediate consumption* and the *Value added* of 922,900 euro gives 1,561,100 euro. In 2011, only in Trade sector, the compensation for employees was slowly greater than in Other services sector.

In 2011, the greatest value of direct and indirect effects throughout EU economy was in Manufacturing sector, but lower than in previous year. The order of the other

sectors was the same as in 2010: Construction, Agriculture, Trade and Business services were followed by Other services.

Concluding about the value added, the sectors with the greatest values are also the sectors of services, Manufacturing having the lowest added value for 1 million euro of final demand.

Almost all the analyzed indicators of direct and indirect effects of inputs, presented in Table 13, were greater in 2011, face to 2010, proving the ascending tendency of EU GDP evolution. The values of final demand of all sectors were higher in 2011, face to 2010, but the total of *Domestic intermediates* was lowest than in 2010. Only in the sectors of Manufacturing and Business services, the *Domestic intermediates* were higher than in 2010. These changes have affected the coefficients of technological matrix, *A*, which describes the relationships between the EU economic sectors, in 2011.

In 2011, as also in 2010, the same sectors of Agriculture, Manufacturing and Business services have had greater outputs than the theoretical expected; their *Domestic intermediates* and *Imports* were higher than the theoretical ones, and also their *Intermediate consumption*, than planned.

The highest *Value added* and meantime greater than the theoretical calculated, was for Other services, and in order for: Business services and Agriculture. The sectors of Manufacturing, Construction and Trade had less than their theoretical foreseen values. The only change face to 2010, is that Trade sector, in 2010 had a greater *Value added* than the theoretical one, but not also in 2011. The *Value added* of all sectors was greater in 2011, face to 2010.

8. Economic Diffusion in European Union, in 2010 and 2011

The demand and the offer of the sectors create interconnections which in the dynamism of economic activity define *the backward* and *the forward linkages*.

The "*backward linkages*" is defined in relation with the demand side of a sector, summing the connections with the sectors from which it purchases for increasing its own production. The *backward linkages* are described by the output multipliers which reflect the direct and indirect requirements; they are the column sums of the inverse Leontief matrix.

The "*forward linkages*" refers to the supplying side of a sector whose output is sold to the other sectors. The output coefficients for EU economy represent market shares of different sectors, referring to the output distribution. The direct effects of the *forward linkages* are measured by the row totals of the output coefficients of matrix *A*, but the *forward linkages* which measure also the direct and indirect effects of the

sectors output throughout the final uses are given by the row sums of elements of $(I - A)^{-1}$, inverse matrix Leontief of output coefficients.

The domestic intermediates refer to all inter-flows between the sectors of EU economy. This context is used here to assess the forward and backward linkages. The direct effects are comprised in the direct and indirect effects.

Regarding in Table 14 at the backward linkages of Manufacturing sector, we can see that for 1 million euro of final demand in this sector, the total effect induced in EU economy was 2.1947 million euro in 2010 and 2.1612 million euro in 2011 - the output multipliers of this sector. This aspect could be positive, because of a lower effort for obtaining 1 million euro, but the forward linkage was also lower in 2011 face to 2010 and this sector had the greatest internal requirements of its own consumption about 1.5825 in 2010, and continued to increase at 1.5848 in 2011, as it can be seen in Table 7 and Table 8. The situation is different for Construction sector, where both the internal consumption and the backward and forward linkages decreased in 2011 face to 2010.

In both analyzed years, Agriculture sector had the highest values of *forward linkages*, being the most supply-oriented; its output had been sold into the entire EU economy with the highest multipliers of 2.5476 in 2010 and 2.4972 in 2011. For 1 million euro of agricultural output increasing, in 2010, the direct and indirect effects of sold output were 2,547,600 euro, from which the direct effects value was 733,000 euro. In 2011, for all sectors, we can conclude that both the *forward and backward linkages* were lower than in 2010. Looking at direct effects of *backward linkages* we notice that Business services sector had a slowly increasing of direct requirements in 2011.

In both years, Manufacturing and Construction had their *backward linkages* greater than their *forward linkages*, meaning that these two sectors are more resourceful demanding from the other sectors, than they are selling to the other sectors. The same characteristic was available for their direct effects in EU economy, in both years.

Calculating the absolute values corresponding to the relative backward and forward linkages effects of final demand of 2010 and 2011, in Table 15, we can compare the structures of the direct and indirect effects throughout EU economy.

The structure of sectoral output should have been comprised in the intervals determined by the structures of sectoral backward linkages and forward linkages. The structures of the backward linkages from Table 15, are presented in Figure 2. The structures of backward linkages show the structure of economic production costs; over 40% of economic activity is paid by Manufacturing sector.

The structures of the forward linkages, from Table 15, and presented in Figure 3, show rather a stability of the direct and indirect effects of EU supplying sectors for EU final uses. The proportions of forward linkages of sectors describe their market shares in the final uses.

The sectoral outputs must include also the forward and backward effects of imports. Considering the absolute forward linkages of imports in EU economy, from Table 16, we can compare the structures of sectoral imports both in 2010 and 2011 with the structure of their backward linkages in Figure 4, respectively in Figure 5.
The real structure of imports in EU economy, in both years, presents high proportions for Agriculture, even if the backward linkages show low weights of requirements for this sector. The Manufacturing had the largest proportion of requirements, close to 50%, which was highly satisfied.

The theoretical structure of direct and indirect effects of imports in EU economy in 2011 is quite close to that from 2010. The effective sectoral structure of imports were slowly different for Manufacturing which had increased in 2011 face to 2010; Agriculture had decreased in 2011, with approximate 6% face to the same sector import, in 2010. The theoretical structures described by the requirements of imports through backward linkage are similar in both analyzed years, but they are different face to the effective sectoral structures of imports.

The sums of backward linkages of sectors are exactly the volumes of imports both in 2010 and in 2011, as it can be seen in Table 15 and Table 16. The explanation is that the imports were used completely, based on the direct and indirect requirement of economic sectors.

Looking at Figure 6, to the structure of forward linkage effects of imports in EU economy, for the two years, and comparing them, we conclude that they are very close to each other.

Products of imports in Agriculture are not bought for the categories of final uses of this sector, also is the case of Business services sector. A proportion of 57% of Manufacturing production is sold to the other sectors as intermediate and to final uses. The volumes of forward linkage of imports in EU economy, from Table 16, are very large, showing that there is still place for action.

The backward and forward linkages describe the inter-relations between sectors output, in each year. They are reflecting the required efforts, respectively the resulted effects in final uses.

At EU macro level the structure of production costs required in the entire EU economy for 1 unit of final demand, e.g. for 1 million euro, should be approximately the same with the structure of sectoral revenues received by selling their output.

The effective structure of sectoral output should lie in the interval delimited by backward linkages as lower limit and forward linkages as upper limit. The sectors for which the limits of backward and forward linkages are reversed, in Figure 7, still have some managerial problems of efficiency within them; these sectors were in 2010: Construction and Trade.

Comparing the effective structure of sectoral output in 2010, from Figure 8, with both the backward and forward linkage in 2010, from Figure 7, we conclude that Manufacturing and Other services sectors didn't attain the lower limit of the possibilities offered by their backward linkages.

The weights for sectoral outputs from Figure 8 are very similar for the two years, showing that the inter-sectoral relations described by technical matrices of input and output coefficients are slowly changing from one year to another.

The structures of sectoral output in 2010 and 2011 are very close between them and close both to the structure of effects induced in EU economy by the backward and forward linkages, presented in Figure 7 and Figure 9. In 2011, Construction and Trade are the same sectors as in 2010, for which the limits of backward and forward linkages are reversed, in Figure 9.

Analyzing also the structures of value added by sectors of EU economy, in Figure 10, we see that Manufacturing and Construction have lower proportions than the weights of their output, of forward and backward linkages. The sector Other services brought the highest proportions of value added. The sectoral structures of value added in EU economy are very close both in 2010 and 2011.

Conclusions

Using the input-output model of analysis, the paper presents different structural aspects of EU economy in two consecutive years: 2010 and 2011, latest years for which Eurostat had defined the input-output tables for EU27. Summarizing the data of economic branches in six sectors, we elaborated the condensed input-output tables for European Union economy, in 2010 and 2011 and we estimated the EU GDP, in both years, using the three methods of GDP estimation.

For each year, we have calculated the input coefficients and the output multipliers for EU economy, on which basis we have calculated the direct and indirect effects for the inputs of production activities throughout EU economy. Economic diffusion in European Union, in 2010 and 2011 was explained based on the interconnections between the demand and the offer of the six sectors. The dynamism and the structure of economic activity were defined in terms of backward and forward linkages both for intermediate consumption and for imports.

The analyses of sectoral structures of backward and forward linkages, and their absolute effects starting from the final demand, were compared with the effective structures of sectors output, sectoral imports, sectoral value added, in 2011 face to 2010.

The limits of this research lie in the assumptions of input-output model, which supposes fully respected the relationships between sectors, the theoretical aspects about substitution and competition processes.

Resuming the data to only six sectors could appear less important for the managers within the sectors, but it could be very useful for EU level top-managers, who establish the stable way of EU development on medium and long term.

The analysis of economic sectoral structure of EU should be done on more than two years, usually on a longer period in order to identify some tendencies in the sectoral changes.

This kind of analysis could be applied within a sector, to describe the relations between the industries of the sector and the relationships with other sectors. The EU managers could find the economic policies in a more informed framework, which envisages the whole economy of EU.

The structural input and output coefficients offer an image about the structure of economic costs in comparison with the market shares and the structure of revenues, at the level for which the analysis is undertaken: company, industry, sector, country, or region.

The further researches could envisage sectoral aspects of productivity, employment, analysis of households' income in correlation with the compensation of employees, efficiency of investments and gross capital formation, efficiency analysis of imports and exports and other aspects related to the reactions of price indices at different changes of prices in one sector or aspects of environment protection.
The input-output model could be a useful forecasting tool and based on the technological matrix of Leontief there can be forecasted the flows for the next year.

National sectoral structures of EU member states could offer a framework to identify some profiles of development within EU and the way the European policies have been implemented. The national profile of each EU member state could show both a national specificity in accordance with geography, history, religion, customs and cultural values, but also with the current development stage. The deviations of the national sectoral profiles face to the EU sectoral profile, i.e. face to the backward and forward linkages, could reveal some opportunities for future development of the analyzed countries.

The classifications of industries, of products and of production activities, already being established at EU level, but also at national level, in the statistical data transmission system to Eurostat, should be the base for the development of national information systems of automatically reporting of sectoral cash flows, when the commercial transactions take place. The development of information technology and communications offer huge possibilities to implement such databases which could be automatically loaded in a dynamic and telematic way. Then preparing the reports at industrial or branch level, or at sectoral level could be easily obtained. A tremendous efficiency of data reporting could also be overspread over the social and economic activity of each country.

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2010	EU27	Million euro						FINAL USES								
	Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total	Final cons. expend. households	Final cons. expenditure by government	Final cons. exp.	Gross fixed capital formation	Changes inventories and valuables	Gross capital formation	Exports	Total final uses at basic prices	Total use at basic prices
Agriculture	59,981	289,203	11,476	22,962	692	10,571	394,885	100,260	1,468	101,729	8,185	8,122	16,306	25,776	143,811	538,696
Manufacturing	100,771	2,219,986	323,751	445,812	100,717	447,090	3,638,128	1,476,301	60,524	1,536,825	502,764	-22,940	479,823	1,045,825	3,062,474	6,700,602
Construction	6,151	56,276	314,762	48,761	19,610	174,270	619,830	56,358	3,604	59,962	1,032,060	-1,584	1,030,476	5,025	1,095,464	1,715,294
Trade	43,749	694,265	110,714	719,009	98,792	318,694	1,985,222	1,765,825	90,931	1,856,755	127,670	10,150	137,820	288,828	2,283,404	4,268,626
Business services	13,243	168,892	44,154	190,429	518,189	474,137	1,409,044	572,972	10,895	583,867	165,628	497	166,126	161,813	911,805	2,320,849
Other services	26,668	529,413	159,663	557,429	324,035	1,139,727	2,736,937	2,132,046	2,530,590	4,662,637	144,375	2,899	147,275	169,538	4,979,449	7,716,386
TOTAL	250,563	3,958,035	964,519	1,984,402	1,062,035	2,564,489	10,784,045	6,103,763	2,698,012	8,801,775	1,980,682	-2,855	1,977,826	1,696,805	12,476,407	23,260,452
Agriculture	8,513	302,213	5,141	11,068	894	7,335	335,164	18,212	131	18,343	1,500	9,236	10,736	6,893	35,972	371,136
Manufacturing	8,443	336,769	32,644	57,533	19,002	69,733	524,124	225,126	16,487	241,614	121,980	25,632	147,612	96,008	485,234	1,009,358
Construction	16	176	428	76	26	325	1,047	57	1	57	732	-5	727	47	832	1,879
Trade	487	10,109	1,261	61,759	3,850	8,603	86,069	16,845	1,480	18,325	439	412	851	3,909	23,085	109,154
Business services	332	4,900	1,049	5,524	18,198	12,514	42,516	10,390	263	10,653	3,696	-146	3,551	5,388	19,591	62,107
Other services	881	41,425	4,787	19,230	26,107	39,094	131,524	7,444	2,396	9,840	2,934	-431	2,503	8,143	20,486	152,010
Use of imported products, cif	18,672	695,592	45,310	155,190	68,077	137,603	1,120,444	278,073	20,758	298,831	131,282	34,698	165,980	120,389	585,200	1,705,644
Taxes less subsidies on products	10,166	72,746	22,861	81,824	42,650	130,960	361,207	766,724	7,071	773,795	158,659	664	159,323	3,527	936,644	1,297,851
Total interm. cons. /final use at p.p.	279,401	4,726,373	1,032,691	2,221,415	1,172,762	2,833,052	12,265,695	7,148,560	2,725,841	9,874,401	2,270,623	32,506	2,303,129	1,820,721	13,998,251	26,263,946
Compens. employees	74,225	1,123,865	374,891	1,203,384	604,480	2,696,180	6,077,025									

Wages and salaries	59,790	881,075	299,323	970,923	473,144	2,104,663	4,788,918										
Other net taxes prod.	-34,942	29,776	38,460	60,110	14,136	13,524	121,063		Methods:	GDP								
Cons. of fixed capital	85,045	369,301	53,118	283,137	152,082	871,176	1,813,859		production	**12,292,607**	mil. Euro							
Operating surplus, net	134,967	451,286	216,134	500,579	377,390	1,302,453	2,982,809		income	**12,292,607**								
Operating surplus, gross	220,012	820,587	269,252	783,716	529,472	2,173,630	4,796,668		uses	**12,292,607**								
Value added bp	259294.51	1974228.2	682,603	2,047,211	1,148,087	4,883,333	10,994,756											
Output at basic prices	538695.69	6700601.7	1,715,294	4,268,626	2,320,849	7,716,386	23,260,452											

Table 1. Condensed Input-Output table for European Union economy, in 2010

2011	EU27	Million euro					FINAL USES								
	Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total	Final cons. expend. households	Final cons. expenditure by government	Final cons. exp.	Gross fixed capital formation	Changes inventories and valuables	Gross capital formation	Exports	Total final uses at basic prices	Total use at basic prices
Agriculture	56,923	291,021	10,510	22,986	678	10,322	392,439	95,210	975	96,186	8,194	14,227	22,421	32,315	150,922	543,361
Manufacturing	95,355	2,311,973	322,351	434,001	100,818	428,436	3,692,934	1,424,392	61,887	1,486,278	512,687	10,951	523,638	1,178,696	3,188,613	6,881,547
Construction	5,699	53,205	287,580	50,529	19,799	176,956	593,767	44,653	3,891	48,544	1,051,031	330	1,051,361	5,918	1,105,823	1,699,591
Trade	37,369	658,825	101,235	673,867	98,641	289,407	1,859,344	1,856,177	90,875	1,947,052	122,525	15,640	138,166	316,037	2,401,255	4,260,599
Business services	13,465	170,946	43,995	186,120	529,257	463,772	1,407,555	583,677	11,571	595,248	177,805	260	178,065	183,226	956,539	2,364,095
Other services	24,967	538,875	157,167	539,469	336,681	1,097,157	2,694,317	2,245,860	2,542,841	4,788,701	150,584	6,582	157,166	188,139	5,134,006	7,828,323
TOTAL	233,778	4,024,846	922,839	1,906,971	1,085,874	2,466,049	10,640,357	6,249,969	2,712,040	8,962,009	2,022,827	47,990	2,070,817	1,904,333	12,937,158	23,577,515
Agriculture	10,363	282,108	5,056	9,394	765	7,288	314,973	19,986	143	20,128	1,366	11,010	12,376	9,326	41,830	356,803
Manufacturing	11,023	411,319	41,454	68,961	20,460	78,449	631,666	246,832	17,318	264,150	137,144	27,431	164,574	101,872	530,596	1,162,261
Construction	22	281	726	119	33	524	1,705	61	1	62	996	-7	989	2	1,052	2,757
Trade	764	15,591	1,927	69,477	5,936	12,640	106,333	24,317	1,880	26,197	581	-230	350	3,584	30,131	136,464
Business services	578	8,052	1,751	9,020	29,958	16,265	65,624	12,390	109	12,499	5,205	-461	4,744	5,084	22,328	87,952
Other services	1,012	34,541	5,525	21,413	20,626	46,322	129,440	10,095	2,802	12,897	3,564	-167	3,396	7,995	24,288	153,727
Use of IMPORTED products, cif	23,762	751,892	56,438	178,383	77,778	161,487	1,249,740	313,681	22,252	335,933	148,855	37,575	186,430	127,862	650,225	1,899,965
Taxes less subisdies on products	7,749	63,043	23,783	78,120	47,771	158,927	379,394	794,092	8,679	802,772	171,337	848	172,186	6,283	981,240	1,360,634
Total interm. cons. /final use at p.p.	265,288	4,839,781	1,003,060	2,163,474	1,211,424	2,786,464	12,269,491	7,357,742	2,742,972	10,100,713	2,343,019	86,413	2,429,433	2,038,477	14,568,623	26,838,115

Compens. employees	74,575	1,163,518	379,525	1,235,575	617,760	2,755,373	6,226,326									
Wages and salaries	60,151	913,929	303,436	997,664	483,125	2,149,965	4,908,270									
Other net taxes prod.	-37,876	40,512	34,439	59,346	12,114	28,893	137,428		Methods:	GDP						
Cons. of fixed capital	87,443	377,687	55,268	290,804	156,542	903,486	1,871,230		production	**12,668,658**	mil. Euro					
Operating surplus, net	153,931	460,050	227,298	511,401	366,255	1,354,107	3,073,041		income	**12,668,658**						
Operating surplus, gross	241,374	837,736	282,566	802,205	522,796	2,257,593	4,944,271		uses	**12,668,658**						
Value added bp	278,073	2,041,766	696,530	2,097,125	1,152,671	5,041,859	11,308,024									
Output at basic prices	543,361	6,881,547	1,699,591	4,260,599	2,364,095	7,828,323	23,577,515									

Table 2. Condensed Input-Output table for European Union economy, in 2011

Evolution and dynamics of EU GDP during 2000-2014
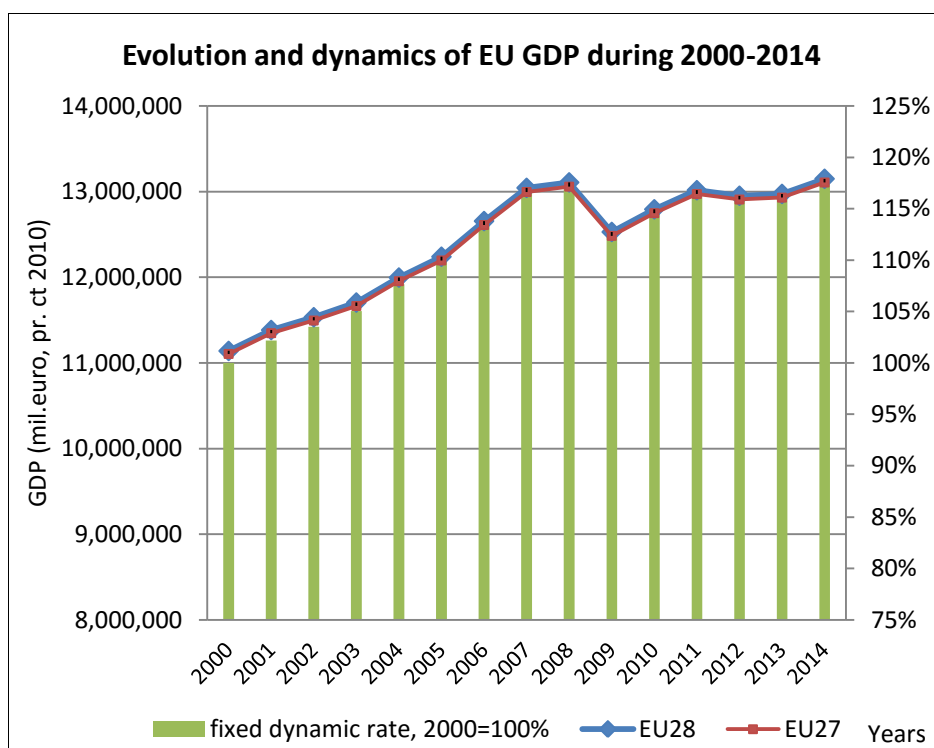
Figure 1. EU GDP and its dynamics during 2000-2014

matrix A		Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total
1	Agriculture	0.1113	0.0432	0.0067	0.0054	0.0003	0.0014	0.0170
2	Manufacturing	0.1871	0.3313	0.1887	0.1044	0.0434	0.0579	0.1564
3	Construction	0.0114	0.0084	0.1835	0.0114	0.0084	0.0226	0.0266
4	Trade	0.0812	0.1036	0.0645	0.1684	0.0426	0.0413	0.0853
5	Business services	0.0246	0.0252	0.0257	0.0446	0.2233	0.0614	0.0606
6	Other services	0.0495	0.0790	0.0931	0.1306	0.1396	0.1477	0.1177
	Total EU intermediates	0.4651	0.5907	0.5623	0.4649	0.4576	0.3323	0.4636

Table 3. Input Coefficients for EU Intermediates, in 2010

matrix A		Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total
1	Agriculture	0.1048	0.0423	0.0062	0.0000	0.0003	0.0013	0.0166
2	Manufacturing	0.1755	0.3360	0.1897	0.1019	0.0426	0.0547	0.1566
3	Construction	0.0105	0.0077	0.1692	0.0119	0.0084	0.0226	0.0252
4	Trade	0.0688	0.0957	0.0596	0.1582	0.0417	0.0370	0.0789
5	Business services	0.0248	0.0248	0.0259	0.0437	0.2239	0.0592	0.0597
6	Other services	0.0459	0.0783	0.0925	0.1266	0.1424	0.1402	0.1143
	Total EU intermediates	0.4302	0.5849	0.5430	0.4476	0.4593	0.3150	0.4513

Table 4. Input Coefficients for EU Intermediates, in 2011

Leontief matrix (I-A)	Agriculture	Manufacturing	Construction	Trade	Business services	Other services
Agriculture	0.8887	-0.0432	-0.0067	-0.0054	-0.0003	-0.0014
Manufacturing	-0.1871	0.6687	-0.1887	-0.1044	-0.0434	-0.0579
Construction	-0.0114	-0.0084	0.8165	-0.0114	-0.0084	-0.0226
Trade	-0.0812	-0.1036	-0.0645	0.8316	-0.0426	-0.0413
Business services	-0.0246	-0.0252	-0.0257	-0.0446	0.7767	-0.0614
Other services	-0.0495	-0.0790	-0.0931	-0.1306	-0.1396	0.8523

Table 5. Leontief matrix of direct requirements for EU intermediates, in 2010

Leontief matrix (I-A)	Agriculture	Manufacturing	Construction	Trade	Business services	Other services
Agriculture	0.8952	-0.0423	-0.0062	0.0000	-0.0003	-0.0013
Manufacturing	-0.1755	0.6640	-0.1897	-0.1019	-0.0426	-0.0547
Construction	-0.0105	-0.0077	0.8308	-0.0119	-0.0084	-0.0226
Trade	-0.0688	-0.0957	-0.0596	0.8418	-0.0417	-0.0370
Business services	-0.0248	-0.0248	-0.0259	-0.0437	0.7761	-0.0592
Other services	-0.0459	-0.0783	-0.0925	-0.1266	-0.1424	0.8598

Table 6. Leontief matrix of direct requirements for EU intermediates, in 2011

inverse Leontief matrix $(I-A)^{-1}$	Agriculture	Manufacturing	Construction	Trade	Business services	Other services
Agriculture	1.1448	0.0787	0.0305	0.0196	0.0080	0.0095

Manufacturing	0.3713	1.5825	0.4076	0.2358	0.1311	0.1399
Construction	0.0269	0.0269	1.2384	0.0277	0.0233	0.0377
Trade	0.1708	0.2213	0.1647	1.2527	0.0986	0.0875
Business services	0.0702	0.0834	0.0816	0.0997	1.3179	0.1078
Other services	0.1415	0.2018	0.2134	0.2343	0.2461	1.2220
output multipliers	*1.9255*	*2.1947*	*2.1361*	*1.8698*	*1.8249*	*1.6044*

Table 7. Matrix of direct and indirect requirements for EU intermediates, in 2010

inverse Leontief matrix $(I-A)^{-1}$	Agriculture	Manufacturing	Construction	Trade	Business services	Other services
Agriculture	1.1336	0.0753	0.0276	0.0111	0.0070	0.0082
Manufacturing	0.3427	1.5848	0.3988	0.2236	0.1274	0.1303
Construction	0.0236	0.0246	1.2161	0.0267	0.0226	0.0363
Trade	0.1420	0.2006	0.1464	1.2305	0.0928	0.0761
Business services	0.0656	0.0800	0.0779	0.0945	1.3175	0.1021
Other services	0.1261	0.1938	0.2031	0.2207	0.2463	1.2073
output multipliers	*1.8336*	*2.1592*	*2.0700*	*1.8071*	*1.8136*	*1.5603*

Table 8. Matrix of direct and indirect requirements for EU intermediates, in 2011

Direct requirements (input coefficients) for:	Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total
	DOMESTIC PRODUCTION						
Domestic goods and services, 2010	0.4651	0.5907	0.5623	0.4649	0.4576	0.3323	0.4636
Domestic goods and services, 2011	0.4302	0.5849	0.5430	0.4476	0.4593	0.3150	0.4513
	IMPORT						
Imported goods and services, 2010	0.0347	0.1038	0.0264	0.0364	0.0293	0.0178	0.0482
Imported goods and services, 2011	0.0437	0.1093	0.0332	0.0419	0.0329	0.0206	0.0530
	SUPPLY						
Taxes less subisdies on products, 2010	0.0189	0.0109	0.0133	0.0192	0.0184	0.0170	0.0155
Taxes less subisdies on products, 2011	0.0143	0.0092	0.0140	0.0183	0.0202	0.0203	0.0161

Intermediate consumption, 2010	0.5187	0.7054	0.6020	0.5204	0.5053	0.3671	0.5273
Intermediate consumption, 2011	0.4882	0.7033	0.5902	0.5078	0.5124	0.3559	0.5204
INCOME							
Compensation of employees, 2010	0.1378	0.1677	0.2186	0.2819	0.2605	0.3494	0.2613
From which: wages & salaries, 2010	0.1110	0.1315	0.1745	0.2275	0.2039	0.2728	0.2059
Compensation of employees, 2011	0.1372	0.1691	0.2233	0.2900	0.2613	0.3520	0.2641
From which: wages & salaries, 2011	0.1107	0.1328	0.1785	0.2342	0.2044	0.2746	0.2082
Consumption of fixed capital, 2010	0.1579	0.0551	0.0310	0.0663	0.0655	0.1129	0.0780
Consumption of fixed capital, 2011	0.1609	0.0549	0.0325	0.0683	0.0662	0.1154	0.0794
Other net taxes on production, 2010	-0.0649	0.0044	0.0224	0.0141	0.0061	0.0018	0.0052
Other net taxes on production, 2011	-0.0697	0.0059	0.0203	0.0139	0.0051	0.0037	0.0058
Net operating surplus, 2010	0.2505	0.0674	0.1260	0.1173	0.1626	0.1688	0.1282
Net operating surplus, 2011	0.2833	0.0669	0.1337	0.1200	0.1549	0.1730	0.1303
Value added at basic prices, 2010	0.4813	0.2946	0.3980	0.4796	0.4947	0.6329	0.4727
Value added at basic prices, 2011	0.5118	0.2967	0.4098	0.4922	0.4876	0.6441	0.4796

Table 9. Direct effects of production activities inputs of EU economy, in 2010 and 2011

Direct and indirect requirements for:	Agriculture	Manufacturing	Construction	Trade	Business services	Other services
	DOMESTIC PRODUCTION (millions of euro)					
Final demand	1	1	1	1	1	1
Domestic intermediates	0.9255	1.1947	1.1361	0.8698	0.8249	0.6044
Output	1.9255	2.1947	2.1361	1.8698	1.8249	1.6044
	IMPORT (millions of euro)					
Imported goods and services	0.0897	0.1818	0.0883	0.0785	0.0611	0.0440
	SUPPLY					
Taxes less subsidies on products	0.0330	0.0282	0.0298	0.0331	0.0322	0.0266
Intermediate consumption	1.0482	1.4047	1.2541	0.9815	0.9182	0.6749
	INCOME (millions of euro)					
Compensation of employees	0.3418	0.4368	0.4855	0.5093	0.4852	0.5127
From which: wages & salaries	0.2723	0.3439	0.3854	0.4072	0.3804	0.4012
Other net taxes on production	-0.0689	0.0065	0.0308	0.0191	0.0104	0.0049
Consumption of fixed capital	0.2339	0.1434	0.1060	0.1330	0.1299	0.1612
Net operating surplus	0.3705	0.2033	0.2597	0.2270	0.2812	0.2506
Value added at basic prices	0.8773	0.7900	0.8820	0.8883	0.9067	0.9295

Table 10. Output multipliers of input for EU production activities, in 2010

Direct and indirect requirements for:	Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total, 2010
	DOMESTIC PRODUCTION (millions of euro)						
Final demand	143,811	3,062,474	1,095,464	2,283,404	911,805	4,979,449	12,476,407
Theoretic Domestic Intermediates	133,092	3,658,610	1,244,549	1,986,212	752,165	3,009,417	10,784,045
Domestic Intermediates	250,563	3,958,035	964,519	1,984,402	1,062,035	2,564,489	10,784,045
Theoretical Output	276,903	6,721,084	2,340,013	4,269,615	1,663,970	7,988,866	23,260,451
Output	394,374	7,020,509	2,059,983	4,267,806	1,973,841	7,543,938	23,260,452
	IMPORT (millions of euro)						
Theoretic imports	12,904	556,801	96,691	179,324	55,736	218,989	1,120,445
Imported goods, services	18,672	695,592	45,310	155,190	68,077	137,603	1,120,444
	SUPPLY (millions of euro)						
Theoretic taxes less subsidies on products	4,740	86,437	32,626	75,629	29,332	132,443	361,206
Taxes less subsidies on products	10,166	72,746	22,861	81,824	42,650	130,960	361,207
Theoretic Intermediate consumption	150,736	4,301,848	1,373,865	2,241,164	837,233	3,360,849	12,265,695
Intermediate consumption	279,401	4,726,373	1,032,691	2,221,415	1,172,762	2,833,052	12,265,695
	INCOME (millions of euro)						
Compensation of employees (theoretic)	49,149	1,337,604	531,797	1,162,945	442,425	2,553,106	6,077,025
Wages and salaries (th)	39,163	1,053,175	422,158	929,777	346,864	1,997,781	4,788,918
Other net taxes on production (theoretic)	-9,912	19,924	33,731	43,509	9,515	24,297	121,063
Consumption of fixed	33,642	439,187	116,102	303,763	118,434	802,732	1,813,859

capital (theoretic)						
Operating surplus, net (th)	53,288	622,522	284,517	518,234	256,365	1,247,882	2,982,809
Theoretic Value added	126,167	2,419,236	966,147	2,028,451	826,738	4,628,017	10,994,756
Value added at basic prices	259,295	1,974,228	682,603	2,047,211	1,148,087	4,883,333	10,994,756

Table 11. Direct and indirect effects of inputs, throughout EU economy, in 2010

Direct and indirect requirements for:	Agriculture	Manufacturing	Construction	Trade	Business services	Other services
DOMESTIC PRODUCTION (millions of euro)						
Final demand	1	1	1	1	1	1
Domestic intermediates	0.8351	1.1612	1.0714	0.8193	0.8145	0.5611
Output	1.8351	2.1612	2.0714	1.8193	1.8145	1.5611
IMPORT (millions of euro)						
Imported goods and services	0.0986	0.1924	0.0981	0.0856	0.0673	0.0473
SUPPLY						
Taxes less subsidies on products	0.0261	0.0252	0.0295	0.0317	0.0349	0.0298
Intermediate consumption	0.9598	1.3788	1.1990	0.9366	0.9167	0.6382
INCOME (millions of euro)						
Compensation of employees	0.3218	0.4314	0.4773	0.5066	0.4856	0.5051
From which: wages & salaries	0.2567	0.3400	0.3793	0.4055	0.3805	0.3951
Other net taxes on production	-0.0738	0.0084	0.0282	0.0190	0.0096	0.0069
Consumption of fixed capital	0.2308	0.1415	0.1046	0.1322	0.1310	0.1610
Net operating surplus	0.3965	0.2010	0.2622	0.2248	0.2716	0.2498
Value added at basic prices	0.8753	0.7824	0.8724	0.8827	0.8977	0.9229

Table 12. Output multipliers of input for EU production activities, in 2011

Direct and indirect requirements for:	Agriculture	Manufacturing	Construction	Trade	Business services	Other services	Total, 2011
DOMESTIC PRODUCTION (millions of euro)							
Final demand	150,922	3,188,613	1,105,823	2,401,255	956,539	5,134,006	12,937,158
Theoretic Domestic Intermediates	126,027	3,702,629	1,184,823	1,967,297	779,082	2,880,499	10,640,357
Domestic Intermediates	233,778	4,024,846	922,839	1,906,971	1,085,874	2,466,049	10,640,357
Theoretical Output	276,949	6,891,242	2,290,646	4,368,552	1,735,621	8,014,505	23,577,515
Output	384,700	7,213,459	2,028,662	4,308,226	2,042,413	7,600,056	23,577,515
IMPORT (millions of euro)							
Theoretic imports	14,879	613,511	108,515	205,636	64,412	242,788	1,249,740
Imported goods, serv.	23,762	751,892	56,438	178,383	77,778	161,487	1,249,740
SUPPLY (millions of euro)							
Theoretic taxes less subsidies on products	3,946	80,341	32,587	76,133	33,403	152,985	379,394
Taxes less subsidies on products	7,749	63,043	23,783	78,120	47,771	158,927	379,394
Theoretic Intermediate cons.	144,852	4,396,481	1,325,924	2,249,067	876,896	3,276,271	12,269,491
Intermediate consumption	265,288	4,839,781	1,003,060	2,163,474	1,211,424	2,786,464	12,269,491
INCOME (millions of euro)							
Compensation of employees (th)	48,561	1,375,719	527,863	1,216,580	464,474	2,593,128	6,226,325
Wages and salaries (th)	38,744	1,084,279	419,477	973,594	363,932	2,028,244	4,908,270
Other net taxes on production (th)	-11,138	26,838	31,184	45,702	9,219	35,623	137,428
Consumption of fixed capital (th)	34,829	451,236	115,722	317,379	125,271	826,794	1,871,230
Operating surplus, net (th)	59,845	640,968	289,953	539,825	259,760	1,282,689	3,073,041
Theoretic Value added	132,097	2,494,761	964,721	2,119,485	858,725	4,738,234	11,308,024
Value added b.p.	278,073	2,041,766	696,530	2,097,125	1,152,671	5,041,859	11,308,024

Table 13. Direct and indirect effects of inputs, throughout EU economy, in 2011

	Direct and indirect effects				Direct effects			
	forward linkages		*backward linkages*		*forward linkages (output coefficients)*		*backward linkages (input coefficients)*	
	2010	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**
Agriculture	2.5476	2.4972	1.9255	1.8351	0.7330	0.7222	0.4651	0.4302
Manufacturing	2.0734	2.0428	2.1947	2.1612	0.5430	0.5366	0.5907	0.5849
Construction	1.6222	1.5896	2.1361	2.0714	0.3614	0.3494	0.5623	0.5430
Trade	1.8995	1.8238	1.8698	1.8193	0.4651	0.4364	0.4649	0.4476
Business services	2.1770	2.1311	1.8249	1.8145	0.6071	0.5954	0.4576	0.4593
Other services	1.6582	1.6257	1.6044	1.5611	0.3547	0.3442	0.3323	0.3150
Total domestic interm.					0.4636	0.4513	0.4636	0.4513

Table 14. Sectoral inter-linkages in EU, in 2010 and 2011

Sectors	Final demand		Output		Imports		Backward linkages		Forward linkages	
	2010	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**
Agriculture	143,811	150,922	538,696	543,361	335,164	314,973	276,908	276,957	366,373	376,882
Manufacturing	3,062,474	3,188,613	6,700,602	6,881,547	524,124	631,666	6,721,212	6,891,230	6,349,734	6,513,699
Construction	1,095,464	1,105,823	1,715,294	1,699,591	1,047	1,705	2,340,021	2,290,602	1,777,062	1,757,817
Trade	2,283,404	2,401,255	4,268,626	4,260,599	86,069	106,333	4,269,508	4,368,603	4,337,325	4,379,408
Business services	911,805	956,539	2,320,849	2,364,095	42,516	65,624	1,663,954	1,735,640	1,985,000	2,038,481
Other services	4,979,449	5,134,006	7,716,386	7,828,323	131,524	129,440	7,989,028	8,014,697	8,256,922	8,346,354
Total	12,476,407	12,937,158	23,260,452	23,577,515	1,120,444	1,249,740	23,260,630	23,577,730	23,072,416	23,412,641

Table 15. Sectoral final demand, output, imports and inter-linkages, in 2010 and 2011
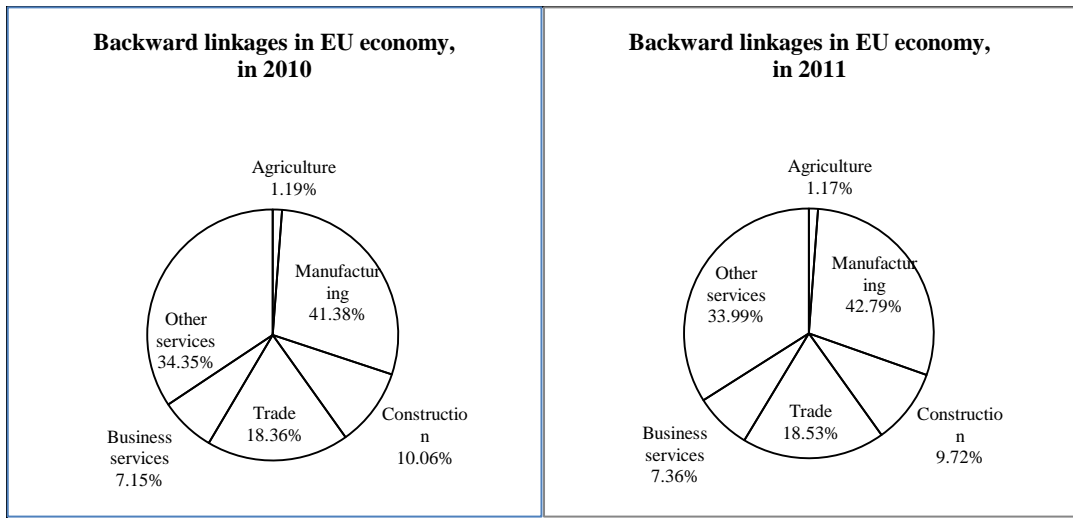
Figure 2. Comparative structures of backward linkages of EU economy, in 2010-2011
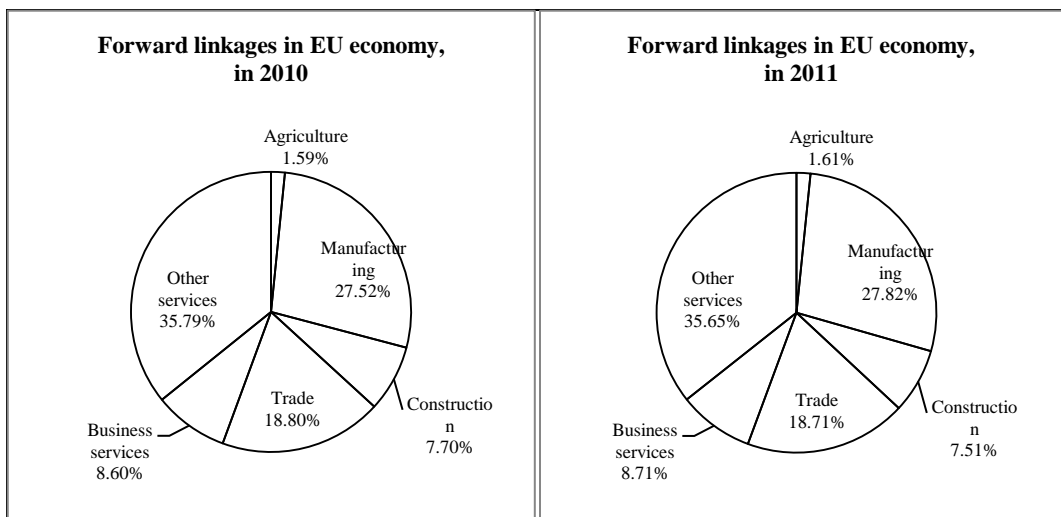

Figure 3. Comparative structures of forward linkages of EU economy, in 2010 and 2011

Sectors	Relative direct and indirect effects of imports				Absolute direct and indirect effects of imports				Absolute direct and indirect effects in EU economy			
	Forward linkages		Backward linkages		Forward linkages		Backward linkages		All backward linkages		All forward linkages	
	2010	**2011**	**2010**	**2011**	**2010**	**2011**	**2010**	**2011**	**2011**	**2011**	**2011**	**2011**
Agriculture	0.0283	0.0282	0.0897	0.0986	4,076	4,255	12,904	14,879	370,448	381,137	289,812	291,835
Manufacturing	0.7143	0.6969	0.1818	0.1924	2,187,385	2,222,096	556,801	613,511	8,537,119	8,735,795	7,278,013	7,504,742
Construction	0.0888	0.0878	0.0883	0.0981	97,238	97,071	96,691	108,515	1,874,300	1,854,887	2,436,712	2,399,117
Trade	0.1965	0.1920	0.0785	0.0856	448,784	461,131	179,324	205,636	4,786,109	4,840,539	4,448,832	4,574,239
Business serv.	0.0832	0.0838	0.0611	0.0673	75,839	80,147	55,736	64,412	2,060,839	2,118,627	1,719,689	1,800,052
Other serv.	0.1990	0.1948	0.0440	0.0473	990,712	1,000,344	218,989	242,788	9,247,634	9,346,698	8,208,017	8,257,485
Total					3,804,034	3,865,043	1,120,444	1,249,740	26,876,450	27,277,684	24,381,074	24,827,470

Table 16. Relative and absolute direct and indirect effects of linkages in EU, in 2010 and 2011
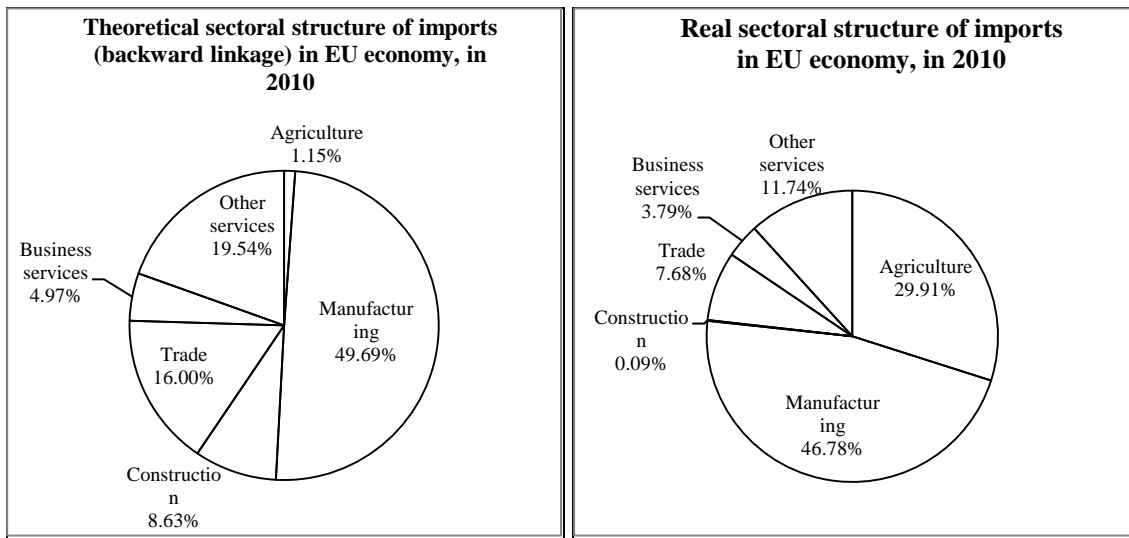
Theoretical sectoral structure of imports (backward linkage) in EU economy, in 2010
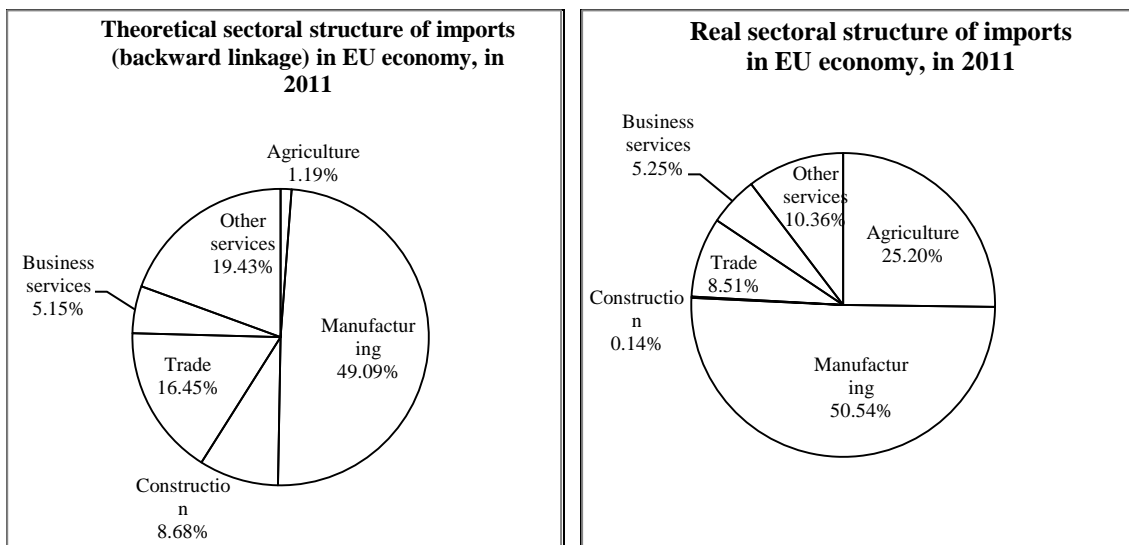
Agriculture
1.15%

Other services
19.54%

Business services
4.97%

Trade
16.00%

Manufacturing
49.69%

Construction
8.63%

Real sectoral structure of imports in EU economy, in 2010

Other services
11.74%

Business services
3.79%

Trade
7.68%

Construction
0.09%

Agriculture
29.91%

Manufacturing
46.78%

Figure 4. Theoretical and real sectoral structure of imports in EU economy, in 2010

Theoretical sectoral structure of imports (backward linkage) in EU economy, in 2011

Agriculture
1.19%

Other services
19.43%

Business services
5.15%

Trade
16.45%

Manufacturing
49.09%

Construction
8.68%

Real sectoral structure of imports in EU economy, in 2011

Business services
5.25%

Other services
10.36%

Trade
8.51%

Construction
0.14%

Agriculture
25.20%

Manufacturing
50.54%

Figure 5. Theoretical and real sectoral structure of imports in EU economy, in 2011

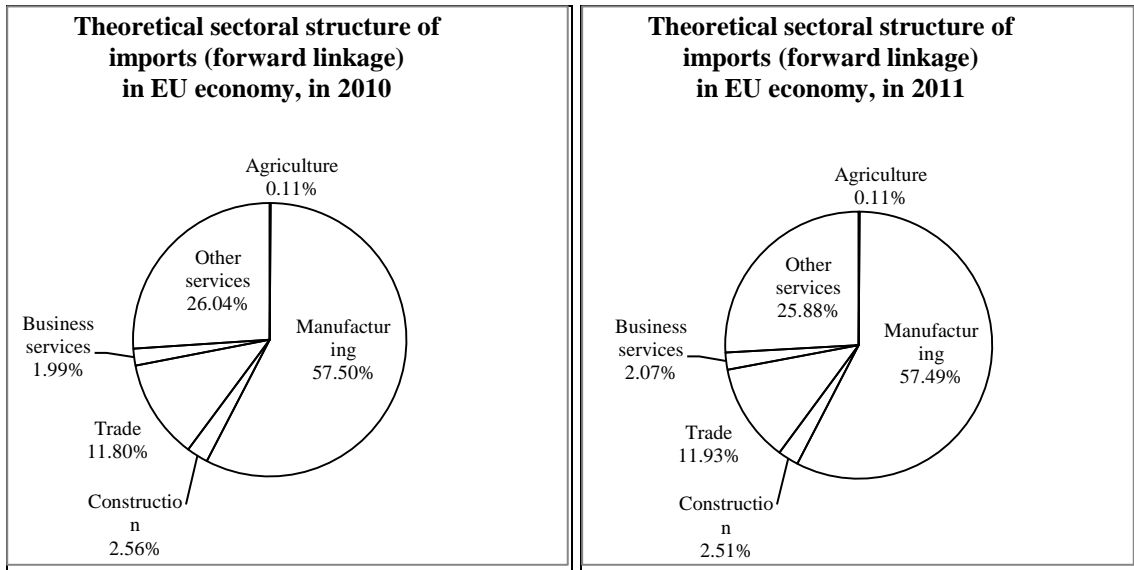**Theoretical sectoral structure of imports (forward linkage) in EU economy, in 2010**

Agriculture 0.11%
Other services 26.04%
Manufacturing 57.50%
Business services 1.99%
Trade 11.80%
Construction 2.56%

Theoretical sectoral structure of imports (forward linkage) in EU economy, in 2011

Agriculture 0.11%
Other services 25.88%
Manufacturing 57.49%
Business services 2.07%
Trade 11.93%
Construction 2.51%

Figure 6. Structures of forward linkage of imports in EU economy, in 2010 and 2011

All backward linkages in EU economy, in 2010

Agriculture 1.19%
Other services 33.67%
Manufacturing 29.85%
Business services 7.05%
Trade 18.25%
Construction 9.99%

All forward linkages in EU economy, in 2010

Agriculture 1.38%
Other services 34.41%
Manufacturing 31.76%
Business services 7.67%
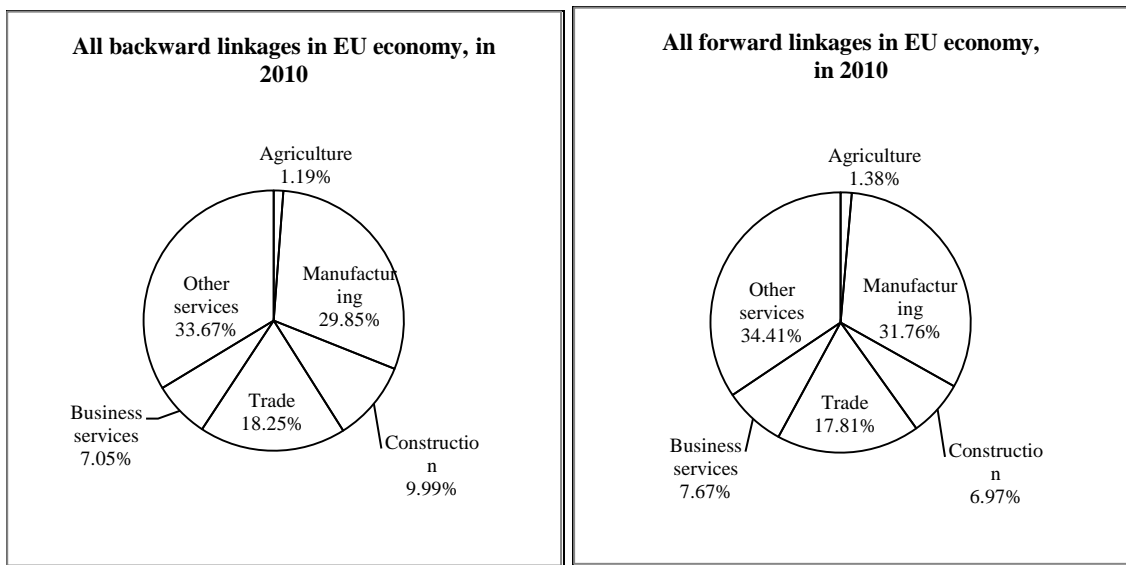Trade 17.81%
Construction 6.97%

Figure 7. Structures of all backward and forward linkage in EU economy, in 2010
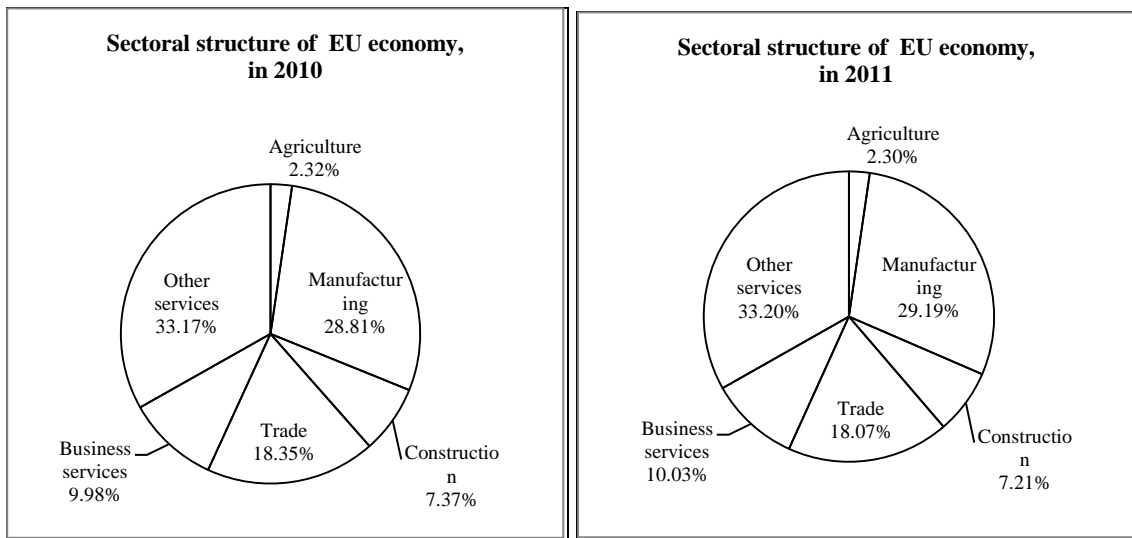
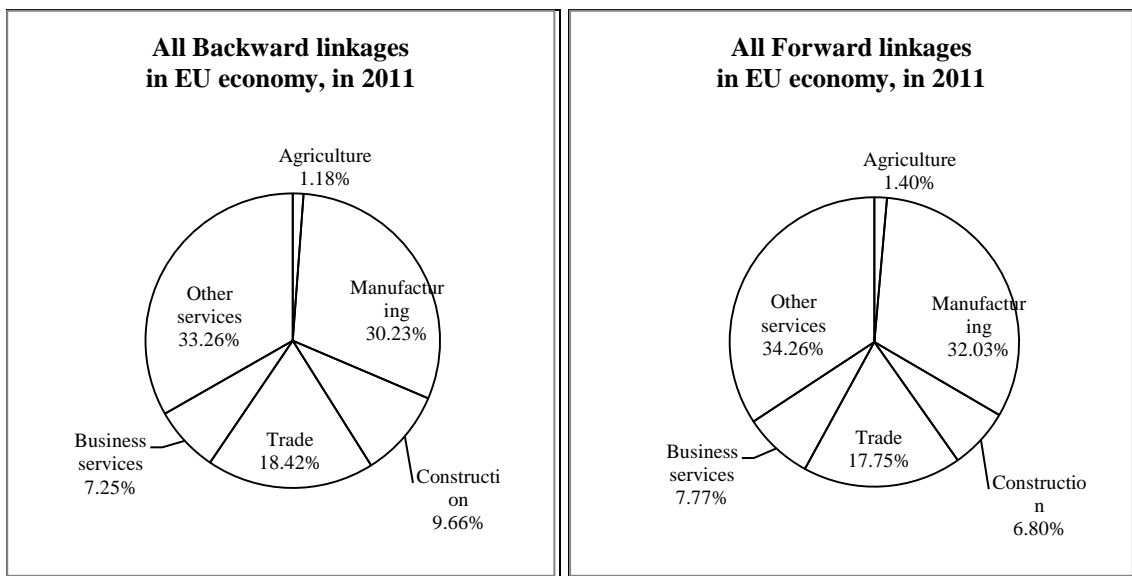**Figure 8.** Comparative structures of sectoral output of EU economy, in 2010 and 2011

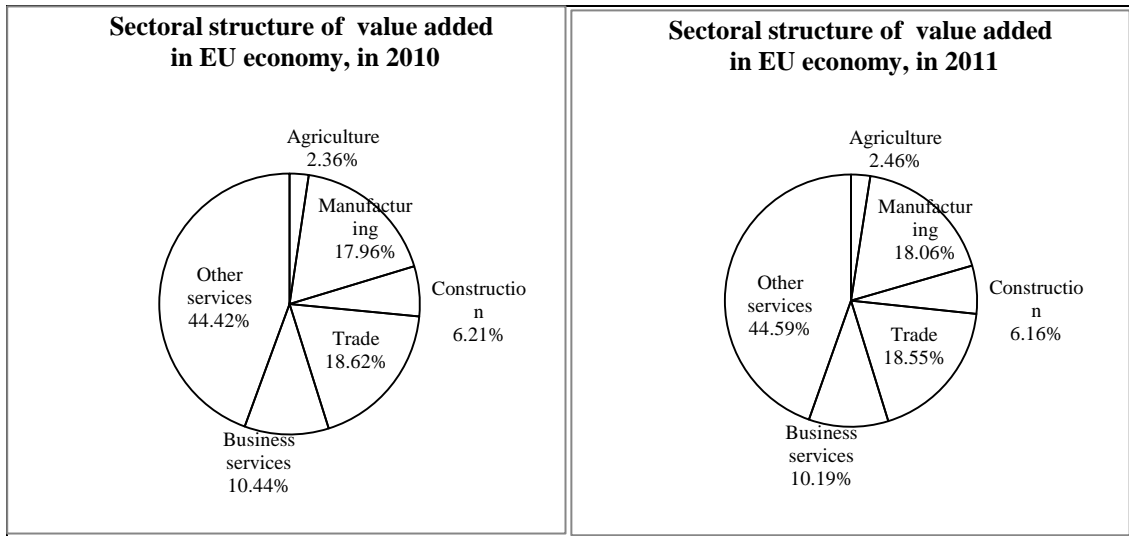**Figure 9.** Comparative structures of all backward and forward linkages in EU, in 2011

Figure 10. Sectoral structures of value added in EU economy, in 2010 and 2011