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ECONOMICS OF THE INPUT-OUTPUT RELATIONS

The financial and economic crisis of 2008 has substantially affected the economic structures and relationships in Bulgaria. The assessment of the input-output relations reveals that failures accompany the development of micro economy, on sectors' and subsectors' level. It is shown that the structural changes correlate positively with economic development. One should differentiate between the various types of structural dynamics – purposeful or chaotic (searching). With the first type of structural dynamics (the pre-crisis one) the dependence on the economic dynamics is obvious whereas with the second type (the post-crisis one) the latter is highly diluted. The financial and economic crisis has its positive influences – it starts a process of cleansing the economy and shifting it to a higher level in the development spiral. The post-crisis period can be described by an active restructuring of the input coefficient matrix. The crisis stated a process of progressive raw materials substitution. Producers looked for alternative production options, mainly by means of raw materials restructuring and savings in order to reduce their current expenditures. The crisis leaves its imprint on the formation of the key sectors. What looms in the group of key sectors is the presence of the main industrial manufacturing sectors. This specifics is much more definite in the case of better developed economies. The well-known fact (which is often forgotten or ignored) has confirmed that a modern economy cannot develop successfully without the solid presence of industry. The other sectors (agriculture primarily, tourism and services as a whole) complete the skeleton in order to get a sound body of an efficiently functioning economy.

Methodology and Data Set

The methodology for the assessment of the input-output relations is based on the use of the Input-Output table (IOT). As an instrument for economic analysis and forecasting it is well-known enough and developed as early as in the years of its creation (Leontief, 1977). During the 1970s and 1980s of the XXth century IOT was widely used by the countries of the so called socialist camp since it enabled the formal utilization of planning at a macroeconomic level.

A key particularity as well as a restraint for using IOT was the absence of information provisions. The requirements for information sufficiency grow exponentially with the increase in the number of sectors. IOT presumes that there are precisely

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organized statistical observations, consequently in such time the usefulness of the analysis and the accuracy of the design depend on the existing dynamic rows.

Before 1990s the National Statistical Institute (NSI) in Bulgaria had been specialized in working out a two-sector nomenclature IOT. The more aggregated sectors nomenclature included 25 sectors (16 industrial) and 102 sectors (with about 90 subsectors of the industry). NSI prepared annually an IOT by 25-sector nomenclature and periodically (once in every five years), the extended sector nomenclature. Since 1989 this practice has been terminated, most likely because of problems of statistical nature and data accuracy.

The interest towards IOT was restored about two decades later. The methodological guidance on the statistical formation of IOT was taken over by Eurostat. They started working out IOT annually for the EU countries, given a unified and internationally comparable methodological basis for a 65sector nomenclature. The statistical working out of IOT is complicated enough since data is officially delayed by 36 months - after the respective report period is over but as a matter of fact, the delay is of about a year longer than that.

Three types of tables have been elaborated: Supply table; Use table; Symmetric input-output table. NSI prepares matrices for the first two types only[1].

In accordance with the NSI methodological notes[2] supply and use tables represent an integrated part of the annual National Accounts. They are a final and balanced presentation of the economic categories in the composition of GDP, structured in details by groups of products and services, economic activities and categories of the final consumption. They are elaborated on the base of ESA concepts and definitions treating the transactions, the economic entities and the classificatory principles of statistical units' grouping as they are applied elsewhere in the System.

Supply is presented in the basic price, including a transformation to market price. Use is presented in market price. Supply and Use tables are matrices by industries and products describing production processes and the transactions in products of the national economy in detail. These tables show:

a) the structure of the costs of production and the value added that is generated in the production process;

b) the flows of goods and services produced within the national economy;

c) the flows of goods and services within the rest of the world.

The ESA 1995 regulation (Regulation 2223/96 of the European Council) may be referred to for specific explanations concerning contents of the tables.

Time coverage of the tables is 2000-2005 (NACE.BG-2001, NACE.BG-2003), 2008-2010 (NACE.BG-2008).

Supply matrix links the products produced (by rows), distributed by sectors output (columns).

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[1] The information is as of 01.11.2016.

[2] One could find the methodological notes on http://www.nsi.bg/bg/content/13455/ecc-2010, as of 01.11.2016.

The use matrix links the products produced (by rows) and their usage by individual sectors (by columns). It is square and the rows correspond to the columns. In this sense the use table is a kind of approximation of the IOT. The analysis and the juxtaposition between the use matrix, on the one hand, and the symmetric input-output matrix (where and for those EU countries for which they exist in parallel), on the other hand, outlines how close the matrices of input-output coefficients are.

The use matrix is applied as an approximation of IOT in the present study. When the matrix of the input-output coefficients is defined, the last two rows and columns are removed for statistical ease.

Because of the great variety of information sources there are grounds to claim that the supply and the use matrixes, as well as the IOT, reflect the sum total of conditions corresponding to the specific way of production and distribution of economic products and services.

The results, described and discussed below, were obtained through the use matrixes, composed by current basic prices.

The assessment of the structural changes complements the sector's picture in the aggregate nomenclature mentioned, suggested by NSI. Minassian (1983) pointed out that the angle between the vectors of the indicators could be considered as a measure of the structural changes. The angle's assessment is made in *gradients*, i.e. what is assessed is the structural change in percent.[3] The measurement has been successfully applied by researchers of various countries (see for example Shevchenko & Razvadovskaya (2013), Jekov (2007), Valkauskas & Zaicev (2007) and others as well).

Input-output structural characteristics

The structural changes in the economy accompany the overall economic development. They are necessary both under intense economic growth and deep manifestations of crisis. The most essential ones are undoubtedly the changes in the structure at the lowest level of production as far as they illustrate the search for a profitable production reply to the changing market demand as well as the directions for increased efficiency and profitability of the firm. The assessment of these changes requires adequate data supply, the expenses for this exponential growth from the scale. The research of Stiglitz (2004) led to the conclusion that quite often minimal information inaccuracies might seriously distort the analytical evaluations.

IOT provides exceptionally varied information on detailed sector decomposition which enables a detailed and consistent evaluation of the changes observed both

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[3] The measure *gradient (known as well as grad)* of an angle forms the right angle, i.e. the right angle is assessed with 100 gradients. Given a structure of two elements the maximum structural change is assessed with 100 gradients. In this context the evaluation of the structural change in gradients makes sense as part of the maximum possible change of 100, i.e. it is presented in percentage. Then the structural changes yield to a better interpretation in terms of content.

along the line of absolute development and the line of structural changes. The statistical methodology of working out of IOT is not firmly fixed which results from both objective and subjective causes. Life is too rich and varied, new economic facts emerge all the time and when taken into account they should be adjusted to the availing statistical techniques, i.e. their improvement, correction and improvement. Statistics is not infallible, so the formation of the individual aggregates is by far always precise and accurate enough. Additional complications might arise in international comparisons. All this necessitates a careful analysis of the results obtained, i.e. enables to admit the existence of certain logical intervals of reliability.

In Table 1 and Table 2 the evaluations for the structural dynamics of the major elements of the IOT for Bulgaria are shown for the periods 2001-2005 and 2008-2011 respectively. IOT for these sub-periods was drawn out from the NSI use tables.[4] There are changes in the methodology of their elaboration for the two time sub-periods, as well as in the sectors nomenclature. Nevertheless, however, they provide some grounds for thought, deliberations and conclusions.

The last column in Table 1 and Table 2 represents an indicator which might be called Structural Target Coefficient (STC, percent). The latter reveals how far the structural changes in the period under consideration pursue a given goal. If, for example, the structural change in year t_2 on year t_1 is assessed at α %, the one in year t_3 compared to year t_2 – at β%, as well as in year t_3 compared to year t_1 – at γ%, than STC is calculated by the formula:

$$STC = \frac{\gamma}{\alpha + \beta} \text{ x } 100\% .$$

In all cases $0 \le STC \le 100\%$, where the higher value of STC shows more deliberate structural changes.

The average annual structural changes during the first structural sub-period were smoother and more moderate compared to the second sub-period. This fact is logical and easy to explain in view of the significant divergence of the economic nature of both sub-periods. In 2001-2005 the economy developed positively and relatively calm, market demand followed greater satisfaction in terms of quantity and saturation while supple tried to meet it within the standards set.

The picture changed during the second sub-period. Production and demand encountered unexpected problems due to the financial and economic crisis, which accounted for the substantial changes in the structures. Leontief (1977) defined the situation under which the economy faced problems quite different from the problems it had to solve under an economic stress.

Consumption modified substantially its structural characteristics. There was an almost abrupt drop in the demand for the „*Real estate services*" (by 5,6 percentage

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[4] The sector nomenclature for both sub-periods is not the same although one can make an acceptable comparison.

points - pp), as well as of the „*Public administration and defense services; compulsory social security services*" (by 2,3 pp). After the prolonged boom of demand and prices in the previous ten years, there followed a kind of sobering in the first sector, i.e. the pendulum swung back. The reduction in the second sector had to be connected to the reforms carried out in the administration services provided to the population and last but not least – to the wider application of the internet services.

The demand for the following sectors was increased: „*Imputed rents of owner-occupied dwellings*" (by 3,1 pp), for *„Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services*" (by 1,9 pp, although not progressively), for „*Electrical equipment*" (by 1,6 pp). Some of these changes were due to the reforms carried out, delayed in time but they had become inevitable in the period of crisis, i.e. adjusting the price level in accordance with the expenditure for the services provided.

Table 1

Structural Dynamics, Bulgaria 2001-2005
(63 sectors), %

Indicators	2001	2002	2003	2004	2005	2000-2005	Annual Average	STC
Output	4	5	4	8	12	21	7	64
Final Demand	6	7	6	9	14	23	9	54
Final Consumption and Expenditures	4	6	4	4	8	16	5	60
Value Added	4	5	3	4	15	21	6	67
Gross Capital Formation	11	10	7	8	11	15	10	32
Export	10	19	11	18	8	26	13	39
Input coefficient matrix	4	3	3	5	8	8	5	36
Inverse matrix coefficient table	10	8	6	6	10	19	8	48

Table 2

Structural Dynamics, Bulgaria 2009-2011
(63 sectors), %

Indicators	2009	2010	2011	2008-2011	Annual Average	STC
Output	8	11	7	18	8	71
Final Demand	14	13	13	23	13	57
Final Consumption and Expenditures	13	10	12	21	12	60
Value Added	7	12	8	15	9	57
Gross Capital Formation	11	8	11	17	10	56
Export	16	7	24	32	16	69
Input coefficient matrix	35	29	24	41	29	47
Inverse matrix coefficient table	14	11	8	15	11	46

When the structural improvement of the final consumption and expenditures is traced, one might assess that the reforms were meaningful and reflected on the population's behavior, i.e. making them had an impact on the formation of the economic structures.

During the second sub-period pursuing a given structural goal became more remarkable. The economy began to shed off its inefficient outputs and looked for ways to meet demand more directly. This justifies the conclusion that the financial and economic crisis had its positive impacts, namely started a process of cleansing the economy and made it climb up to a higher level of the spiral of development.

Production stood out as the one enjoying the most firm and consecutive structural policies despite the relatively low values of the structural changes. The latter has revealed the pronounced inertia of production within the structural nomenclature adduced. This is in line with the view of Leontief (1977), that supply adjusts to a given market situation more slowly than demand. A certain rigidity of the production structures is typical of the national economy, i.e. the supposed and necessary flexibility in facing and meeting demand was absent. Production flexibility requires management behavior of higher professional training and the cultivated feeling for a weighed risk taking, which obviously our microeconomic management was lacking.

An analogical situation took place in the structural development of the value added. It was relatively smooth and correlated with that of production. There were not observed (or hardly made) any revolutionary changes in the sector production structures which would have radically changed the nature of production, i.e. there was no remarkable move towards the production output of higher value added. In this sense it is hard, even painful to achieve a mature economy. Adequate management measures are required both at macro and micro economic levels in order to accelerate the movement towards progressive economic structures. If such a type of movement is not available, an active integration of the country's economy into the European (and global) production structures would be impossible.

The most essential structural changes in both sub-periods can be seen in exports. The country's structure of exports is not established. There are no prevailing or typical outputs for the local economy. It is even hard to identify them, i.e. there is no specialization. Sometimes, a lucrative export agreement is concluded but it remains as an incident. The export list contains products that do not have long-term agreements but took place as a specific demand to be met. Those incidental exports should be followed by long-term agreements which would contribute to the establishment of a relatively stable export structure. A similar development is possible provided the quality characteristics of the export goods are guaranteed which will take time. Export, in this sense, is looking for its physiognomy and finding it out and establishing it will be a long and difficult process.

In the second sub-period, a given structural goal with exports seems to be more firmly pursued but it is mainly at the expense of the promotion of outputs of relatively low value added. Thus, for instance, some agricultural produce and outputs

of the light industry ("*Products of agriculture, hunting and related services*", „*Food products, beverages and tobacco products*", „*Textiles, wearing apparel and leather products*") increased their presence in the export list in 2011 compared to 2008 by 7,2 pp. At the same time two high-tech industrial sectors („*Coke and refined petroleum products*" and „*Chemicals and chemical products*") reduced their share in the exports for the same period by 13,2 pp. The good news is that exports grew of the sector „*Computer programming, consultancy and related services; information services*" (by 2,5 pp) as well as of three industrial branches (although inconsistently: „*Electrical equipment*", „*Machinery and equipment n.e.c.*", „*Motor vehicles, trailers and semi-trailers*") – by 4,6 pp.

The crisis seems to push producers look for better opportunities and new markets for their products. Time only will show how far the development achieved will prove a firm trend but the positive impact of this experience cannot be ignored.

The gross capital formation (which includes the changes in inventories as well) keeps the extent of its structural dynamics in both sub-periods but with a substantial difference in the direction of the structural changes. The main part of the gross capital formation was made up by two sectors: „*Construction work*"[5] and „*Machinery and equipment n.e.c.*" (as a total about three fourths). During the first sub-period the sector„*Motor vehicles, trailers and semi-trailers*" (up to a fifth) represents a significant part in the composition of the gross capital formation, whereas during the second sub-period its relative participation collapsed about ten times. One reason might be a certain saturation of car demand, mainly for personal needs. The depreciation period of this type of equipment is not long and renewing the car park will require new investments in the non-distant future. The data illustrate the post-crisis restraint from accumulating and using means of goods and personal transportation.

During the first sub-period, the share of the sector „*Construction work*" in the gross capital formation structure consistently grew as of 2005 to reach 42% of its total volume and the share of the sector „*Machinery and equipment n.e.c.*" remained relatively stable (about a fifth), despite quite a few variations.

During the second sub-period the opposite trend was observed –the share of the sector „*Construction work*" dropped (not very consistently), and the share of „*Machinery and equipment n.e.c.*" grew (by a pronounced positive trend).

Such a change might be assessed positively, however, under some conditions. During the first sub-period the economy needed to create the assets for the construction business and renew the production construction equipment, but a substantial part of the construction output was meant for consumption. The bad news is that the creation of such assets is accompanied by purely speculative acts. Speculation was made possible due to the poor control of the regulations exercised

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[5] The name of this sector was changed during the two periods under consideration. In 2000-2005 NSI used the name „*Construction work*", while in 2008-2011 it was „*Constructions and construction works*". Very likely there was some difference in terms of scope but the prevailing content of the sector could not differ.

by the government as well as the predominant social opinion that investment in real estate is an eternal and always profitable business. The crisis of 2008 and the financial and economic realities that followed it, however, made investors more sober. Another positive impact of the 2008 crisis on the economic landscape was outlined too, namely, society realized that there are no assets that are always gaining, on the one hand, and a reversal in the production structure of the gross capital formation and especially intensification of the share of machine-building investments at the expense of the construction ones, on the other hand.

The relationship between the rates of GDP growth, on the one hand, and the structural changes, on the other is quite interesting. There is not much specific data about this relationship - only five points for the period 2000-2005 and three for the period 2008-2009. Despite that an unpretentious look suggests the possibility for such a positive correlation.

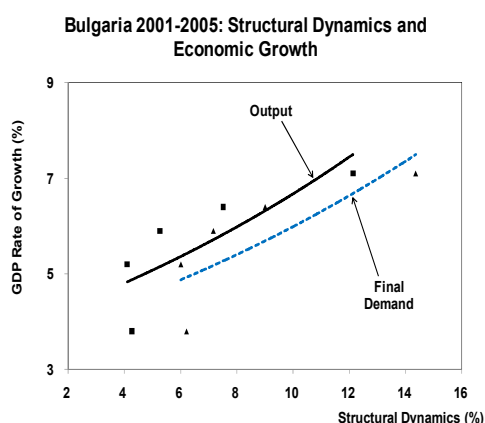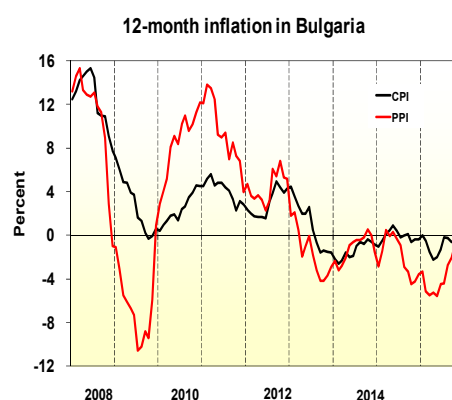Figure 1   Figure 2

The assessment of the structural dynamics of two indicators is presented in Figure 1: on the abscises output and final demand, and on the ordinate – the rates of GDP growth for 2001-2005. The visual display is explicit: the statement that economic dynamics and structural changes correlate positively is well grounded. Figure 1 suggests something more – more intensive structural changes presume more than linear increase of the rates of growth of GDP. The elasticity of GDP to the structural changes in the output is about one third, i.e. every three percent structural changes are linked to an additional percent of GDP growth. This type of relationship justifies looking for and striving for economic policies that encourage and create prerequisites for carrying out intensive structural changes.

The information available for the three post-crisis years is too short to enable to evaluate the extent of some assumed dependency, in force during the second sub-period, the more so that right after 2008, quite unexpectedly, economic realities

altered dramatically. The data from the three post-crisis years showed that the economic structural characteristics were not established, there was too much variation in the search for an adequate structural configuration, and namely the settling down of structures and their dynamics was still to happen.

The structural changes in the input coefficient matrix and in the inverse matrix coefficient table require special attention.

The almost sharp growth in the structural changes, in the input coefficient matrix, as well as in the inverse matrix coefficient table during the second sub-period compared to the first sub-period is quite impressive. The structural changes in the inverse matrix coefficient table in the second sub-period are for example 3-4 times more intensive than those in the first sub-period. The advance of the financial and economic crisis forced producers to intensify their activities and look for new different opportunities for production using alternative options for raw materials and materials. Leontief (1977) demonstrated that there were some ideal proportions for each production process where all the production factors, involved in this process, had to unite. The search for such an „*ideal proportion*" in the conditions of an overall economic stress is further complicated both because of the headlong increase in technical innovations and the price fluctuations.

The second sub-period stands out with the abrupt fluctuating dynamics of the producer price index (PPI, Figure 2), which accounted for the increased demand for suitable substitutes of the traditionally used raw materials and materials. The PPI variations resulted from the development of the crisis process in a global scale and the shrinking of global output, more especially, accompanied by reduced demand for raw materials and materials. This process reflected on the national economy but it was not felt uniformly by raw materials types. This opened a possibility for the firms to look for the winning option in the use of raw material substitutes.

A trend was observed for increased intra-sector consumption it testifies for the efforts made for intra-sector division of labor and improvement of the processing of products and services at the intra-sector level. There were a number of changes, in parallel, which could be interpreted as a striving for improved structure of production costs.

The input coefficients, connected with the usage of electricity, gas, steam and air-conditioning, as well as coke and refined petroleum products diminished. The process developed in parallel with the rise in energy prices. This fact revealed the reserves in production for a more economic use of energy sources and resulted from the imposition of market realities. It demonstrated that prices exercise a significant influence on consumption and they are a serious regulating lever for managing the efficient use of raw materials.

A growth in the input coefficients for using products of the chemical industry was observed, especially in agriculture and food industry, but also in other basic industrial sub-sectors. At the same time the usage of chemical products in pharmaceuticals and products made of rubber and plastic was reduced. The latter

can be accounted for by the improved efficiency of the specific output, which again was related in a certain way with the current financial and economic crisis. Another positive trend was observed in the inner structural changes in the pharmaceutical industry and the replacement of chemical raw materials by natural herb resources.

The intermediate consumption of the basic metals in the main manufacturing sectors dropped. This was another positive trend and the data revealed that the crisis started this process of progressive replacement of raw materials.

The lasting low use of products and services of sector „*Scientific research and development services*" is worrying. The crisis has even deepened this negative trend. It resulted from many factors, some of which traditionally in operation, others openly or not officially imposed. Logical thinking and global experience have shown that in critical situations namely the need for scientific provision and backing of investment and economic activities should rise. Carlin & Mayer (1999) proved, that investment in research and development activities, not simply the gross capital formation, is a main factor, through which the financial system influences economic operations.

A reason for this negative trend witnessed is the poor university training of the managerial elite, which looks at the expenses for scientific projects as an additional burden. Moreover, the official policy materialized in the government budget, stirs distrust in the possibilities of science, too. Scientific structures are to be blamed as well, because they do not manage to shake off the inherited thinking for an expected automatic social financing. The policies of managing science are primarily based on regulating their own scientific structures without showing a greater aggressiveness in the offer and advertising of their products and services.

In the long run, the outcome is socially negative. Scientific activities in the country stand relatively aloof in society while producers expect technological and managerial innovations to be readily available for free. Scientific achievements are regarded and perceived as free social wealth for which at the best the government is supposed to take care. This type of inherited thinking still exists and it is hard to be overcome.

The mentality both with the demand and supply of scientific products and services should undergo substantial changes. It cannot happen automatically and by itself. It requires purposeful policies in forming the demand and then the supply of scientific products and services.

The most serious changes along the line of the structure of the intermediate consumption of products and services are realized in the sub-sectors of services which involve almost half of all the sector nomenclature of 63 sectors. The fact that almost everywhere in the aggregate sector of services the use of the output of the sector „*Public administration and defense services; compulsory social security services*" grew cannot be assessed definitely. The firms connected with services turn into satellites of the state-owned management, they live and survive thanks to public procurements. On the one hand, it is normal for the state management to resort to external services, especially under a situation of crisis, but the trend being

deliberately established raises doubts and questions. A bearable measure of the scale should be set and when it is exceeded the pendulum effect will start functioning, i.e. will reach the other extreme.

The most significant increase is established in the use of services of the sector „*Real estate services*". The development of services and the expansion of activities of the aggregate sector of services are linked to the visible increase in the requirements for office buildings. It has a purely psychological and advertising and marketing impact too, as far as the shining and luxurious office is perceived as the face of the company and its performance. An additional factor is the feeling and understanding, indirectly imposed, for prestige, attractiveness and poor amortization in time of the building itself. In this respect a certain degree of saturation should be reached but data show that this moment is yet to come in the future.

Growth (almost everywhere) was fixed in the intermediate consumption of products and services of the subsector „*Computer programming, consultancy and related services; information*", as well as in the subsector „*Advertising and market research services*". This is a natural process which is not yet intensive enough and saturation can be expected in the more distant future. It somewhat is in contrast with the reduction in the intermediate consumption of products of the subsector „*Computer, electronic and optical products*". A certain degree of saturation is noticed there and restriction of the respective expenses, most of all because of the development of the crisis. There was some calm in the demand for electronic hardware too, but it might be considered artificial and most likely, it will not last too long.

The dynamics of the structural changes in the inverse matrix coefficient table was much more restrained in both sub-periods. There, too, was an increased intensification of the structural changes during the second sub-period on the first one but at a much lower extent – for example twice. The comparison leads to the conclusion that what was observed on the surface of economic developments does not always affect the essentially deep correlations. The search for alternative raw materials substitutes quite often does not affect very hard the complex usage of raw materials.

A definitely positive assessment can be made for the clearly pronounced reduction in the use of products from the sectors „*Mining and quarrying*", „*Basic metals*", „*Coke and refined petroleum products*" according to the inverse matrix coefficients, i.e. reduction in the intermediate consumption of primary material resources. The importance of the overall assessment of the inverse matrix coefficients, however, was demonstrated by individual sectors where an opposite dynamics was noticed with the direct input coefficients. Such was the situation with the sector „*Electricity, gas, steam and air-conditioning*" and with „*Chemicals and chemical products*" as well. There was a positive growth witnessed in the inverse matrix coefficients of these sectors, along the line of the usage of their products from the other sectors, notwithstanding the fall in the respective direct input coefficients. In other words the substitution of raw materials on input level does not automatically lead to respective effects on inverse matrix level, i.e. the search should continue.

The comparable information available by sector nomenclature for Hungary[6] for the same period (2008-2011) for the use matrix allows making a parallel assessment (Table 3).

Table 3

Structural Dynamics, Hungary 2009-2011
(63 sectors), %

Indicators	2009	2010	2011	2008-2011	Annual Average	STC
Output	16	8	6	17	5	55
Final Demand	24	8	7	25	8	64
Final Consumption and Expenditures	28	2	3	28	9	87
Value Added	28	5	5	28	9	73
Gross Capital Formation	10	10	11	11	4	38
Export	8	3	9	8	2	42
Input coefficient matrix	10	11	10	15	5	47
Inverse matrix coefficient table	4	5	6	6	1	50

What impresses are the relatively comparable structural changes in the vectors of the major economic indicators in Table 2 and Table 3 – output, final demand, final consumption and expenditures, value added, gross capital formation and export. Still, in Hungary, the structural changes were more restrained which was related to the greater inertia in view of both the larger size of the Hungarian economy, and the greater structural adjustment in the pre-crisis period as a prerequisite for better production stability after the crisis. The indicators STC for the respective vectors were also comparable, which implied the difficulties in hitting the acceptable structural composition in both economies.

The structural changes in the input coefficient matrix and in the inverse matrix coefficient table in Bulgaria and Hungary are quite different. This confirmed the hypothesis about the much better stability of the inverse matrix coefficient table compared to the input coefficient matrix. In Hungary, the post-crisis change in the input coefficient and the raw materials substitution was much weaker than in Bulgaria.

The stability of the inverse matrix coefficient table in Hungary with 63 rows and columns (3969 elements) was, however, remarkable! Obviously Hungary was ahead of us in terms of adapting the efficiency of its production (and especially of the intermediate consumption of raw materials) to the modern norms (i.e. the efficiency spring was drawn tighter), which made its possibilities for more successful substitutions weaker. Bulgaria, actually, turned out to enjoy in parallel much greater reserves in increasing the efficiency of the use of raw materials.

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[6] The data was used from the internet file of Központi Statisztikai Hivatal (Hungarian Central Statistical Office), http://statinfo.ksh.hu/Statinfo/themeSelector.jsp?page=2&szst=QPA&lang=en, as of 30.09.2016.

The comparable values of STC for both matrices in both countries showed that the process of looking for and finding out the acceptable (optimal?!) structure of intermediate consumption requires comparable efforts and it is not easy to attain.

Key sectors

The rich and varied analytical possibilities of IOT are illustrated also by outlining the key sectors.

The technique in defining the key sectors by means of IOT is well-known and developed in specialist literature (Hazari, 1970; Schultz, 1977; Massón-Guerra, 2008; Botrić, 2013; Leal, 2015 and others). In Bulgaria, in the 80s of the last century large-scale assessments of key sectors (Minassian, 1983b) were also made.

The notion „*key sector*" involves a sector which:

• Has strong relationships with the other sectors as a producer and as a consumer as well. The key sector offers output, which is consumed intensively by other sectors of the national economy, as well as it consumes intensively the other sectors' output. The notion „*strong*" (or "*weak*") is used not in the absolute, but in a relative sense. It is said, that the input relations of a sector as a producer are strong, if the corresponding inverse matrix coefficients by the row of the sector (as a sum) are higher than the average for the country. By analogy, the relations of a sector as a consumer are strong, if the corresponding inverse matrix coefficients by the column (as a sum) of the sector are higher than the average for the country.

• The variation of the inverse matrix coefficients of the key sector is small. Here again relative, not absolute measures are applied. For each sector the variation of the corresponding inverse matrix coefficients can be assessed both by the respective row and column of the inverse matrix coefficients table. The requirement for a „*key sector*" is the respective variations of the coefficients by row and column to fall within the average value of the variations by sectors.

The importance of the key sectors results from the circumstance that their dynamics in time is parallel to the GDP dynamics, respectively to the economic activity of the country. The positive rates of growth of the key sectors presume and require a respective growth in the national economy as far as their growth is fed by other sectors and the output produced is a resource and raw material for the development of the other sectors.

The key sectors directly correlate with the priorities for sector development of the economy. They are an indicator for determining the sectors, which are able to boost up the economy, at a higher level. The Bulgarian government has a registered exercise in formulating the national priorities (see Council of Ministers of R. Bulgaria…, 2012), but the criteria for their determination remain vague, unclear. Petranov (2016) thinks that the priority sectors in Bulgaria are not specified according to precise criteria although many such criteria are suggested officially and made public in the public space. Specifying the sector priorities is related to pursuing a specific industrial policy, which under the Bulgarian conditions is still vague and not established.

An example of key sector determination is shown on Table 4 and Table 5. Table 4 presents the sector distribution (2011) by quadrants in accordance with the degree of intensity of their input-output relations as producers (by rows) and as consumers (by columns). Those sectors, where the sum of the inverse matrix coefficients by rows and columns are higher than the average for the country are represented in the first quadrant of Table 4. These are the sectors whose output is actively consumed by the other sectors on the one hand and at the same time they, themselves, also actively consume the output of the other sectors.

Table 5 shows the distribution of the sectors by degree of variation of the inverse matrix coefficients by rows and columns as well. In quadrant four of Table 5 one can see the sectors where a relatively even distribution is observed by sectors, both in terms of their output and the consumed output, produced by the other sectors (small variation of the inverse matrix coefficients).

Table 4

**Sectors distributions according to the direct and indirect relations
as a producer and as a consumer, 2011**

	Strong relations as a consumer	Weak relations as a consumer
Strong relations as a producer	8, 10, 11, **13**, 15, **16**, 17, **24**, **27**, **31**, 49	4, 6, 41, 42, 44, 46
Weak relations as a producer	1, 2, 3, 5, 7, 9, 12, 14, 18, 19, 20, 21, 22, 23, 26, 29, 32, 33, 34, 37, 38, 53, 59	25, 28, 30, 35, 36, 39, 40, 43, 45, 47, 48, 50, 51, 52, 54, 55, 56, 57, 58, 60, 61, 62

Table 5

**Sectors distributions according to the variation of
the inverse matrix coefficients, 2011**

	Huge variation as a consumer	Small variation as a consumer
Huge variation as a producer	1, 5, 6, 9, 17, 32, 43, 45, 49, 52, 59, 61, 62	4, 10, 11, 15, 39, 41, 42, 46, 47, 51, 55, 56
Small variation as a producer	3, 7, 8, 12, 20, 21, 22, 25, 26, 28, 29, 30, 33, 35, 36, 37, 38, 48, 50, 53, 58, 60, 63	2, **13**, 14, **16**, 18, 19, 23, **24**, **27**, **31**, 34, 40, 44, 54, 57

The key sectors are those, which fall simultaneously in the first quadrant of Table 4 and in the fourth quadrant of Table 5. In this specific case they are presented by their names in the last row of Table 7 and correspond to the sector numbers used in the sector classification presented in the Table in the Annex.

The key sectors for 2000-2005 by years are represented in Table 6, and for 2008-2011 – in Table 7. In the first case one can speak about a pre-crisis (expansion, 2000-2005) and crisis (post-crisis, 2008-2011) situation.

The input-output relations looked much more stable and established in the years of economic expansion 2000-2005. For this period the average annual rates of GDP growth were assessed at about 6,6% and a consistent economic development

was revealed. There appeared some key sectors in the initial year, which were invariably present in the following years too. Later in time they were joined by others that were also repeated. All this speaks about some succession, continuity and complimentary development.

Table 6

Bulgaria 2000-2005: Key sectors

Years	Key sectors
2000	Machinery and equipment n.e.c. Electrical machinery and apparatus n.e.c. Construction work
2001	Other non-metallic mineral products Machinery and equipment n.e.c. Electrical machinery and apparatus n.e.c. Construction work Supporting and auxiliary transport services travel agency services
2002	Other non-metallic mineral products Machinery and equipment n.e.c. Electrical machinery and apparatus n.e.c. Construction work Supporting and auxiliary transport services travel agency services
2003	Metal ores Other non-metallic mineral products Machinery and equipment n.e.c. Electrical machinery and apparatus n.e.c. Construction work Land transport transport via pipeline services Supporting and auxiliary transport services travel agency services
2004	Metal ores Other non-metallic mineral products Machinery and equipment n.e.c. Electrical machinery and apparatus n.e.c. Construction work Land transport transport via pipeline services Water transport services Supporting and auxiliary transport services travel agency services
2005	Other non-metallic mineral products Fabricated metal products, except machinery and equipment Machinery and equipment n.e.c. Electrical machinery and apparatus n.e.c. Construction work Land transport transport via pipeline services Supporting and auxiliary transport services travel agency services

There were three key sectors in 2000 („*Machinery and equipment n.e.c.*"; „*Electrical machinery and apparatus n.e.c.*"; „*Construction work*") and they did not

drop as such until 2005. The sectors „*Other non-metallic mineral products*" and „*Supporting and auxiliary transport services; travel agency services"* were added to them in the following years (2001-2005). Those five sectors built up the skeleton of the key sectors of the period under review. One should add (or drop) to them another two transport subsectors: „*Land transport; transport via pipeline services*" (for 2003-2005) and „*Water transport services*" (2004), as well as the sector „*Metal ores*" (in 2004).

Table 7

Bulgaria 2008-2011: Key sectors

Years	Key sectors
2008	Basic pharmaceutical products and pharmaceutical preparations Fabricated metal products, except machinery and equipment Electrical equipment Machinery and equipment n.e.c. Land transport transport via pipeline services Warehousing and support services for transportation Security and investigation services services to buildings and landscape office administrative, office support and other business support services
2009	Electrical equipment Machinery and equipment n.e.c. Land transport transport via pipeline services Real estate services
2010	Fabricated metal products, except machinery and equipment Electrical equipment Construction work Land transport transport via pipeline services Real estate services
2011	Rubber and plastics products Fabricated metal products, except machinery and equipment Electricity, gas, steam and air-conditioning Construction work Land transport transport via pipeline services

Such a sharp outline of the key sectors suggests that it is not a question of some casual coincidence in one or another list but a meaningful ranking present.

Two main manufacturing sectors were constantly key sectors. The lasting presence of industrial manufacturing sectors in the set of key sectors confirmed the thesis that no modern economy can develop without a progressively built structure of industrial sectors.

Construction was also outlined as a leading and moving sector. It offered its output to almost any economic activity and simultaneously made use of the output of the other sectors. Time showed (only after 2008), that the construction sector had developed chaotically to a great extent. The problem was not in exaggerating its importance in developing the economy but in its poor regulation. It was its poor

reputation namely, that had allowed carrying out speculative operations which finally led to overbuilding.

The inclusion of three transport subsectors in the list of the key sectors for 2000-2005 does not sound trivial and surprising. The regional distribution of production and the development of the territories inevitably require active transport services without which the input-output relations are held up. This explains how important transport sectors are for producers. Accounts show that transport sub-sectors intensively use the output of other sectors of the economy and thus contribute for their development. The main part of the production expenses of the transport sub-sectors is formed by the output of the sector „*Coke and refined petroleum products*" (in accordance with the internationally accepted classification), but data revealed that they almost everywhere and evenly (although not in very big volumes) consumed products from the other sectors. The specificity of the transport sectors in Bulgaria is that energy prices gravitate to the international ones whereas the general price level in the country remains at about below 50% of the average European ones. This particularity is reflected in the price correlations linked with the input-output relations of the transport subsectors. The relatively high prices of liquid fuels compared to the general price level in the country brings about the high input coefficients in the transport subsectors, which turns them into big consumers of output of the other sectors of the national economy.

The key sectors did not include a single subsector of the „*Services*" sector, as well as the agricultural subsectors. It is too often said that they are and should enjoy priority. The input-output relations show, that they develop more or less independently and do not provoke an overall push of the economy to the higher spiral of development. In a modern economy the agricultural sectors (in the context of the extractive sectors including), as well as services (most of all tourist services) look more like something complementing the picture of the overall economic landscape rather than determining it.

The crisis of 2008 has changed significantly the list of the key sectors (Table 7). The sectors' „*fluctuation*" over the years has been much higher. A total of 11 sectors were included in the key sectors during the four-year period given that the annual average number of key sectors for the period was about five. The structural transpositions, caused by the financial and economic crisis increased production demand and adjustments to the changed situation where, by trial and error, various production options were tested. Leontief (1977) pointed out that in an economy of free exchange a major method for adjustment is the well-known method of the error and trial. As a synonym the label „*iterative consecutive approximation (approximation)*" can be used, giving a greater clearness of purpose to the management but does not change the techniques for establishing the successful (optimal) structure. Thus the economy finds out solutions to its structural equations.

Knowledge is the main positive factor in this process of search. As Goethe put it one sees as much as s/he knows. The good preliminary managerial training at the university decreases the useless ramblings and directs efforts in the right

way. The degree of unaddressed and chaotic structural changes is a testimonial and evaluation of the preparation and skills of the managerial team.

When you throw key sectors in disorder this brings about much greater structural changes in the input coefficient matrix, as well as in the inverse matrix coefficient table (Table 1 and Table 2).

„*Land transport; transport via pipeline services*" is the only one, which is a key sector for the whole 4-year post crises period. *„Warehousing and support services for transportation" is another transport subsector, which appears only once* (2008)*.* The presence of these sectors (in parallel with the transport subsectors in the pre-crisis period) shows that the inclusion of transport subsectors to the key sectors is not something casual. It confirms the thesis that in forming a modern economy the development of transport is a must which accompanies, (respectively stimulates or restricts) economic development. The efficient transport services presume a well-functioning transport infrastructure which is linked to the development of construction too. In this way the input-output interactions attain clearer and more understandable outlines.

The connections and dependencies thus outlined justify earmarking financial resources for building up the infrastructure sites even in periods of crisis and even at the cost of emerging budget deficits.

Altogether six manufacturing subsectors are included in the group of the key sectors for the post crises period under consideration. They are: „*Fabricated metal products, except machinery and equipment*" (2008, 2010-2011), „*Electrical equipment*" (2008-2010), „*Machinery and equipment n.e.c.*" (2008-2009), „*Basic pharmaceutical products and pharmaceutical preparations"* (2008), „*Rubber and plastics products"* (2011) and „*Electricity, gas, steam and air-conditioning*" (2011). They are included in the group of the main manufacturing subsectors. In the post crisis period too, a necessity was felt to develop major industrial subsectors as a condition and prerequisite for the development of the national economy.

Two services subsectors were included casually in the list of the key sectors at this sub period: „*Real estate services*" (2009-2010) and „*Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services*" (2008).

The services of the subsector „*Real estate services*" are not cheap and they are used by all sectors of the national economy. Fully in line with the expected the distribution of services is relatively evenly spread, namely the sector has entertained active relations as producer and they were distributed quite consistently by sectors. As a consumer the subsector used more wide-scale services from „*Construction*", „*Financial services, except insurance and pension funding*", as well as „*Electricity, gas, steam and air-conditioning*". The subsector made expenses for products from quite a few other branches, although of smaller volume. This accounted for its incidental inclusion into the key sectors – most of all because of the circumstances in the years indicated. It is not logical to expect that it could remain in the group of key sectors in a strong and better developed economy.

The „*Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services*" were completely accidentally included in the key sectors in 2008. Its presence only suggests that under some circumstances the operations for security and investigation in Bulgarian economy expanded which was not by far a good testimonial about Bulgarian society.

The comparative data available (by the same sectors nomenclature) for Hungary give an opportunity to make a parallel comparative survey of the key sectors (Table 8). In Hungary processes seemed better structured and taking place consecutively. The dominant key sectors were almost exclusively the main manufacturing subsectors. Three subsectors were constantly key sectors: „*Electrical equipment*", „*Machinery and equipment n.e.c.*" and „*Rubber and plastics products*".

Table 8

Hungary 2008-2011: Key sectors

Years	Key sectors
2008	Food products, beverages and tobacco products Rubber and plastics products Electrical equipment Machinery and equipment n.e.c. Electricity, gas, steam and air-conditioning Land transport transport via pipeline services
2009	Food products, beverages and tobacco products Coke and refined petroleum products Rubber and plastics products Electrical equipment Machinery and equipment n.e.c.
2010	Food products, beverages and tobacco products Rubber and plastics products Electrical equipment Machinery and equipment n.e.c.
2011	Rubber and plastics products Electrical equipment Machinery and equipment n.e.c. Electricity, gas, steam and air-conditioning Land transport transport via pipeline services

Two raw materials sectors appeared in the group of the key sectors, namely: „*Electricity, gas, steam and air-conditioning*" and „*Coke and refined petroleum products*".

„*Land transport; transport via pipeline services*" was included twice in the key sectors during the four years (2008, 2011), which corresponded to the situation in Bulgaria. One should note, however, that in Hungary, the transport subsectors appeared accidentally, not permanently in the list of the key sectors. This could result from the relatively cheaper fuel in Hungary in comparison with Bulgaria – in 2008-2011 the average price level in Bulgaria was about 50% of that in the EU-28,

whereas in Hungary it was about 15 pp higher,[7] and fuel prices gravitated to the international ones.

The food producing subsector „*Food products, beverages and tobacco products*" was steadily present in the list of the key sectors of Hungary, while in Bulgaria it did not appear even once. The explanation should be looked for in the much higher integration of the subsector in the other subsectors of the national economy. In Bulgaria, the production of food as a manufacturing subsector continues to stay rather aloof in the set of the manufacturing subsectors.

The key sectors in Hungary can be explained more or less directly, i.e. economic developments in Hungary were better established and steady compared to those in Bulgaria.

Conclusion

The financial and economic crisis of 2008 has substantially affected the economic structures and relationships in Bulgaria. Bulgarian economy does not possess these special attributes characteristic of the developed world and which caused the phenomena of crisis. Despite that Bulgarian economy, however, lost 6-7years in the search of the right way and goes on wandering. The situation in the developed world had no doubt an impact on domestic economic developments but experience shows and theory summarizes that the most important ones are the endogenous management reactions.

The assessment of the input-output relations shows that failures accompany the development of micro economy, on sectors and subsectors level. The overall structural road for the five-year period 2011-2015 was shaped in half by uninformed search for the right structure and in half by specifically directed efforts. The production elasticity requires managerial behavior of high professional training and cultivation of a feeling for well-weighed risk taking which macroeconomic management obviously lacks.

A spirit of compromise, conciliatoriness with the situation and passivity is noticeable. Fewer efforts were made for looking for the right production structure. It becomes obvious when going deeper into the sector composition and in the dynamics and this cannot be assessed positively. A mature economy is very hard to obtain, ever painful.

The data base available with respect to the production structures in fractional nomenclature is highly insufficient to enable making more substantial conclusions, especially in development. In spite of all that, however, there are signs by which one can judge that the structural changes correlate positively with economic development. One should differentiate between the various types of structural dynamics – purposeful or chaotic (searching). With the first type of structural dynamics (the pre-crisis one) the dependence with the economic dynamics is obvious whereas with the second type (the post-crisis one) the later is highly diluted.

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[7] Eurostat data, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode= tec00120& plugin=1, as of 15/11/2016.

The financial and economic crisis has its positive influences – most generally speaking it starts a process of cleansing the economy and shifting to a higher level in the development spiral. Heilbroner [1999] adduced Shumpeter's idea that the economic crisis is not to be perceived as a cause for some special anxiety. „*For capitalism depression is a good cold shower*".

The crisis of 2008 had a positive impact on the economic landscape – society realized that there is no such a thing as always gaining assets, most of all in the form of real state. The composition of the gross capital formation improved the share of the sector „*Construction work*" dropped at the expense of the greater development of „*Machinery and equipment n.e.c.*" (of a quite visible positive trend).

In general, there was a trend of increase in the intra-sector consumption, which is an evidence for the efforts made for intra-sector division of labor.

The post-crisis period can be described by an active restructuring of the input coefficient matrix. The crisis stated a process of progressive raw materials substitution. The impact of prices on the intermediate consumption, as well as on the consumption of the population was substantial and this turned into a serious regulatory lever for managing the efficient use of the raw materials. Producers looked for alternative production options, mainly by means of raw materials restructuring and savings in order to reduce their current expenditures. The intermediate consumption of basic metals diminished, primarily in the main manufacturing sectors. Data showed that a positive result was obtained, which was additionally seized by the state as adjustments (taxes less subsidies on products) in the GDP composition by value added.

What is worrying is the enduring exceptionally low usage of products and services of the subsector „*Scientific research and development services*". The lack of scientific feeding of production activities will be sensibly felt in the long run, most of all after the situation of crisis fades away. A positive upturn cannot take place automatically and all by itself. It needs purposeful policies both in the formulation of demand, as well as in the supply of scientific products and services.

The crisis leaves its imprint on the formation of the key sectors. What looms in the group of key sectors is the presence of the main industrial manufacturing sectors. This specificity is much more definite in the case of better developed economies, especially in Hungary. The well-known fact (which is often forgotten or ignored) is confirmed that a modern economy cannot develop successfully without the solid presence of industry. It is the backbone of the economy. This can account for and justify the policies of reindustrialization in the EU, for which our country it seems is still not ready (Petranov, 2016). The other sectors (agriculture primarily, tourism and services as a whole) complete the skeleton in order to get a sound body of an efficiently functioning economy.

A more special attention should be paid to construction and transport subsectors. They also periodically get involved in the key sectors at this specific stage of development of the Bulgarian economy although their impact and position will undergo changes over time.

Annex

Table

Rows and Columns of the Use Matrix

N	Rows	Columns
1	Products of agriculture, hunting and related services	Crop and animal production, hunting and related service activities
2	Products of forestry, logging and related services	Forestry and logging
3	Fish and other fishing products; aquaculture products; support services to fishing	Fishing and aquaculture
4	Mining and quarrying	Mining and quarrying
5	Food products, beverages and tobacco products	Manufacture of food products, beverages and tobacco products
6	Textiles, wearing apparel and leather products	Manufacture of textiles, wearing apparel and leather products
7	Wood and of products of wood and cork, except furniture; articles of straw and plaiting materials	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
8	Paper and paper products	Manufacture of paper and paper products
9	Printing and recording services	Printing and reproduction of recorded media
10	Coke and refined petroleum products	Manufacture of coke and refined petroleum products
11	Chemicals and chemical products	Manufacture of chemicals and chemical products
12	Basic pharmaceutical products and pharmaceutical preparations	Manufacture of basic pharmaceutical products and pharmaceutical preparations
13	Rubber and plastics products	Manufacture of rubber and plastic products
14	Other non-metallic mineral products	Manufacture of other non-metallic mineral products
15	Basic metals	Manufacture of basic metals
16	Fabricated metal products, except machinery and equipment	Manufacture of fabricated metal products, except machinery and equipment
17	Computer, electronic and optical products	Manufacture of computer, electronic and optical products
18	Electrical equipment	Manufacture of electrical equipment
19	Machinery and equipment n.e.c.	Manufacture of machinery and equipment n.e.c.
20	Motor vehicles, trailers and semi-trailers	Manufacture of motor vehicles, trailers and semi-trailers
21	Other transport equipment	Manufacture of other transport equipment
22	Furniture; other manufactured goods	Manufacture of furniture; other manufacturing
23	Repair and installation services of machinery and equipment	Repair and installation of machinery and equipment
24	Electricity, gas, steam and air-conditioning	Electricity, gas, steam and air conditioning supply
25	Natural water; water treatment and supply services	Water collection, treatment and supply
26	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services	Sewerage; waste collection, treatment and disposal activities; materials recovery; remediation activities and other waste management services
27	Constructions and construction works	Construction
28	Wholesale and retail trade and repair services of motor vehicles and motorcycles	Wholesale and retail trade and repair of motor vehicles and motorcycles
29	Wholesale trade services, except of motor vehicles and motorcycles	Wholesale trade, except of motor vehicles and motorcycles
30	Retail trade services, except of motor vehicles and motorcycles	Retail trade, except of motor vehicles and motorcycles
31	Land transport services and transport services via pipelines	Land transport and transport via pipelines
32	Water transport services	Water transport

N	Rows	Columns
33	Air transport services	Air transport
34	Warehousing and support services for transportation	Warehousing and support activities for transportation
35	Postal and courier services	Postal and courier activities
36	Accommodation and food services	Accommodation and food service activities
37	Publishing services	Publishing activities
38	Motion picture, video and television program, production services, sound recording and music publishing; programming and broadcasting services	Motion picture, video and television program, production, sound recording and music publishing activities; programming and broadcasting activities
39	Telecommunications services	Telecommunications
40	Computer programming, consultancy and related services; information services	Computer programming, consultancy and related activities; information service activities
41	Financial services, except insurance and pension funding	Financial service activities, except insurance and pension funding
42	Insurance, reinsurance and pension funding services, except compulsory social security	Insurance, reinsurance and pension funding, except compulsory social security
43	Services auxiliary to financial services and insurance services	Activities auxiliary to financial services and insurance activities
44	Real estate services excluding imputed rents	Real estate activities excluding imputed rents
45	Imputed rents of owner-occupied dwellings	Imputed rents of owner-occupied dwellings
46	Legal and accounting services; services of head offices; management consulting services	Legal and accounting activities; activities of head offices; management consultancy activities
47	Architectural and engineering services; technical testing and analysis services	Architectural and engineering activities; technical testing and analysis
48	Scientific research and development services	Scientific research and development
49	Advertising and market research services	Advertising and market research
50	Other professional, scientific and technical services; veterinary services	Other professional, scientific and technical activities; veterinary activities
51	Rental and leasing services	Rental and leasing activities
52	Employment services	Employment activities
53	Travel agency, tour operator and other reservation services and related services	Travel agency, tour operator reservation service and related activities
54	Security and investigation services; services to buildings and landscape; office administrative, office support and other business support services	Security and investigation activities; services to buildings and landscape activities; office administrative, office support and other business support activities
55	Public administration and defense services; compulsory social security services	Public administration and defense; compulsory social security
56	Education services	Education
57	Human health services	Human health activities
58	Social work services	Social work activities
59	Creative, arts and entertainment services; library, archive, museum and other cultural services; gambling and betting services	Creative, arts and entertainment activities; libraries, archives, museums and other cultural activities; gambling and betting activities
60	Sporting services and amusement and recreation services	Sports activities and amusement and recreation activities
61	Services furnished by membership organizations	Activities of membership organizations
62	Repair services of computers and personal and household goods	Repair of computers and personal and household goods
63	Other personal services	Other personal service activities
64	Services of households as employers; undifferentiated goods and services produced by households for own use	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use
65	Services provided by extraterritorial organizations and bodies	Activities of extra-territorial organizations and bodies

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