SECTORAL SPECIALISATION IN THE SR

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2. Structural indicators

In connection with the SR's entry to the EU it will be important to know how integration is affecting its sectoral specialisation and to what degree it is stimulating structural changes in the Slovak economy. It will also be important to monitor, how the sectoral specialisation and structural changes will influence economic performance by means of an increase in labour productivity and conversely, how labour market policy and product market policy will influence the speed of structural changes.

Several institutions are focused on the issue of structural changes, of which particular mention must be made of the OECD and the European Central Bank. One of the possible approaches applied by these institutions in their studies is to analyse structural changes by means of mathematical-statistical methods (the Krugman Specialisation Index, the Concentration Index, the Lilien Indicator, etc.).

In an attempt to compare the situation in the SR and EU countries, the NBS has applied these procedures to Slovakia[1]. Calculations by the NBS for the SR indicate the main divergences in the sectoral structure of the Slovak economy and EU countries. Since at the time of preparing the article the SR was not part of the EU, it is necessary, in interpreting the results, to take into consideration their limited predictive ability, which should, with regard to the construction of individual structural indicators, improve through Slovakia's integration into the EU.

2.1 The Krugman Specialisation Index

The Krugman Specialisation Index depicts the structure of the economy in the respective country in relation to the structure in the EU. It is defined as

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[1]In total 11 sectors are included in the indicators for the SR, these being: agriculture, mining and quarrying, manufacturing, utilities, construction, wholesale and retail, hotels and restaurants, transport and storage, posts and telecommunications, financial intermediation, real estate, renting and business activities. With regard to the specific creation of added value influencing the development of labour productivity, public services have not been included.

$$K^k(t) = \quad abs\left| V_i^k(t) - V^k(t) \right|$$

where:
$V_i^k(t)$ is the share of sector k in country i at period t
$K^k(t)$ is the share of sector k in the EU without country i,
in both cases on the basis of the gross added value at constant prices.

The Krugman Specialisation Index may reach two limit values:

• 0 – if the sectoral structure of the economy in the respective country is identical with the rest of the EU, i.e. the country is not specialised,

• 2 – if the sectoral structure of the economy in the respective country is not identical with the rest of the EU, i.e. the country is strongly sectorally specialised.

From the values of the Krugman Index for the SR it ensues that its average value for the years 1996 – 2002 exceeded almost twice the average value for the EU. That may mean that the specialisation of the Slovak economy is at a higher level in comparison with the average for the European Union. On the basis of calculations by the NBS, within the EU the lowest specialisation is seen in Holland, Great Britain and Denmark, and the highest specialisation in Luxembourg, Greece and Finland. The sectoral specialisation of the Slovak economy measured by the Krugman Index in this most resembles countries with the highest values of this index. These results however need to be treated with caution, since at the given time Slovakia was not yet a part of the EU.

SR – Krugman Specialisation Index

	1996	1997	1998	1999	2000	2001	2002	Average 1996 – 2002
EU – average	0,11	0,12	0,12	0,12	0,12	0,12	0,12	0,12
SR total	0,26	0,23	0,21	0,25	0,22	0,23	0,20	0,23

Source: NBS recalculation from OECD data

2.2 The Concentration Index

The concentration index expresses the view of an economy's sectoral specialisation from the other side. This index reflects the share of a sector in the respective country in the EU sector's output, in relation to the share of its whole economy in the output of the EU. Values of the index exceeding 1 point to a high level of concentra-

tion, values around 1 represent a concentration of sectors similar to the EU average.

The concentration index is defined as:

$$I_i^k(t) = \frac{x_i^k(t)}{X_{EU}^k(t)} \,\Big|\, \frac{x'_i(t)}{X'_{EU}(t)}$$

where:

$x_i^k(t)$) is gross added value at constant prices in country i and sector k

$X_{EU}^k(t)$ jis gross added value at constant prices in the EU and sector k

$x'_i(t)$ is gross added value at constant prices in country i

$X'_{EU}(t)$ is gross added value at constant prices in the EU

Calculations of the concentration index in the SR for sectors on average for the period 1996 – 2002 indicate that the output of the SR in comparison with the E U is highly concentrated in agriculture (the share of agriculture in aggregate output in the SR was almost twice as high as in the EU) and conversely, the lowest concentration was seen in financial services (their share in the SR representing approx. only 70% of the share in the EU). Values of the concentration index for industry and

SR – concentration indices

	1996	1997	1998	1999	2000	2001	2002	Average 1996 – 2002
Agriculture	1,60	1,71	1,80	1,79	1,81	1,74	1,87	1,75
Industry	1,47	1,30	1,31	1,38	1,26	1,27	1,27	1,32
Construction	1,28	1,22	1,00	0,70	0,71	0,68	0,70	0,90
Business services	1,06	1,18	1,14	1,18	1,19	1,21	1,11	1,15
Financial services	0,57	0,67	0,65	0,66	0,72	0,69	0,73	0,67

Source: NBS recalculation from OECD data

business services in the SR slightly exceeded the value 1, meaning that the share of these sectors in the aggregate output of the SR slightly exceeded for shares of industry and commercial services in the EU. The share of the SR's construction and that of the EU was almost identical, this being documented by the index value of this sector, which on average for the years 1996 to 2002 for the SR reached a level slightly below 1.

2.2 The Lilien Indicator

Differences in specialisation may be the result of dif-

ferent speeds of structural changes. An analysis of the speed of structural changes allows a picture to be ascertained of the adaptability to changes in aggregate demand. The Lilien Indicator[2], dealing with this, is defined as:

$$\delta = \left[\sum_i \frac{x_{it}}{X_t} \,(\Delta\log x_{it} - \Delta \log X_t)^2 \right]^{1/2}$$

where:

x_{it} is employment in sector i

X_t is total employment

The indicator is thus founded on an assessment of employment, through which the speed of structural changes is measured. A high value of this indicator means fast structural changes and a significant reallocation of employment between sectors. External shocks here have a tendency to accelerate structural changes and to increase a country's adaptability to changes in aggregate demand. However, the speed of structural changes, as measured by this indicator for sectoral aggregates, only partially reflects a country's adaptability to changes in aggregate demand, since the shift of resources occurs more within the framework of sectors rather than between them.

The ability of the Slovak economy to flexibly react to changes in aggregate demand is documented by data in the table. Whereas over the years 1996-1998 the Lilien Indicator for the SR on aggregate reported lower values, over the years 1999 – 2000, in connection with economic measures limiting domestic demand, its values almost doubled. The fastest structural changes here were seen in agriculture and construction, where the value of their indicators exceeded the average value for the SR. In agriculture this concerned in particular the period 1998 – 2001, probably in consequence of the lapsing of loss-making enterprises and the start up of business subjects in the form of commercial companies operating on leased land, the efforts of which were directed towards a rationalisation of the production process in the interest of maximising the operating result. In construction the indicator reached the highest values over the years 1997 – 2000, in consequence both of a decline in demand for building works, as well as a further reduction of over-employment in medium- and large-sized con-

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[2] The Lilien Hypothesis, termed the Sectoral Shifts Hypothesis (Lilien, D.: Sectoral Shifts and Cyclical Unemployment. Journal of Political Economy 1982, No 90, pp. 777 – 793) is considered by some authors as controversial. They argue that some sectors, for example industrial production, are very sensitive to the economic cycle and thus a greater decline in employment is seen in them

during a recession. Conversely, the service sectors are less sensitive to the economic cycle, because during a recession their employment falls more slowly. Despite this the sectoral view of this hypothesis, on which it is founded, has broader macroeconomic implications (it is used for example in analysing the development of credit, equities, etc.).

SR – Lilien Indicator

	1996	1997	1998	1999	2000	2001	2002	Average 1996 – 2002
Agriculture	0,049	0,047	0,156	0,158	0,139	0,102	0,005	0,094
Industry	0,067	0,077	0,005	0,054	0,028	0,033	0,050	0,045
Construction	0,010	0,102	0,034	0,068	0,161	0,000	0,054	0,061
Business services	0,001	0,069	0,107	0,060	0,040	0,040	0,021	0,048
Financial services	0,012	0,003	0,141	0,012	0,017	0,015	0,026	0,032
Total	0,021	0,039	0,032	0,078	0,094	0,031	0,070	0,052

Source: NBS calculation from data from the Statistical Office of the Slovak Republic

struction enterprises. On the other hand, financial services were the slowest to react to changes in aggregate demand, something which is connected with the specific role of this sector in a transforming economy.

Conclusion

With Slovakia's accession to the European Union, besides nominal convergence there comes to the forefront also the issue of real convergence, which is closely connected with structural changes in the supply side of the Slovak economy. Experience from advanced economies confirms that a substantial part of the structural changes in member states of the EU took place in the 1980's and at the beginning of the 1990's, and this in particular at a time of gradual enlargement and the accession of states to this economic community. Many of the analyses prepared on structural aspects therefore focus on the results of economies in consequence of countries' accession to the EU, i.e. in what way the economic structure of the respective country's economy changed following accession to the EU.

This article set itself the aim of mapping out the development to date of the sectoral structure of the SR economy and comparing it with the situation in the European Union. Its first part is focused on analysing the development of the sectoral structure of the Slovak economy on the basis of added value, employment and labour productivity, which it compares with the average data for the European Union (including the EU15 countries, i.e. the state prior to enlargement in May 2004). From the analysis for the years 1996-2002 it resulted that the SR economy, on the one hand, has a higher share of agriculture and industry and, on the other hand, a lower share of services. Over the course of seven years, under the influence of structural changes, however, the share of individual sectors in the creation of the added value and employment has changed and gradually, through a decline in the importance of agriculture and industry and through an increase in the importance of services, we have witnessed an approxi-

mation to levels in the advanced economies. In the framework of the services sector, business services have most approximated to the EU average. Financial services, despite their dynamic changes, as well as public services, which have recorded relatively smaller structural shifts, lag behind the EU level. The growth in labour productivity in the SR in the period evaluated reached more than three times the rate in comparison with the average rate in the European Union. From a comparison of the development of sectoral productivity it can be seen that while labour productivity in the SR grew in all sectors, its development in the EU was differentiated, something which was connected with the different development of sectoral employment in the SR and the EU. According to findings, productivity growth in sectors of the Slovak economy has in particular been a consequence of the reduction in employment.

The article in its second part focuses on an analysis of the structural changes in the SR, using a mathematical-statistical methods. From the Krugman Specialisation Index and the Concentration Index, which depict the structure of added value in the respective countries in relation to the EU it results that specialisation of the Slovak economy reached a higher degree in comparison with the average for the European Union.

The values calculated for the concentration index confirmed that Slovakia had, on the one hand, recorded a high concentration of output in agriculture, a moderately higher concentration in the industry and business services and, on the other hand, a low concentration of output in financial services.

The differences in specialisation and concentration were probably the result of the different speed of structural changes, characterised by the Lilien Indicator. From its values for the SR and sectors it can be seen that the supply side of the Slovak economy reacts relatively flexible the two changes in aggregate demand. The fastest structural changes were recorded by agriculture and construction. With regard to their specific standing in the economy, financial services have been the slowest to react to changes in aggregate demand.

Slovakia is at a certain stage of transformation, which is characterised by the gradual change of the economy's sectoral structure. The above analysis of it is therefore only an initial work of the issue of sectoral specialisation, which, besides structural reforms underway and under preparation, will in the future take account also of the factor of the SR's accession to the European Union.