Competitiveness of manufacturing branches in Latvia: international comparison, analysis, and forecasts

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Issues related to global, sectoral, and business competiveness are topical all over the world, including the new European Union (EU) member states with fast growing economies as Latvia. Since entering the EU in 2004, the average annual growth rate of gross domestic product (GDP) of Latvia was 11%, and, in 2007, it was 10.3%, which was the highest growth within the EU member countries. Experts hold a view that the fast economic development in these years has been achieved by productivity increase.

Due to the present situation, when the annual growth of economy is mainly determined by the development of service sector industries (wholesale and retail trade; real estate, renting and business activities; transport and communications; financial intermediation etc.), the issues related to manufacturing sector and its current and further development have become extremely topical and demand sophisticated study and analysis.

The paper is devoted to Latvian manufacturing sector, its present trends and structure, share in the economy, and its further development trends taking into account competitiveness issues.

Analysis of concept of competitiveness

Competitiveness is a considerably new concept and it represents capability of a country, sector, or business to compete and maintain its positions in the market. Concept of competiveness is a composite concept that includes several divisions and covers different and various aspects to reach its goal.

Many authors stress that the concept of competitiveness is an elusive concept (Grilo et al., 2006), that it is difficult to measure (Bronisz et al., 2008). And many authors have proposed new or upgraded definitions of this concept and also carried out detailed analysis and clarification of the current definitions. However, one must admit that there is not a one widely recognised definition and there are many similar definitions accepted by some or many specialists at the same time.

M.E. Porter, which is one of world's leading specialists in competitiveness issues, defines the competitiveness of a location as the productivity that companies located there can achieve (Porter (1990), Ketels (2006)). Productivity is the key determinant of the level of prosperity (created not inherited) a location can sustain over time.

Fisher and Schornberg (2006) define competitiveness as a construct (i.e., a composite concept), covering relative and multidimensional economic performance as indicated by profitability, and productivity as output growth. The authors (Fisher and

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Schornberg) stress the importance to distinguish competitiveness indicators from competitiveness determinants.

In some studies (Kohler-Toglhofer et al., 2007), authors focus more on costs competitiveness and apply various indicators and indexes elaborated on basis of costs/prices indexes.

Sirikrai and Tang (2006), who analyse industrial competitiveness, argue that financial and non-financial indicators are widely used. And combination of financial and non-financial indicators ensure a more detailed analysis of organizational performance, which can, in turn, lead to a more meaningful analysis of industrial competitiveness. And hence the competitiveness of firms within a particular industry therefore, reveals the competitiveness of that industry, and it is with upmost importance to split competitiveness indicators from competiveness drivers. In practical application to Thailand's economy, five industrial competiveness indicators are identified, which are considerably general and therefore can be applied to other economies: manufacturing excellence, value-added of product, market expansion, financial returns, intangible values.

Despite the revealed problems regarding the defining of the concept of competitiveness, authors have elaborated theoretical and practical aspects of this sphere in more detail as classification, factors or drivers of competitiveness. One of the solutions to eliminate some of problems regarding the definition and ease the further theoretical research and practical application process is to divide several levels or objects of competitiveness. Some authors (for example, Drescher et al., 1999) mark out three levels of competiveness: competitiveness of companies (microeconomic level), competitiveness of industries (mesoeconomic level), and competitiveness of national economies (macroeconomic level). This subdivision is applied in practice as it eases the understanding of the concept and facilitates studies and practical elaborations of used tools and methods.

Nowadays, several organisations prepare and publish a variety of reports, evaluation of countries, regional, sectoral competitiveness. In most cases, each of these reports contains a set of indicators to disclose and represent the situation regarding competiveness. It is also evident that more attention is paid to competitiveness of nations, and sectoral competitiveness globally and within the country is analysed less intensively. At the same time, several authors have carried out elaborated analysis of competitiveness of a specific sector or sectors, such as food industry, meat production etc. These studies are focused only on this certain industry, subsequently less or no attention is paid to others sectors.

IMD Word Competiveness Yearbook (WCY) and *The Global Competitiveness Report (GCR)* are leading reports on global competitiveness state and changes. Despite the focus of these reports, they use and integrate different indicators, cover diverse number of countries etc., and also the definitions included are dissimilar.

According to the definition presented in *WCY 2008*, competitiveness of nations is a field of economic knowledge, which analyzes the facts and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people. The methodology of the *WCY* divides national environments into four main factors: economic performance, government efficiency, business efficiency and infrastructure. It means that competitiveness analyzes how nations and enterprises manage the totality of their competencies to achieve prosperity and profit. Some nations support competitiveness

more than others by creating an environment that facilitates the competitiveness of enterprises and encourages long-term sustainability. At the same, In *GCR 2007-2008* competitiveness is defined as the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy. In other words, more competitive economies tend to be able to produce higher levels of income for their citizens. The productivity level also determines the rates of return obtained by investments in the economy. Because the rates of return are the fundamental determinants of the growth rates of the economy, a more competitive economy is one that is likely to grow faster over the medium to long run. The concept of competitiveness thus involves static and dynamic components: although the productivity of a country clearly determines its ability to sustain a high level of income, it is also one of the central determinants of the returns to investment, which is one of the key factors explaining economy's growth potential.

As for applied criteria and the number of countries covered by the reports, WCY ranks the 55 countries[e] on the basis of 331 criteria, it includes the criteria used to compute the rankings, which are grouped into 4 main factors (economic performance, government efficiency, business efficiency, infrastructure) divided into 20 sub-factors. Business efficiency covers such fields as productivity, labour market, finance, management practices, attitudes and values. Furthermore, the sub-factors of productivity and efficiency are: overall productivity, real growth of productivity, labour productivity and its growth, productivity in agriculture, industry, services, large corporations, small and medium-size enterprises, productivity of companies. However, GCR ranks 131 economies[f] and it includes relative rankings for more than 100 variables. The used index (*Global Competitiveness Index 2007-2008*) contains three sub-indexes relating to basic requirements (as institutions, infrastructure, macroeconomic stability, health and primary education), efficiency enhancers (as labour market efficiency, market size etc.), and innovation and sophistication factors. This index is developed by Professor Xavier Sala-i-Martin (Columbia University). The report also contains *The Business Competitiveness Index*, which is developed by Professor Michael E. Porter (Harvard Business School).

Both of the above-mentioned publications give an important insight into national competiveness and indicate the occurred changes (gain or loss of competitiveness). On the other hand, these reports only offer overall characteristics of a country's level or status regarding the competitiveness, at the same time, taking into account the rankings of other, especially neighbouring countries.

In practice, statistical bureaus and other institutions compute various indicators regarding competiveness and productivity. Mostly these indicators cover such fields as outcomes, investment, innovation, skills, enterprises and competition. Outcome indicators as GDP per worker, GDP per hour worked are some of the key indicators that are widely-used and recognised.

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[e] Latvia is not included in the list of analysed countries in *IMD Word Competiveness Yearbook 2008*. Estonia was in 22nd place, but Lithuania was in 36th place. In WCY 2007, Estonia was in 24th, but Lithuania in 31st place.

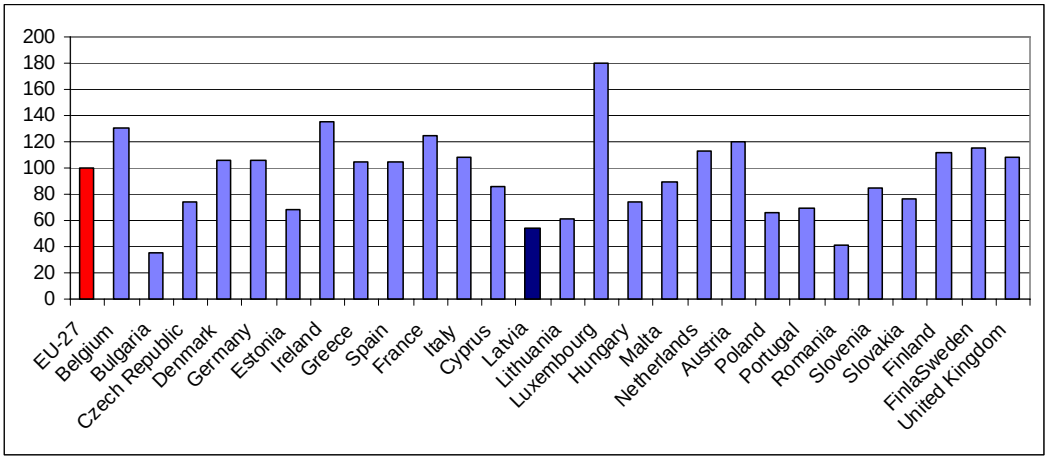
[f] According to Global Competitiveness Index (GCI) Latvia was in 45th place in 2007-2008 edition , but in 44th place in 2006-2007 edition. The neighbouring countries (Estonia, Lithuania) have upper position in this ranking – respectively 27th (26th) and 38th (39th) place, in 2007-2008 (and 2006-2007) editions.

Regarding the carried-out analysis and evaluations of Latvian sectoral competiveness, so far, the major point is put to overall issues or very specific issues and theoretical aspects, however, numerical results are omitted in most cases (Vanags I. et al. (2004), Vanags A. et al. (2005), Kasalis (2004)).

This paper focuses on sectoral competitiveness and hence, due to the limiting factors and conditions, it outlines more productivity and growth indicators (regarding competiveness of industries (at mesoeconomic level)) and not that much other indicators as profitability, investment, skills and education, innovation etc.

Analysis of trends

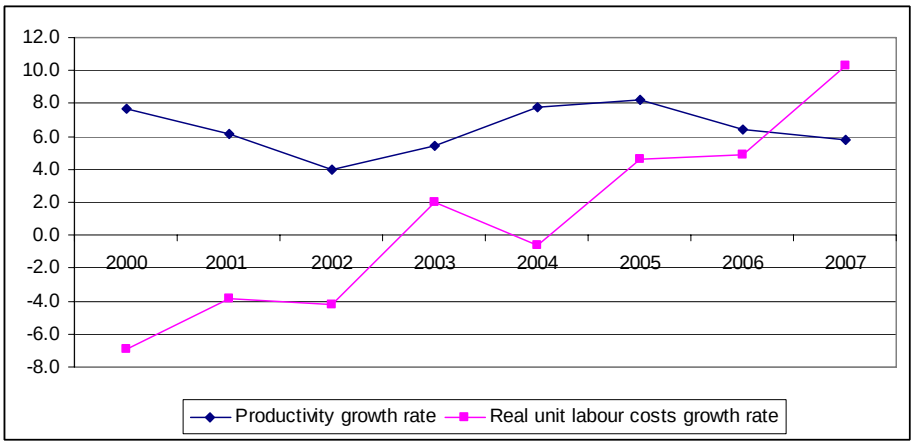
Although Latvia has experienced high economic growth rates since 2000, especially in the past few years, its labour productivity in 2007 was one of the lowest among the EU-27 countries (see Figure 1). It accounted only for 53.6% of the average productivity in the EU-27. However, productivity in Latvia has grown significantly in the previous years, for example, comparing with 2000, it has grown by 68%. During this period, productivity growth was higher only in Estonia (83%) and in Lithuania (78%) while the average productivity in the EU-27 countries grew only by 25%.



Source: Eurostat

Figure 1. Labour productivity per person employed - GDP in Purchasing Power Standards (PPS) per person employed relative to EU-27 in 2007 (EU-27 = 100)

Productivity is often analysed together with labour costs in order to show, whether increase in labour costs are justified with equal or higher productivity growth. Using real unit labour costs and real output per employee, we can see that in 2000–2006 productivity growth rate was higher than unit labour costs growth rate. However, in 2007, unit labour costs increased 4.5% points faster than productivity.



Source: CSB database

Figure 2. Dynamics of productivity and labour costs in Latvia (%)

In order to improve overall productivity level in Latvia, it is important to concentrate on major branches of economy. As productivity is directly connected with employment, major industries are to be analysed from the point of view of number of employees. Data in Table 1 show that most important industries regarding number of employees are trade, manufacturing, construction, agriculture and transport and communications. Manufacturing is considered to be the key industry as a major driving force of Latvian exports, comprising more than half of it (56.6% of exports of goods and services in 2007).

Table 1

Latvian industry structure, productivity and labour costs in 2007

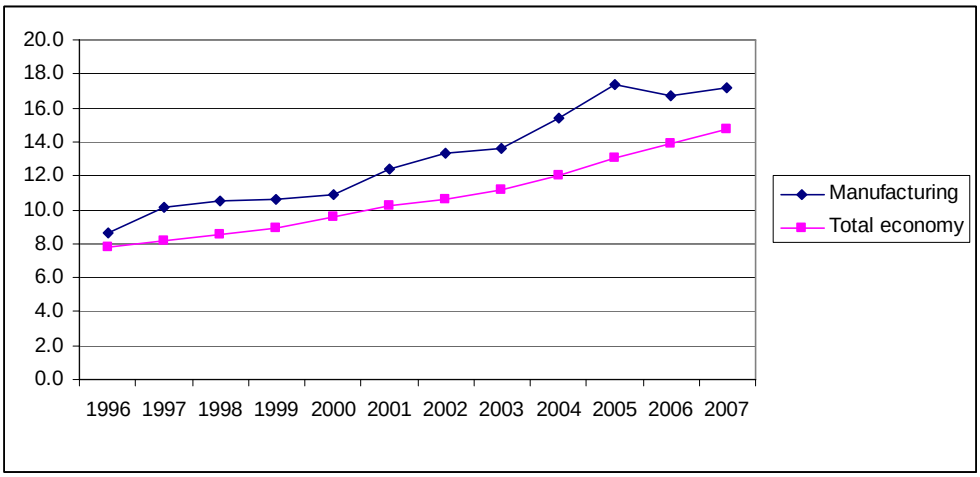
Industry	Output (%)	Employment (%)	Productivity (thsd Ls)	Labour costs per employee (thsd Ls)
Agriculture	3.6	9.7	5.5	0.9
Fishing	0.1	0.3	7.0	2.0
Mining and quarrying	0.4	0.6	10.5	2.4
Manufacturing	17.2	14.8	17.2	4.6
Electricity, gas and water supply	3.2	1.9	25.2	6.0
Construction	10.1	11.3	13.2	3.6
Trade	20.7	16.6	18.5	4.6
Hotels and restaurants	2.1	2.8	11.3	3.2
Transport and communications	14.7	9.3	23.2	4.7
Financial intermediation	4.2	2.0	31.7	11.8
Real estate	11.3	6.6	25.1	7.3
Public administration	4.0	7.5	7.9	7.8
Education	2.5	7.3	5.0	6.6
Health and social work	1.8	4.5	5.8	6.0
Other activities	4.0	4.8	12.2	4.5
Total economy	100.0	100.0	14.7	5.3

Source: CSB database

It is interesting that industries with higher productivity (expressed as real output to the number of employees) also have higher labour costs (see Table 1) and industries with lower productivity – lower labour costs (with the exception of public administration, education and health and social work, which are usually considered as public sector provided services). This may indicate that wages are an important motivator in private sector, but not as important in public sector.

Analysis of productivity shows that manufacturing is one of industries with higher productivity than the overall economy. However, it is only half as large as in financial intermediation. If the analysis is based on indicator – real value added per employee, than in 2007 manufacturing is also the 6th most productive industry (with 5.4 thsd LVL per employee), but it is not as productive as overall economy (6.9 thsd LVL).

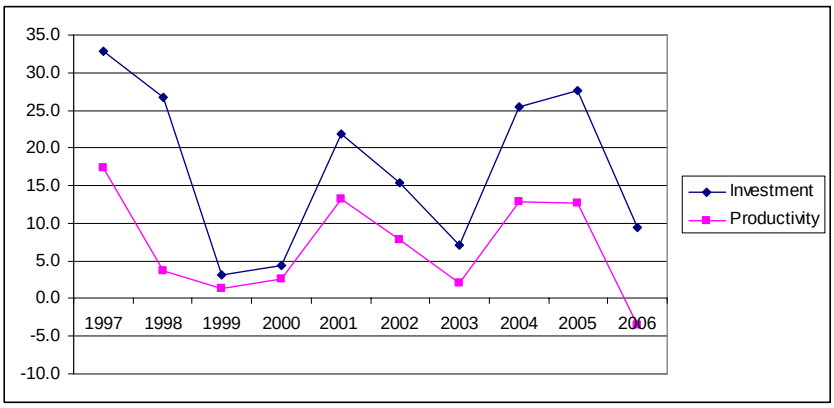
Positive trend in manufacturing is constant increase of productivity (except in 2006), as it is seen in Figure 2. During 1996 – 2007 productivity in manufacturing has almost doubled, growing on average 6.4% a year, which is more than overall productivity growth (on average 6% a year). The same applies analysing value added per employee.



Source: CSB database

Figure 2. Dynamics of output per employee (thsd LVL)

Figure 3 illustrates relation between the growth of capital investment and productivity in manufacturing. Both indicators follow the same trend, however, increase of investment does not provide the same increase in productivity, therefore also other factors count. During the last few years Latvia is facing more serious problems associated with workforce. For example, the number of vacant workplaces in manufacturing has grown from 1.1% in 2005 to 2.3% in 2007. Therefore other means of action are implemented, including increase of salaries, which may cause disparities in growth of labour costs and productivity.



Source: CSB database

Figure 3. Growth rates of investment and productivity in manufacturing (%)

Detailed data on manufacturing is not available as duly as macroeconomic data; therefore comparison of all manufacturing branches is prepared using data of 2005, which are given in Table 2. Leading branches both regarding production and employment are manufacture of food products and beverages and manufacture of wood and wood products. Other significant branches regarding employment are manufacture of furniture, manufacture of wearing apparel, publishing, printing and reproduction of recorded media, manufacturing of fabricated metal products and manufacture of textiles. Increase of productivity in these branches would ensure the highest increase of productivity in manufacturing industry and overall economy.

Table 2

Latvian manufacturing structure, productivity and labour costs in 2005

Branch (NACE)	Production (%)	Employment (%)	Productivity (thsd EUR)	Personnel costs per employee (thsd EUR)
Manufacture of food products and beverages (D15)	25.7	21.5	36.3	4.0
Manufacture of tobacco products (D16)	-	0.20	-	-
Manufacture of textiles (D17)	2.9	5.0	17.9	3.7
Manufacture of wearing apparel (D18)	2.6	8.1	9.6	2.9
Tanning, dressing of leather (D19)	-	0.38	-	-
Manufacture of wood and of wood products (D20)	22.7	20.2	34.1	3.6
Manufacture of pulp, paper and paper products (D21)	1.3	0.97	40.9	5.3
Publishing, printing, reproduction of recorded media (D22)	5.4	6.3	25.6	5.4
Manufacture of coke, refined petroleum products and nuclear fuel (D23)	-	0.03	-	-
Manufacture of chemicals and chemical products (D24)	2.7	2.6	31.6	5.8
Manufacture of rubber and plastic products (D25)	3.1	2.5	37.6	4.3
Manufacture of other non-metallic mineral products (D26)	4.9	3.6	41.0	5.2
Manufacture of basic metals (D27)	6.3	2.1	89.8	6.6
Manufacture of fabricated metal products (D28)	4.9	5.4	27.5	4.2
Manufacture of machinery and equipment n.e.c. (D29)	2.8	4.4	19.2	4.5
Manufacture of office machinery and computers (D30)	0.27	0.11	75.1	7.3
Manufacture of electrical machinery and apparatus n.e.c. (D31)	2.3	2.1	34.2	5.9
Manufacture of radio, television and communication equipment and apparatus (D32)	0.63	0.65	29.4	5.0
Manufacture of medical, precision and optical instruments (D33)	0.80	1.05	23.2	4.7
Manufacture of motor vehicles, trailers and semi-trailers (D34)	0.73	0.58	38.5	4.7
Manufacture of other transport equipment (D35)	2.9	3.5	24.7	4.8

Table 2 continued

Branch (NACE)	Production (%)	Employment (%)	Productivity (thsd EUR)	Personnel costs per employee (thsd EUR)
Manufacture of furniture; manufacturing n.e.c. (D36)	4.6	8.2	16.9	3.5
Recycling (D37)	1.4	0.38	112.9	3.5
Manufacturing (D)	100.0	100.0	30.3	4.2

Source: Eurostat

Data in Table 2 show that productivity in two leading branches as well as nine minor branches (regarding employment) is higher than the average in manufacturing industry. However, one cannot unambiguously declare that it is easier to enhance productivity in branches with lower productivity than average. Only specialists of particular branches can evaluate how wage increase or additional investments might improve productivity. For example, in branches like manufacture of fabricated metal products, manufacture of transport equipment or manufacture of furniture, increase in investment generate considerably lower increase of productivity, but in branches like manufacture of textiles, manufacturing of wearing apparel and manufacturing of wood and wood products the difference is not as significant.

Analysis of investment also shows that from 2004 higher investment growth was associated with high and medium technology manufacturing branches: average annual increase in high technology branches was 30%[g], in medium technology branches – 38% and in low technology branches – 5.5%. In 2007 investment in high technology branches grew by 26% and formed 13% of all investment in manufacturing. Such trends might indicate on capital saturation in low technology branches and diminishing growth potential of these branches influenced by competition from cheap labour countries.

As majority of manufacturing branches are export orientated, competitiveness factors are essential for further development of manufacturing. 76.3% of production of manufacture of textile and textile products, 74.7% of manufacture of transport equipment, 71.2% of manufacture of machinery and equipment, 65% of manufacture of wood and wood products and 64% of manufacture of basic metals and fabricated metal products were exported in 2007.

Substantial productivity growth in manufacturing and in many manufacturing branches in particular, is considered as a positive trend. However, increasing labour costs, especially in 2005 – 2007, have negative impact on competitiveness. For example, in manufacture of food products and beverages labour costs grew twice as much as domestic and export prices for production. Impact of increasing labour costs is even more dramatic in manufacture of textiles and textile products because of high labour-intensity. Because of increasing labour costs, production has decreased in manufacture of machinery and equipment. Manufacture of basic metals and fabricated metal products, on the other hand, is considered to be highly competitive, where high increase of export prices has largely compensated increase of production costs.

Methodology and results

Choice of modelling tools and methodologies is heavily influenced by the currently available statistical information in many countries. In Latvia in particular,

[g] Source: Report on the Economic Development of Latvia.

statistical information availability and level of sectoral disaggregation of computed indicators are important factors taken into account by experts and model builders of various fields.

Nevertheless, the situation in Latvia regarding statistical information endowment and quality improves, especially regarding input-output statistics. Notable results have been achieved, reforming the I-O department, involving new and perspective specialists etc. During considerably long time, since 2003 when the input-output tables for 1998 were published, the preparation of input-output tables for 2000, 2001, 2002, 2004, and 2005 was carried-out, but not finished due to various and diverse causes.

According to the plans of the Central Statistical Bureau of Latvia and the EU regulations, the input-output tables for 2004 are planned to be finished till the end of this year. The current processes at statistical bureau seem promising and achievable. Some of the major procrastinatory factors are related to evaluation of trade and transport margins, also some experts believe that several service sectors are overestimated, as well as changes in stocks are dissimilar from conventional level as a result of Latvia's accession to the European Union (in May of 2004).

However, the preparation process of input-output tables for 2005 is delayed due to a lot of factors, but taking into account recent changes and improvements at statistical bureau, this situation also seems promising and results are foreseeable in near future.

At the current moment, in the Latvian INFORUM model productivity by branches is estimated outside the model due to considerably short time series and radical changes in the recent years. Taking into account the estimated productivity growth and integrating these values in the model, results are computed that represent the further economic and sectoral development pace on the basis of integrated assumptions. The applied approach is used to examine the economy's dependence on productivity changes. As in many fields, Latvia converges with the average EU level or, at least, the average Baltic States level of indicators, therefore, such a study gives an insight in potential development trends.

Assumptions regarding the scenario are mainly based on the current economic trends. Since the forth quarter of 2007, the economic development slow down has been observable, and hence the included assumptions are reflecting slow down also in the next few years. It is believed that households' final consumption will grow by 6% in 2008, by 5.5% in 2009, and in 2010 and 2012 it recovers, but in long-term it gradually decreases to 3% in 2020.

Table 3

Output forecasts and employment forecasts*

No.	NACE code	Output forecasts				Employment forecasts			
		2007-2010	2011-2015	2016-2020	2007-2020	2007-2010	2011-2015	2016-2020	2007-2020
1	A 01	1.030	1.018	0.998	1.014	0.990	0.979	0.969	0.979
2	A 02	1.070	1.057	1.032	1.052	1.029	1.016	1.002	1.015
3	B 05	1.044	1.007	0.970	1.004	1.004	0.968	0.941	0.968
4	C 10	1.004	1.021	0.982	1.002	0.965	0.982	0.954	0.967

Table 3continued

No.	NACE code	Output forecasts				Employment forecasts			
		2007-2010	2011-2015	2016-2020	2007-2020	2007-2010	2011-2015	2016-2020	2007-2020
5	C 11-C 14	1.004	1.021	0.982	1.002	0.965	0.982	0.954	0.967
6	D 15	1.043	1.025	1.004	1.023	1.003	0.986	0.975	0.987
7	D 16	0.881	1.068	1.038	1.001	0.847	1.027	1.007	0.965
8	D 17	1.079	1.097	1.066	1.081	1.038	1.055	1.035	1.043
9	D 18	1.049	1.073	1.047	1.057	1.009	1.031	1.016	1.019
10	D 19	1.074	1.097	1.056	1.076	1.033	1.055	1.025	1.038
11	D 20	1.065	1.053	1.035	1.050	1.024	1.013	1.005	1.013
12	D 21	1.002	1.060	1.036	1.034	0.963	1.019	1.006	0.998
13	D 22	1.046	1.083	1.054	1.062	1.005	1.042	1.023	1.025
14	D 23	1.043	1.032	1.018	1.030	1.003	0.993	0.989	0.994
15	D 24	1.045	1.043	1.029	1.038	1.005	1.003	0.999	1.002
16	D 25	1.034	1.034	1.019	1.029	0.994	0.995	0.989	0.993
17	D 26	1.086	1.063	1.042	1.062	1.044	1.022	1.012	1.025
18	D 27	1.081	1.064	1.043	1.061	1.039	1.023	1.013	1.024
19	D 28	1.064	1.054	1.035	1.050	1.023	1.013	1.005	1.013
20	D 29	1.096	1.074	1.048	1.071	1.053	1.032	1.018	1.033
21	D 30	1.111	1.070	1.044	1.072	1.069	1.029	1.014	1.035
22	D 31	1.044	1.063	1.041	1.049	1.004	1.022	1.010	1.013
23	D 32	1.052	1.070	1.042	1.055	1.011	1.028	1.012	1.018
24	D 33	1.073	1.058	1.037	1.055	1.031	1.017	1.007	1.018
25	D 34	1.391	1.196	1.123	1.221	1.338	1.150	1.091	1.178
26	D 35	1.110	1.064	1.040	1.068	1.067	1.023	1.009	1.031
27	D 36	1.089	1.070	1.047	1.067	1.047	1.029	1.017	1.030
28	D 37	1.068	1.056	1.037	1.053	1.027	1.015	1.007	1.016
29	E 40	1.027	1.030	1.017	1.024	0.988	0.990	0.987	0.988
30	E 41	1.001	1.022	0.989	1.004	0.963	0.982	0.960	0.969
31	F 45	1.105	1.073	1.051	1.074	1.063	1.032	1.020	1.037
32	G 50	1.047	1.037	1.019	1.033	1.007	0.997	0.989	0.997
33	G 51	1.035	1.031	1.021	1.029	0.995	0.992	0.991	0.992
34	G 52	1.012	1.021	1.016	1.017	0.973	0.982	0.986	0.981
35	H 55	1.047	1.032	1.015	1.030	1.007	0.992	0.986	0.994
36	I 60	1.046	1.037	1.025	1.035	1.006	0.997	0.995	0.999
37	I 61	1.280	1.143	1.089	1.160	1.230	1.099	1.057	1.119
38	I 62	1.071	1.046	1.027	1.046	1.029	1.006	0.997	1.009
39	I 63	1.022	1.029	1.023	1.025	0.983	0.990	0.993	0.989
40	I 64	1.009	1.046	1.032	1.030	0.970	1.006	1.002	0.994
41	J 65	1.039	1.041	1.028	1.036	0.999	1.001	0.998	0.999
42	J 66	1.060	1.051	1.034	1.048	1.020	1.011	1.004	1.011
43	J 67	1.052	1.041	1.028	1.040	1.012	1.001	0.998	1.003
44	K 70	1.019	1.023	1.015	1.019	0.980	0.984	0.985	0.983
45	K 71	1.044	1.043	1.022	1.036	1.004	1.003	0.993	0.999
46	K 72	1.057	1.049	1.033	1.045	1.017	1.008	1.003	1.009
47	K 73	1.066	1.050	1.038	1.050	1.025	1.009	1.007	1.013
48	K 74	1.049	1.044	1.030	1.041	1.008	1.004	1.000	1.004

Table 3continued

No.	NACE code	Output forecasts				Employment forecasts			
		2007-2010	2011-2015	2016-2020	2007-2020	2007-2010	2011-2015	2016-2020	2007-2020
49	L 75	1.030	1.030	1.029	1.030	0.991	0.990	0.999	0.994
50	M 80	1.036	1.032	1.030	1.032	0.997	0.992	1.000	0.996
51	N 85	1.037	1.038	1.032	1.035	0.997	0.998	1.002	0.999
52	O 90	1.003	1.016	0.996	1.005	0.964	0.977	0.967	0.970
53	O 91	1.111	1.073	1.049	1.075	1.068	1.031	1.018	1.037
54	O 92	1.005	1.016	1.004	1.009	0.967	0.977	0.975	0.973
55	O 93	1.043	1.044	1.031	1.039	1.003	1.003	1.001	1.002

* growth indexes (level of previous period=1).

Table 3 shows the modelling results of average annual growth indexes of output and employment by branches in given time period. Table 3 illustrates all branches of the economy, not only manufacturing sector, to represent the diverse developments within the economy.

On the basis of productivity changes and forecasted output, employment by branches is computed within the model. The comparison of forecasted employment and labour resources (according to demographical indicators estimated) in long-term indicates, whether there will be deficit or surplus of labour force and, therefore, whether the economy demands to re-estimate the current demographical and immigration policies in the country. There were discussions in Latvia, regarding the need for low-cost construction sector workers and several less-skilled manufacturing and service workers from some EU countries (Bulgaria, Rumania, Poland) or the third countries (Moldova, Belarus, etc.) and the consequences of such labour force immigration.

The comparison of employment forecasts and estimated labour force (by Latvian macroeconomic model[h]) indicates that due to slow down in economic growth and gradual not radical productivity increase in long-term, the economy can function without notable immigration of labour force. However, the model illustrates overall results, and as there are different requirements of skills, education, experience (also taking into account intersectoral labour force migration) in any branch, more sophisticated sectoral models or studies should be carried out.

Conclusions

Manufacturing, despite the recent trend of gradual shares decrease in the economy, maintains its positions in the economy as one of the key sectors and components that cannot be omitted or underestimated.

According to the output and employment results, in many branches the number of employees decreases, while output continues to grow. It is due to productivity increase and convergence with the level of neighbouring EU countries and the forecasted population decrease in long-term in Latvia. Manufacturing and also other sectors take into account that total population as local consumers and labour force decrease and the same trend is observable in many EU countries.

[h] Developed at Riga Technical University, Latvia.

Modelling results presented in the paper illustrates the economic growth according to the low economic development scenario's assumptions, that are constructed taking into account latest overall economic situation in Latvia.

LIST OF REFERENCES

1. Auzina A. INFORUM model development in Latvia: problems and solutions // Recent Development in INFORUM-type Modelling (edited by M.Plitch, M.Przybylinski). – Lodz: Lodz University Press, 2007. – p.7-16.
2. Auziņa A., Počs R.. Latvian multisectoral macroeconomic model. – 4th Nordic Econometric meeting konferences materiālos. – Tartu: University of Tartu, 2007. – CD. – 10 p.
3. Bronisz U., Heijman W., Miszczuk A. *Regional competitiveness in Poland: Creating an index*. – Jahrbuch für Regionalwissenschaft, Accepted: 24 June 2008.
4. *Drescher K., Maurer O. Competitiveness in the European Dairy Industries*. – Agribusiness, Volume 15, Issue 2, Date: Spring 1999, Pages: 163-177.
5. Elgazar H. Sources of Japanese competitiveness and growth. - Journal International Advances in Economic Research, Issue Volume 8, Number 1 / February, 2002.
6. *Fisher Ch., Schornberg S. Determinants of sectoral competitiveness and implications for the EU food&drinks manufacturing industries.* - Food Economics. Vol 4, No 3, 2007. Pages 148-158. - *http://www.ifama.org/tamu/iama/conferences/2007Conference/SymposiumPapers_files/1071_Paper.pdf*
7. Fisher Ch., Schornberg S. *The competitiveness situation of the EU meat processing and beverage manufacturing sectors.* - Paper prepared for presentation at the 98 th EAAE Seminar 'Marketing Dynamics within the Global Trading System: New Perspectives', Chania, Crete, Greece as in: 29 June – 2 July, 2006. - *http://ageconsearch.umn.edu/bitstream/10028/1/sp06fi01.pdf*
8. Grilo I., Koopman G. J. Productivity and Microeconomic Reforms: Strengthening EU Competitiveness. - Journal of Industry, Competition and Trade, Volume 6, Number 2 / June, 2006 – p. 67–84.
9. IMD Word Competiveness Yearbook. - *http://www.imd.ch/research/publications/wcy/World-Competitiveness-Yearbook-2008-Results.cfm*
10. Ketels Ch. H. M. *Michael Porter's Competitiveness Framework—Recent Learnings and New Research Priorities.* - Journal of Industry, Competition and Trade, Volume 6, Number 2 / June, 2006. – p. 115-136.
11. Koehler-Toeglhofer W., Magerl Ch., Mooslechner P. *Revised and New Competitiveness Indicators for Austria Reflect Improvement Trend since EMU Accession*. - Monetary Policy and the Economy, Volume (Year): (2006), Issue (Month): 4 (January 2007)Pages: 70-97. - *http://ideas.repec.org/a/onb/oenbmp/y2006i4b5.html.*
12. Latvijas ilgspējīgas attīstības stratēģija līdz 2030.gadam. Ziņojums ekonomika: konkurētspēja un resursi, janvāris, 2008. - *http://www.chamber.lv/uploads/filedir/File/Ek_konkuretsp_zinojums_final.pdf*
13. Latvijas konkurētspēja un tās izvērtējums starptautiskos reitingos (Vanags A., Leduskrasta Z.) (research project for Ministry of Economics of Latvia). – Baltic International centre for economic policy studies, Riga, 2005.
14. Ozoliņa V., Počs R. Forecasting of Latvian Population And Employment (Using Econometric Models). (in Latvian) Scientific Proceedings of Riga Technical University. Series 3. Volume 13. "Economics and Business. Economy: Theory and Practice", Riga, RTU, 2006. pp. 87-97.
15. Ozolina V., Pocs R. Short- and Longterm Forecasting of Population in Latvian Macro- and Multisectoral Models. Recent Developments in INFORUM-type Modeling. Lodz: Wydawnictwo Uniwersytetu Lodzkiego, 2007 pp. 129–139

16. Pohl R. *Wages, exchange rates and competitiveness*. - Economic Bulletin, Volume 34, Number 8 / August, 1997. – p.27-32.

17. Porter, M.E. The Competitive Advantage of Nations. - Free: New York, 1990.

18. Report on the Economic Development of Latvia. – Ministry of Economics, July 2008.

19. Rūpniecības nozaru konkurētspējas pētījumu struktūras pamatprincipi (Vanags I. & others). EM Nr. 2004/119 – research project of Ministry of Economics of Latvia, Riga, 2004.

20. Sirikrai S.B., Tang J.C.S. *Industrial competitiveness analysis: Using the analytic hierarchy process*. - The Journal of High Technology Management Research, Volume 17, Issue 1, 2006, Pages 71-83. - *http://www.sciencedirect.com.resursi.rtu.lv/science?_ob=ArticleURL&_udi=B6W56-4K7168R-1&_user=5674511&_coverDate=12%2F31%2F2006&_alid=776501969&_rdoc=18&_fmt=high&_orig=search&_cdi=6562&_sort=r&_docanchor=&view=c&_ct=2676&_acct=C000062955&_version=1&_urlVersion=0&_userid=5674511&md5=3f734659d9d4cfcda023ed5b55f2438a#secx1*

21. Tautsaimniecības nozaru attīstības tendences, konkurētspēja un struktūra (Kasalis E., Eglīte S., Skujeniece I.). - research project of Ministry of Economics of Latvia, Riga, 2004

22. *The Global Competitiveness Report 2007-2008. - http://www.gcr.weforum.org/*

23. The UK 2007 productivity & competitiveness indicators. URN: 08/P39. - Department for Business, Enterprise & Regulatory Reform's. - http://www.berr.gov.uk/files/file43540.pdf

24. Database of the Central Statistical Bureau of the Republic of Latvia. – *http://data.csb.gov.lv*

25. Eurostat database. - *http://epp.eurostat.ec.europa.eu*