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The Role of Small and Medium-Sized Enterprises - Scenarios for Poland

Abstract

In the previous decade small and medium-sized enterprises (SMEs) played a growing role in the Polish economy. They are estimated to account for 50% of the 1997 turnover, with the share being only 40% in 1993 (some estimates show lower rates however). In addition, SMEs are the engine of employment growth because of their higher flexibility and adaptability to changing market conditions than that characterising large firms. In the paper some scenarios of Polish economy's development are considered and their influence on the SME sector is analysed. A multi-sectoral approach is used for the analyses.

1. Introduction

Small and Medium-Sized Enterprises (SMEs) are typically defined as organizations with less than 250 employees. Additionally, their turnover should not exceed 40 million ECU and/or their balance sheet total should be within 27 million ECU and less than 25% of their equity can be held by a large enterprise. In this official definition the number of employees is the most important criterion of the SME sector.

It should be realized however that SMEs do not comprise a homogenous sector. Problems of firms with only a few employees, and their resulting behaviors, are quite different from those in an organization employing 50, 100 or 200 workers. For example, investigations in the EU countries show that very small enterprises (from 1 to 9 employees) have a higher value added per unit of labor costs than other small or medium-sized enterprises and thus higher profitability. Besides, the smallest firms have the highest rates of both job creation and job destruction. This is why for the sake of analysis an additional distinction between micro (usually family businesses), small and medium enterprises would be useful. However, in this paper we do not use this distinction, mainly because of the scarcity of relevant data.

With the technological progress and changing consumption patterns, as real income rises, niche markets unfold where SMEs can not only compete with larger enterprises on more favorable terms but have a comparative advantage merely because of their size and greater flexibility of their production and resources. They are able to reduce or increase, minimize or

maximize their production in response to market demand. SMEs' production is not a mass production, so their output products can be diversified to fit the market niches. In addition, the flexibility of resources means that SMEs are able to shift them between sectors quite easily. This is why SMEs are treated as a shock absorber when economic fluctuations occur.

On the other hand, SMEs are handicapped in various ways when competing with larger firms, e.g. trying to raise finance. This is why governmental policies often address SMEs to help them compete in the market.

At the beginning of the transition process in Poland market disequilibrium persisted (in national terms and in segments), as an aftermath of the centrally planned economy. This was the period of the most dynamic growth in the SME sector. It is commonly agreed that Poland was able to overcome the crisis of the late 1980s and to enter the path of socio-economic development starting from 1992 only because of the activity of private small and medium-sized enterprises. They were the first to restore the broken commercial ties with the former Soviet countries. In addition, small and medium-sized enterprises efficiently and effectively capitalized on foreign visitors' demand (who visited Poland in a mass mainly from the neighboring countries), taking advanatage of differences in prices, exchange rates and the degree of consumer goods supply to markets in the neighboring countries.

2. Data availability

Data on the SMEs' sector is relatively scarce, especially considering the needs of the inter-industry models. It is possible to find some SME data showing the number of enterprises, employment, production sold, export, investment outlays, value added, output. Its major source is the Industrial Statistical Yearbooks published by GUS (Industrial Yearbooks) and reports on the "State of the SME Sector in Poland" published by the Polish Foundation for the Promotion of SME Development (Reports).

Industrial Yearbooks provide information exclusively on sections C, D (broken down into subsections and several divisions) and E in the NACE classification. Unfortunately, this data does not cover enterprises with employment below 50 persons. Additionally, prior the year 1997 class limits covered enterprises with 50-99, 100-199, 200-499 employees which did not comply with the SME definition, and data earlier than 1994 was presented according to the old KGN classification (Classification of National Economy used in material product system of accounting).

Reports are less detailed but more complete. They can provide data on almost all NACE sections (excluding sections A and B[1]). The subdivisions between sections however do not show even subsections. Data in the Industrial Yearbooks can be used for disaggregation to a limited degree (see the previous paragraph). Data starts in 1994 and in some cases in 1995. The available data today ends in 1998.

Apart from the aforementioned data sources published on a regular basis there are also occasional publications topping research conducted by various institutions and governmental

[1] Small enterprises operating in these sections are not classified as SME.

agencies, such as the Foreign Trade Research Institute or the Council for the Socio-Economic Strategy with the Board of Ministers.

3. The Multi-Sectoral Model and the role of SMEs

As the above characterization shows the currently available statistical data is not conducive to investigations in the SME sector using multi sectoral models. Time series of comparable data comprise from 4 to 5 observations, and disaggregation ends at the level of NACE section level.

There is no available data on variations in manufacturing technologies between SMEs and large enterprises. Having such knowledge would make it possible for instance to employ techniques used in the regional model. Instead of breaking down an economy into regions it could be divided into two sectors: the SME sector and the sector of other enterprises. Even though some data is available that allows to estimate row and column sums of inter-industry flows divided into NACE sections (value added, investment outlays and export in SME), and thus to apply the RAS methodology to estimate elements of the matrix of flows, the absence of information on variations in manufacturing technologies between sectors renders these efforts pointless.

Data problems largely limit research opportunities. Hence at this stage we only decided to indicate these branches where the SMEs' role is significant. The basis for this evaluation can be the SME sector's shares in the turnover, employment or value added in particular branches. Based on experts' opinions and similar forecasts it is possible to identify how the shares may evolve to the year 2010, as well as the power of the changes. On the other hand, scenarios of changes for Polish economy will be constructed and a multisectoral model will be solved for them. Projected shares and results of the model solution for various scenarios will allow to identify economic circumstances in particular industries and thus to indirectly anticipate growth prospects for the SME sector.

Here we present preliminary results of such constructed analysis of the SMEs' role in the Polish economy up to the year 2010.

4. SMEs in Polish economy

The significance of SMEs in Poland's economy is branch-specific. It can be characterized by using the number of enterprises, employment, assets, etc. A good indicator allowing to identify the SMEs' significance drawn on the available data seems to be the amount of production sold of the SME sector with respect to production sold of a given branch. Table 1 presents evolution of SMEs' significance in particular NACE sections in the years 1994 -1998. The significance of SMEs is characterized here using the SMEs' contribution to production sold.

It turns out that the published SME data does not show sections that are important for economy:

A Agriculture, hunting and forestry
B Fishing
J Financial intermediation
L Public administration and defense
M Education
N Health and social work

The total SME share is calculated only in relation to total sales in sections described using the discussed data. As a result the SMEs' significance for the whole economy (see Total in the first part of Table 1) is overestimated. Sections not present in SME data generate products and services accounting for 15 - 20% of total output of Polish economy. Hence Table 1 includes also estimates of SMEs' significance that we modified. The modification was based on the assumption that SMEs' shares in sales were the same as their shares in total output. Using data on the structure of total output in the years 1994 - 1998 derived from the IMPEC model's database (shown in the second data sequence in Table 1), we calculated SMEs' participation indicators in total output, shown in the third data sequence in Table 1).

Data in Table 1 indicates a large and steadily growing contribution of the SME sector to economy. In successive years it grew from 53% in 1994 to 60% in 1998. In as many as 5 sections this participation considerably exceeded 60%.

Section D 'Manufacturing' deserves special attention. Even though the SMEs' share in this section is not one of the highest (38% in 1998), we need to remember that this section generates considerable part of the total ouput of economy. It is enough to take a look at the rates provided in the third data sequence in Table 1. It shows that throughout the analyzed period the significance of this section was growing much more dynamically than that of section G (trade and repair) where the SMEs' share in total output between 1994 and 1995 was the highest and ranged from 12.3 to 12.4%. In 1998 the share of trade and repair was lower than of manufacturing by 1.7 percentage point. Because of that and considering that the section 'manufacturing' is the most diversified among all sections in terms of production types, we are providing more detailed information on the SME sector's shares in section D - see Table 2. Unfortunately, the only data published on this subject (and not fully comparable with data in Table 1) characterizes the year 1995. Modified branch significance rates in Table 2 (shares of the SME sector in total output of the whole economy) are presented in the last column. They show that among divisions of section D the largest SMEs' shares in the output of economy as a whole can be found in the division 'food and beverages' (4.0 and 4.7%), 'metal products' (1.2 - 1.4%) and 'machinery and equipment' (8 - 1.0%). Participation in other divisions is clearly below 1%

Table 1. Importance of SMEs in Polish economy 1994 - 1998 by sections of NACE classification

Section	Name	Year				
		1994	1995	1996	1997	1998
Importance of SMEs in industries (share of SMEs in total sales turnover of sections)						
A	Agriculture, hunting and forestry	-	-	-	-	-
B	Fishing	-	-	-	-	-
C	Mining and quarrying	2.1%	2.9%	3.7%	4.7%	6.9%
D	Manufacturing	31.4%	33.1%	34.8%	36.9%	38.0%
E	Electricity, gas and water supply	4.3%	5.9%	7.4%	6.4%	7.6%
F	Construction	69.3%	70.1%	70.9%	72.5%	72.3%
G	Trade and repair	81.8%	83.2%	84.6%	85.5%	84.5%
H	Hotels and restaurants	77.5%	76.4%	75.2%	77.9%	71.2%
I	Transport, storage and communication	33.5%	36.2%	38.9%	40.0%	40.3%
J	Financial intermediation	-	-	-	-	-
K	Real estate and business activities	81.6%	82.0%	82.4%	82.9%	82.7%
L	Public administration and defence	-	-	-	-	-
M	Education	-	-	-	-	-
N	Health and social work	-	-	-	-	-
O	Other community, social and personal services	66.4%	66.1%	65.8%	56.3%	63.5%
Total		**53.4%**	**55.8%**	**58.1%**	**59.3%**	**60.0%**
Importance of sections in economy (share of industries in total output)						
A	Agriculture, hunting and forestry	7.4%	7.6%	7.1%	6.4%	6.4%
B	Fishing	0.1%	0.1%	0.1%	0.1%	0.0%
C	Mining and quarrying	3.2%	2.9%	2.8%	2.6%	2.1%
D	Manufacturing	35.6%	36.8%	37.4%	38.9%	39.1%
E	Electricity, gas and water supply	4.4%	4.0%	3.8%	3.6%	3.4%
F	Construction	7.7%	7.9%	7.9%	8.0%	8.3%
G	Trade and repair	15.0%	14.9%	15.3%	15.2%	15.5%
H	Hotels and restaurants	0.8%	0.8%	0.9%	0.9%	0.9%
I	Transport, storage and communication	6.1%	6.0%	6.0%	6.0%	6.1%
J	Financial intermediation	0.9%	0.9%	1.2%	1.5%	1.5%
K	Real estate and business activities	7.3%	7.1%	6.8%	6.9%	6.8%
L	Public administration and defence	3.6%	3.6%	3.4%	3.3%	3.3%
M	Education	2.2%	2.1%	2.1%	1.9%	1.8%
N	Health and social work	2.6%	2.4%	2.5%	2.2%	2.2%
O	Other community, social and personal services	3.1%	2.8%	2.9%	2.5%	2.5%
Total		**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Importance of SMEs in economy by sections (estimate of share of SMEs in total output)						
A	Agriculture, hunting and forestry	-	-	-	-	-
B	Fishing	-	-	-	-	-
C	Mining and quarrying	0.1%	0.1%	0.1%	0.1%	0.1%
D	Manufacturing	11.2%	12.2%	13.0%	14.3%	14.8%
E	Electricity, gas and water supply	0.2%	0.2%	0.3%	0.2%	0.3%
F	Construction	5.4%	5.5%	5.6%	5.8%	6.0%
G	Trade and repair	12.3%	12.4%	12.9%	13.0%	13.1%
H	Hotels and restaurants	0.6%	0.6%	0.7%	0.7%	0.6%
I	Transport, storage and communication	2.0%	2.2%	2.3%	2.4%	2.5%
J	Financial intermediation	-	-	-	-	-
K	Real estate and business activities	6.0%	5.9%	5.6%	5.7%	5.6%
L	Public administration and defence	-	-	-	-	-
M	Education	-	-	-	-	-
N	Health and social work	-	-	-	-	-
O	Other community, social and personal services	2.0%	1.9%	1.9%	1.4%	1.6%
Total		**39.8%**	**41.0%**	**42.4%**	**43.7%**	**44.7%**

Source: Reports on SMEs, The IMPEC model database.

Table 2. Importance of SMEs in Polish economy in 1995 by section/division*) of NACE classification

Section/Division	Name	Importance				
		of SME in industries		of industries in economy	of SMEs in economy	
Total		**55.8%**		**100.0%**	**41.0%**	
A	Agriculture, hunting and forestry	-		7.6%	-	
B	Fishing	-		0.1%	-	
C	Mining and quarrying	2.9%		2.9%	0.1%	
D	Manufacturing	33.1%		36.8%	12.2%	
	Number of employees	***0-200***	***0-300***		***0-200***	***0-300***
15	*Food and beverages*	*48.1%*	*56.3%*	*8.3%*	*4.0%*	*4.7%*
16	*Tabacco products*	*1.8%*	*2.9%*	*0.3%*	*0.0%*	*0.0%*
17	*Textiles*	*30.6%*	*36.5%*	*1.0%*	*0.3%*	*0.4%*
18	*Wearing apparel, furs*	*67.2%*	*74.7%*	*1.0%*	*0.7%*	*0.7%*
19	*Leather and leather products*	*50.2%*	*57.5%*	*0.4%*	*0.2%*	*0.2%*
20	*Wood and products of wood*	*61.6%*	*65.9%*	*1.1%*	*0.7%*	*0.7%*
21	*Paper and paper products*	*29.8%*	*36.2%*	*1.1%*	*0.3%*	*0.4%*
22	*Printed matter and recorded media*	*80.1%*	*84.9%*	*0.9%*	*0.8%*	*0.8%*
23	*Coke, refined petroleum products*	*0.6%*	*1.3%*	*1.5%*	*0.0%*	*0.0%*
24	*Chemicals and chemical products*	*15.5%*	*19.8%*	*2.8%*	*0.4%*	*0.6%*
25	*Rubber and plastic products*	*60.0%*	*66.6%*	*1.2%*	*0.7%*	*0.8%*
26	*Other non-metallic mineral products*	*40.9%*	*48.2%*	*1.5%*	*0.6%*	*0.7%*
27	*Basic metals*	*3.7%*	*5.2%*	*3.2%*	*0.1%*	*0.2%*
28	*Metal products*	*65.8%*	*72.3%*	*1.9%*	*1.2%*	*1.4%*
29	*Machinery and equipment*	*33.0%*	*40.4%*	*2.4%*	*0.8%*	*1.0%*
30	*Office machinery and computers*	*46.4%*	*47.8%*	*0.1%*	*0.0%*	*0.0%*
31	*Electrical machinery and apparatus*	*28.6%*	*66.8%*	*1.0%*	*0.3%*	*0.6%*
32	*Radio, television and communication*	*40.5%*	*43.6%*	*0.5%*	*0.2%*	*0.2%*
33	*Medical and optical instruments*	*51.2%*	*63.1%*	*0.3%*	*0.2%*	*0.2%*
34	*Motor vehicles*	*16.2%*	*19.2%*	*1.4%*	*0.2%*	*0.3%*
35	*Other transport equipment*	*11.1%*	*13.8%*	*0.8%*	*0.1%*	*0.1%*
36	*Furniture, other manufactured goods*	*55.4%*	*61.3%*	*1.3%*	*0.7%*	*0.8%*
37	*Recovered secondary raw materials*	*67.0%*	*81.3%*	*0.2%*	*0.1%*	*0.2%*
Total manufacturing		***36.4%***	***42.0%***		***12.7%***	***14.9%***
E	Electricity, gas and water supply	5.9%		4.0%	0.2%	
F	Construction	70.1%		7.9%	5.5%	
G	Trade and repair	83.2%		14.9%	12.4%	
H	Hotels and restaurants	76.4%		0.8%	0.6%	
I	Transport, storage and communication	36.2%		6.0%	2.2%	
J	Financial intermediation	-		0.9%	-	
K	Real estate and business activities	82.0%		7.1%	5.9%	
L	Public administration and defence	-		3.6%	-	
M	Education	-		2.1%	-	
N	Health and social work	-		2.4%	-	
O	Other community, social and personal services	66.1%		2.8%	1.9%	

*) Data for divisions are not fully comparable with data for sections - different sources and definitions of SMEs

Source: Zienkowski 1997: 61-62, The input - output Table... 1999, Reports on SMEs.

5. Winners and losers of Poland's transition

In section 3 we stated that in order to identify the SMEs' role in Polish economy to the year 2010 we would take advantage of Polish economy's development scenarios and in this context the use of the multi-sectoral model will be reduced to its solution (for a variety of scenarios). The solution and particularly the total output of a branch combined with predictions of the significance of SMEs' shares by branches would be employed to answer the question about the role of SMEs. Considering that the IMPEC model in its version based on the new balance of interbranch flows is not ready yet, let us use a two-model approach (Almon 1989). Predictions concerning final demand's components will be derived from a macro economic model (W8 model by Prof. W. Welfe), and then they will be used to identify output by branches using the Leontief model.

The question to be solved was changes in the input-output coefficients used to make the calculations. At this point we decided to take advantage of the research commenced last year and presented at the INFORUM conference in Bertinoro (Plich 2000). Let us remind that in this research amounts of output calculated using the Leontief model (assuming constant coefficients) were set against actual production. Deviations of output that was computed using the model (i.e. theoretical output) and empirical allowed to identify the 'successful' and the 'losing' branches in the first decade of Poland's economic transition.

Let us recall formulas used in calculations:

$$\boldsymbol{Q}_t = (\boldsymbol{I} - \boldsymbol{A}_t)^{-1}(\sum_{k=1}^{D} \boldsymbol{f}_t^k F_t^{(k)} - \boldsymbol{M}_t) \tag{1}$$

$\boldsymbol{Q}$ column vector of gross output,
$\boldsymbol{A}$ matrix of technical coefficients,
$\boldsymbol{f}^k$ column vector showing structure of k-th category of final demand (bridge),
$F^{(k)}$ scalar representing final demand of k-th category,
$\boldsymbol{M}$ column vector of imports,
D number of final demand categories,
t time

Equation (1) allows to compute output for given parameters of the system (the parameters are $\boldsymbol{A}_t, \boldsymbol{f}_t^k$ for $k = 1...D$) and for a given final demand by categories as well as imports ($\boldsymbol{M}_t, F_t^{(k)}$ for $k = 1...D$).

Parameters of equation (1) characterize the structure of economy in year t:

- matrix $\boldsymbol{A}_t$ characterizes the technology of production
- vectors $\boldsymbol{f}_t^k$ for $k = 1...D$ show how the final demand categories are spread across products, which can be interpreted as final users' preferences.

If the parameters are not known for year t, to estimate output for that year one can use the parameters taken from another year, (say) year "0". Thus equation (1) takes the following form:

$$\hat{\boldsymbol{Q}}_t = (\boldsymbol{I} - \boldsymbol{A}_0)^{-1}(\sum_{k=1}^{D} \boldsymbol{f}_0^k F_t^{(k)} - \boldsymbol{M}_t) \tag{2}$$

Please note that in the above equation's true values of final demand and imports are used. In the case the parameters do not change much over time the computed output $\hat{\boldsymbol{Q}}_t$ is a good approximation of the real output $\boldsymbol{Q}_t$ but if parameters change over time the equation (2) is useless for such estimation.

On the other hand, however, in the ex post analysis the results of such computations tell us what the output in year t could be if the parameters in that year were like those in year 0. Having in mind that all elements in formula (2) are taken from year t, but the parameters, the difference between the real and the computed output $\boldsymbol{Q} - \hat{\boldsymbol{Q}}_t$ results from changes in the parameters only, i.e. changes in technology and final users' preferences. An individual element $\hat{Q}_{it}$ of vector $\hat{\boldsymbol{Q}}_t$ larger than output of i-th product in year t ($\hat{Q}_{it} > Q_{it}$) means that producers of this product are "losers" in the structural changes that took place between years 0 and *t* - if structural changes had not taken place, the demand for their products would have been higher. If $\hat{Q}_{it} < Q_{it}$, the producers of *i*-th good are the "winners" of structural changes in the economy. Please note that in the above approach only "aggregate" results of structural changes are observed. This does not tell us about the strength of individual factors of changes which in fact can cancel each other out.

The computations were made using data sets described above, i.e.:

- 1995 input - output table,
- final demand categories and imports from 1990 to 1998.

The results were presented in the form of graphs that show actual output by sectors (sections of NACE) compared with results of simulations made according to formula (2) - see Appendix

Total output in 1990 computed using A matrix of 1995 was 3.8% higher than actual and in the next two years even more (between 7% and 8%). Starting from 1994 the "errors" declined. In 1998 the simulated output was almost 8% lower than the actual one. This means that in the analyzed period the economy as a whole gained because of structural changes.

Manufacturing seemed to be the 'winning' section of the period. Although in 1990 it 'lost' over 30%, in 1998 the output of manufacturing was almost 24% higher compared with the computed output. Other winners were two service sectors: hotels and restaurants and financial intermediation. The results of the latter showed a steady low level of simulated output compared with the actual one and the difference was more than 30%.

The greatest "losers" were fishing, agriculture, mining, electricity, as well as construction.

Transport and health did not lose in the analyzed period, but the tendencies of the errors seemed to be unfavorable.

6. SMEs importance to the year 2010

We decided to make some sets of regressions on the "errors" (models of residuals). At the first stage we decided to estimate the trend function (linear and logarithmic[2]). As for most branches results turned out to be satisfying, we decided to use them in further analyses. A comparison of values of the determination coefficient's distribution in the estimated trend models is presented in Table 3. In further research we decided to use the linear function for most branches, that generally gives a better fit with the empirical data. In some cases however (e.g. in section B - fishing products), the linear function produced unreasonable

[2] Differences between theoretical and observed values were explained. In addition, we estimated also the trend function for quotients of the theoretical and observed values (additionally considering in this case the exponential and power trends), and received distributions of determination coefficients close to those presented in Table 3.

results in the long run (i.e negative output of an industry)[3]. The logarithmic function was used in such cases because of its "slowdown" property. A large problem turned out to be branches where import considerably exceeded domestic output (division 11 - crude oil and natural gas, division 30 - office machinery and computers); there we failed to achieve good results and rates of changes in domestic output were taken arbitrarily.

Table 3. Distribution of the determination coefficient's values in the analyzed trend functions

Range of R^2	Number of R^2 in the range	
	Linear	Logarithmic
0.9 - 1.0	16	2
0.8 - 0.9	11	11
0.7 - 0.8	4	16
0.6 - 0.7	4	6
0.5 - 0.6	4	4
0.4 - 0.5	1	2
0.3 - 0.4	5	3
0.2 - 0.3	3	1
0.1 - 0.2	4	2
0.0 - 0.1	5	10
Total	57	57

Source: Author's calculations

In Graph 1 we present several examples of typical reactions of the simulated amounts of output in branches taken for analysis. Each graph shows four lines:

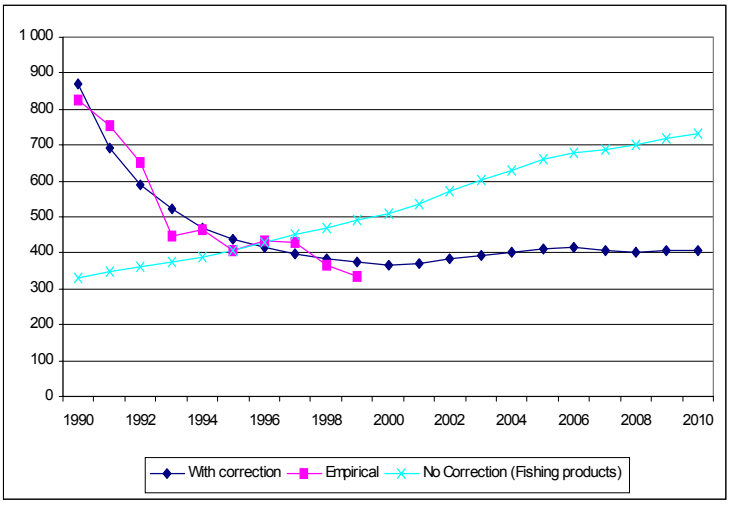
- Empirical values of the 1990 - 1999 output (models of residuals were estimated using the 1990 - 1998 sample)
- Amounts of output resulting from the 1990 - 2010 simulation without residuals
- Output amounts resulting from the 1990 - 2010 simulation, adjusted using results of the model of residuals in the linear version
- Amounts of output resulting from the 1990 - 2010 simulation, adjusted using results of the model of residuals in its logarithmic version.

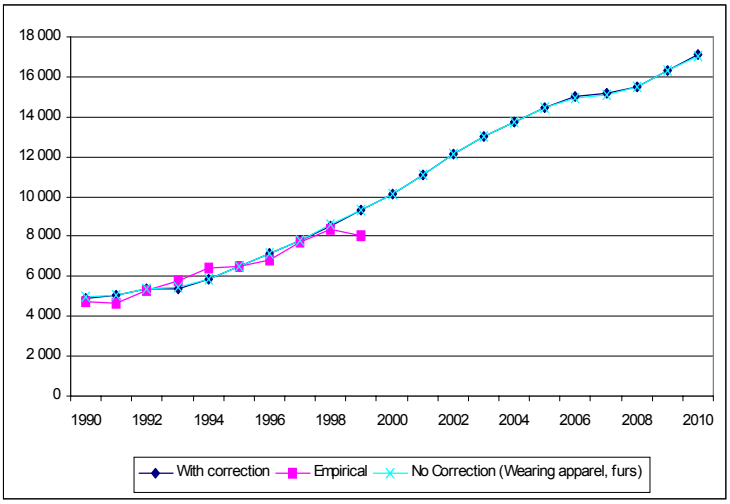
In Table 4 we give characteristics of particular branches, selected using results of simulations for years 1990 - 2010. We use them as the basis for indicating branches that either succeeded or failed the most in that period.

Projection results to the year 2010 have been aggregated to a level that makes it possible to combine them with SME data presented in Tables 1 and 2. Then for years 2000 - 2010 indicators showing SMEs' significance for an economy were computed for distinguished sections and divisions. The computation assumed that the SMEs' shares in production sold of a branch would not change - see Table 5.

[3] We realize that forecasting based on a trend function estimated using 10 observations and reaching 12 years ahead is an abuse. On the other hand it is the only option, taking into account the scarcity of sufficiently long time series. We also realize that the decomposition of residuals at least to those caused by technological changes and changes in patterns of final demand categories is necessary but is impossible at this stage.

Graph 1. Types of behaviour of simulated industry output





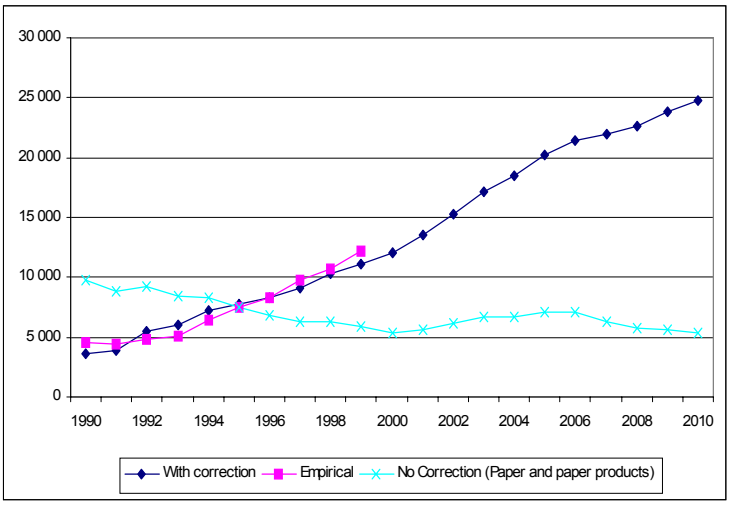


Table 4. Growth rates, "winner/loser" indicators and importance of industries and SMEs in economy

Section/Division	Name	Average growth rates in period			Win/Los Indicator 2010	Importance of industries in economy		Importance of SMEs in economy					
		2010/1990	1998/1990	2010/1998		1999	2010	1995		1999		2010	
Total		**5.0%**	**4.6%**	**5.3%**	**1.159**	**100.0%**	**100.0%**	**41.0%**		**42.7%**		**44.9%**	
A	Agriculture, hunting and forestry	0.8%	-0.2%	1.6%	0.675	5.8%	4.1%	-		-		-	
B	Fishing	-3.5%	-8.6%	0.5%	0.556	0.0%	0.0%	-		-		-	
C	Mining and quarrying	0.0%	-2.3%	1.7%	0.712	1.8%	1.5%	0.1%		0.1%		0.0%	
D	Manufacturing	7.2%	7.8%	6.8%	1.716	38.8%	44.9%	12.2%		12.9%		14.9%	
								0-200	*0-300*	*0-200*	*0-300*	*0-200*	*0-300*
15 (DA)	*Food and beverages*	6.4%	7.4%	5.6%	1.276	8.7%	9.6%	*4.3%*	*5.0%*	*4.2%*	*4.9%*	*4.6%*	*5.4%*
16 (DA)	*Tabacco products*	4.5%	2.3%	6.2%	1.232	0.2%	0.3%	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
17 (DB)	*Textiles*	3.8%	2.2%	4.9%	1.004	0.9%	1.0%	*0.3%*	*0.4%*	*0.3%*	*0.3%*	*0.3%*	*0.4%*
18 (DB)	*Wearing apparel, furs*	6.1%	6.4%	5.9%	1.003	1.0%	1.2%	*0.7%*	*0.8%*	*0.7%*	*0.7%*	*0.8%*	*0.9%*
19 (DC)	*Leather and leather products*	3.5%	2.2%	4.5%	0.994	0.3%	0.3%	*0.2%*	*0.2%*	*0.1%*	*0.2%*	*0.2%*	*0.2%*
20 (DD)	*Wood and products of wood*	7.1%	7.7%	6.7%	1.120	1.5%	1.6%	*0.7%*	*0.8%*	*0.9%*	*1.0%*	*1.0%*	*1.0%*
21 (DE)	*Paper and paper products*	9.7%	12.5%	7.6%	4.660	1.5%	1.7%	*0.4%*	*0.4%*	*0.4%*	*0.5%*	*0.5%*	*0.6%*
22 (DE)	*Printed matter and recorded media*	11.4%	17.3%	7.3%	2.047	1.4%	1.5%	*0.8%*	*0.9%*	*1.1%*	*1.2%*	*1.2%*	*1.3%*
23 (DF)	*Coke, refined petroleum products*	4.3%	2.3%	5.7%	1.254	1.2%	1.5%	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
24 (DG)	*Chemicals and chemical products*	6.0%	5.6%	6.3%	2.915	2.6%	3.1%	*0.5%*	*0.6%*	*0.4%*	*0.5%*	*0.5%*	*0.6%*
25 (DH)	*Rubber and plastic products*	12.0%	17.2%	8.3%	4.731	1.9%	2.2%	*0.8%*	*0.9%*	*1.1%*	*1.3%*	*1.3%*	*1.5%*
26 (DI)	*Other non-metallic mineral products*	6.3%	6.3%	6.4%	1.137	1.9%	2.0%	*0.7%*	*0.8%*	*0.8%*	*0.9%*	*0.8%*	*1.0%*
27 (DJ)	*Basic metals*	4.6%	2.0%	6.5%	1.272	2.5%	3.3%	*0.1%*	*0.2%*	*0.1%*	*0.1%*	*0.1%*	*0.2%*
28 (DJ)	*Metal products*	9.2%	11.4%	7.5%	1.873	2.8%	3.1%	*1.3%*	*1.5%*	*1.9%*	*2.0%*	*2.0%*	*2.2%*
29 (DK)	*Machinery and equipment*	8.1%	8.2%	7.9%	2.549	2.3%	3.2%	*0.8%*	*1.0%*	*0.8%*	*0.9%*	*1.0%*	*1.3%*
30 (DL)	*Office machinery and computers*	16.7%	30.4%	7.4%	-0.375	0.2%	0.2%	*0.0%*	*0.0%*	*0.1%*	*0.1%*	*0.1%*	*0.1%*
31 (DL)	*Electrical machinery and apparatus*	7.8%	8.3%	7.4%	2.488	1.3%	1.4%	*0.3%*	*0.7%*	*0.4%*	*0.9%*	*0.4%*	*0.9%*
32 (DL)	*Radio, television and communication*	12.9%	19.0%	8.6%	6.159	0.9%	1.0%	*0.2%*	*0.2%*	*0.4%*	*0.4%*	*0.4%*	*0.4%*
33 (DL)	*Medical and optical instruments*	8.9%	10.3%	7.9%	2.231	0.4%	0.5%	*0.2%*	*0.2%*	*0.2%*	*0.3%*	*0.3%*	*0.3%*
34 (DM)	*Motor vehicles*	14.5%	22.1%	9.0%	34.348	2.8%	3.0%	*0.2%*	*0.3%*	*0.5%*	*0.5%*	*0.5%*	*0.6%*
35 (DM)	*Other transport equipment*	5.5%	4.3%	6.4%	0.832	0.7%	0.9%	*0.1%*	*0.1%*	*0.1%*	*0.1%*	*0.1%*	*0.1%*
36 (DN)	*Furniture, other manufactured goods*	9.8%	13.1%	7.5%	1.379	1.7%	2.1%	*0.8%*	*0.8%*	*0.9%*	*1.0%*	*1.2%*	*1.3%*
37 (DN)	*Recovered secondary raw materials*	7.2%	6.4%	7.8%	1.561	0.2%	0.3%	*0.2%*	*0.2%*	*0.1%*	*0.2%*	*0.2%*	*0.2%*
Total manufacturing								*13.7%*	*16.1%*	*15.4%*	*18.1%*	*17.5%*	*20.5%*
E	Electricity, gas and water supply	-0.7%	-2.1%	0.4%	0.545	3.3%	1.8%	0.2%		0.2%		0.1%	
F	Construction	5.7%	5.2%	6.0%	0.834	8.4%	9.5%	5.5%		5.9%		6.7%	
G	Trade and repair	5.9%	6.0%	5.9%	1.139	15.9%	16.8%	12.4%		13.3%		14.0%	
H	Hotels and restaurants	8.5%	10.9%	6.7%	1.433	1.0%	1.1%	0.6%		0.8%		0.8%	
I	Transport, storage and communication	3.8%	3.0%	4.4%	0.896	6.2%	5.5%	2.2%		2.2%		2.0%	
J	Financial intermediation	5.5%	6.3%	4.8%	1.352	2.1%	1.3%	-		0.0%		-	
K	Real estate and business activities	4.3%	3.8%	4.6%	0.991	7.1%	6.4%	5.9%		5.8%		5.3%	
L	Public administration and defence	3.5%	4.0%	3.1%	1.030	3.1%	2.5%	-		0.0%		-	
M	Education	2.6%	2.7%	2.5%	0.901	1.9%	1.3%	-		0.0%		-	
N	Health and social work	1.8%	1.8%	1.8%	0.868	2.0%	1.4%	-		0.0%		-	

Source: Authors calculation

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Appendix

Legend for Figure which follows

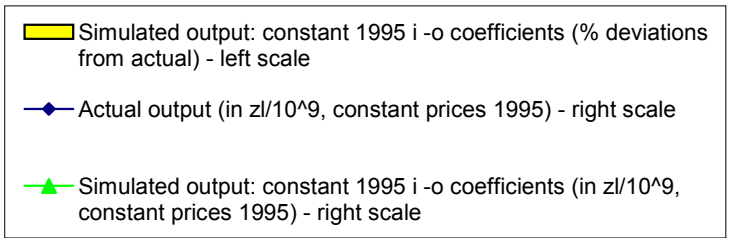
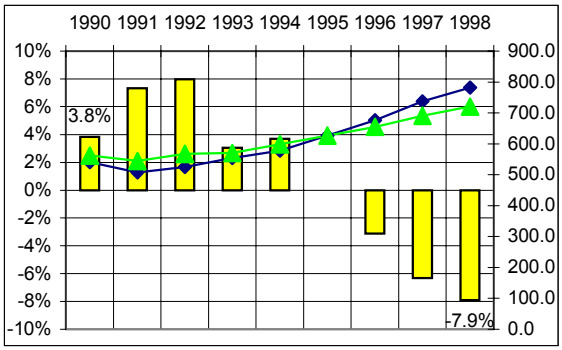
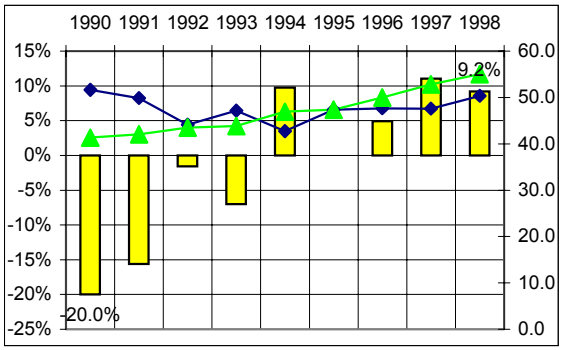


Figure. Actual output and results of simulations

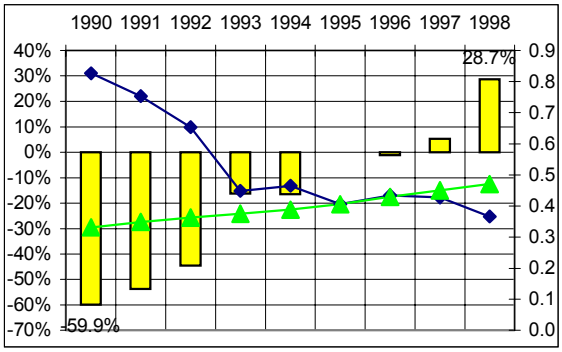
Total



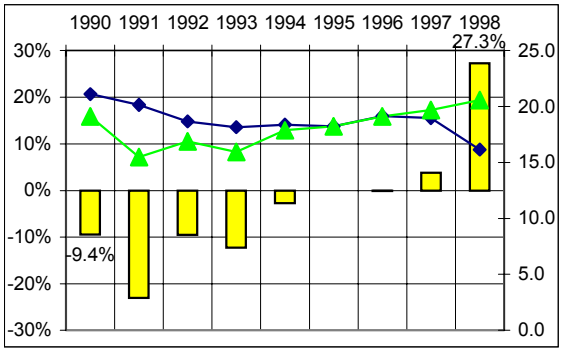
A. Agriculture, hunting and forestry



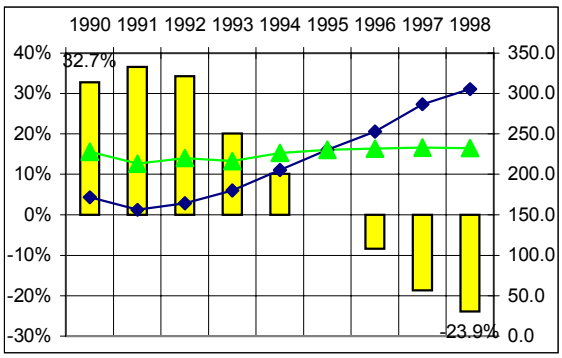
B. Fishing



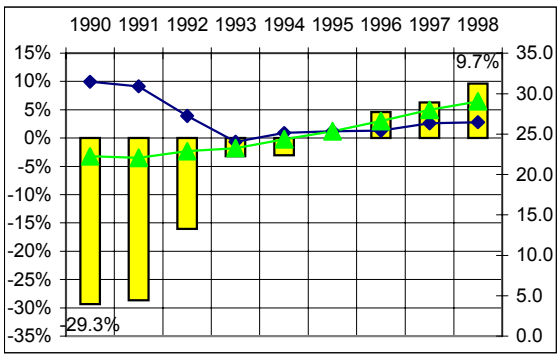
C. Mining and quarrying



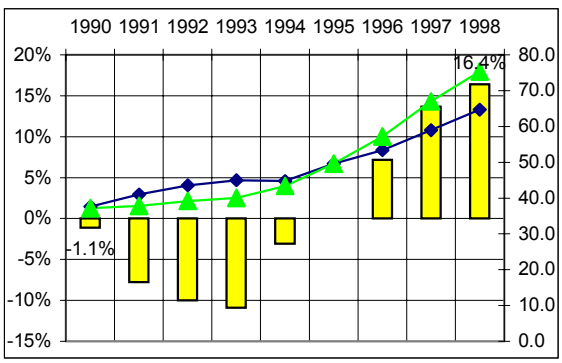
D. Manufacturing



E. Electricity, gas and water supply



F. Construction



G. Trade and repair

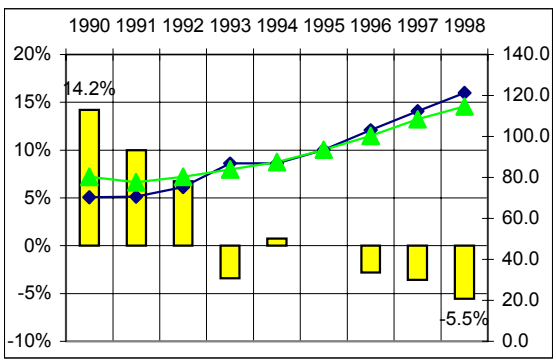
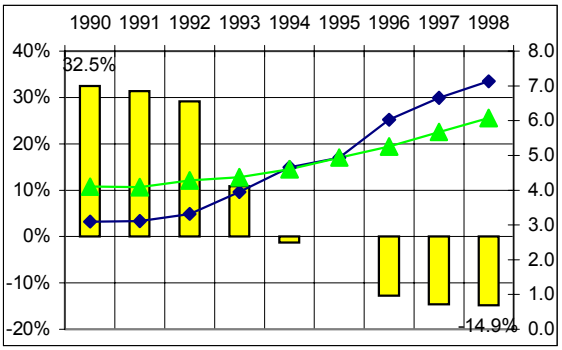
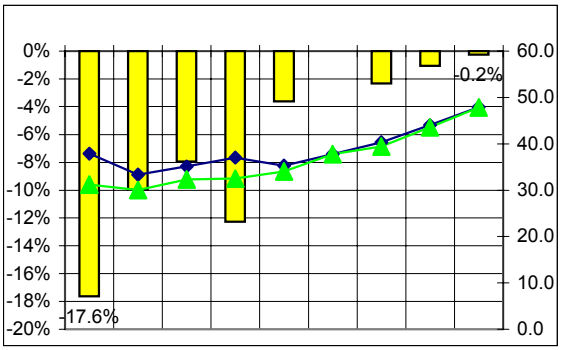


Figure. Actual output and results of simulations *(continued)*

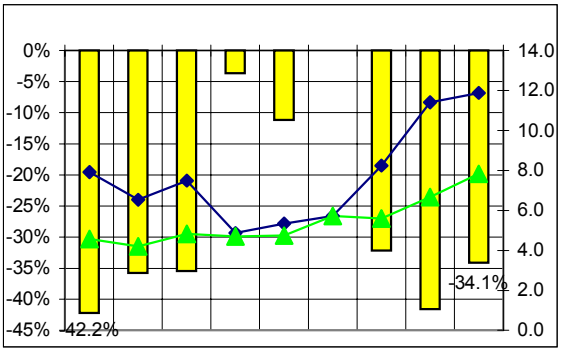
H. Hotels and restaurants



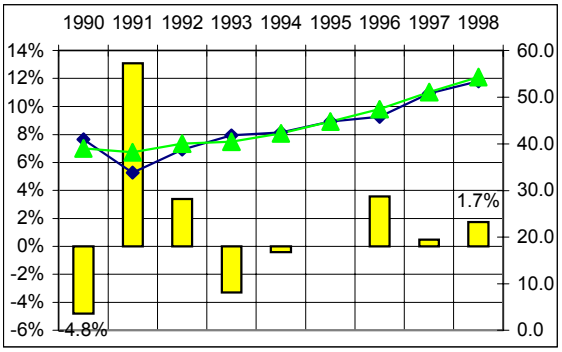
I. Transport, storage and communication



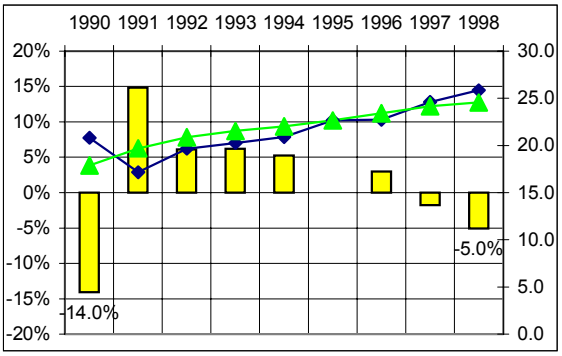
J. Financial intermediation



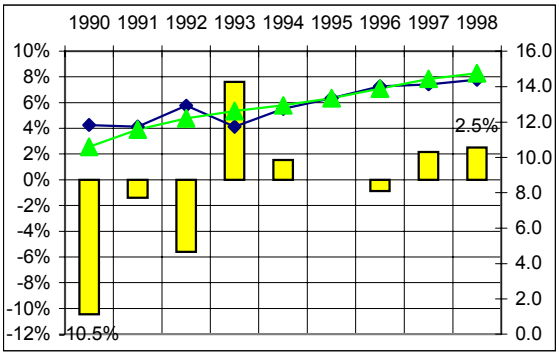
K. Real estate and business activities



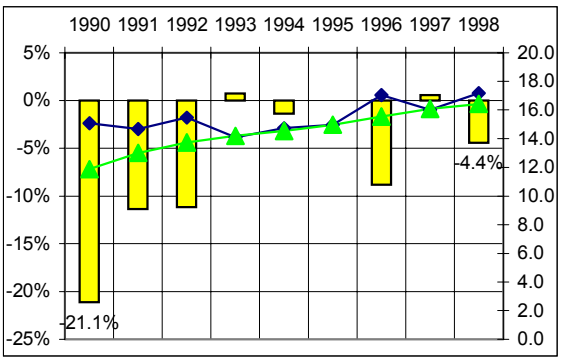
L. Public administration and defence



M. Education



N. Health and social work



O. Other community, social and personal services

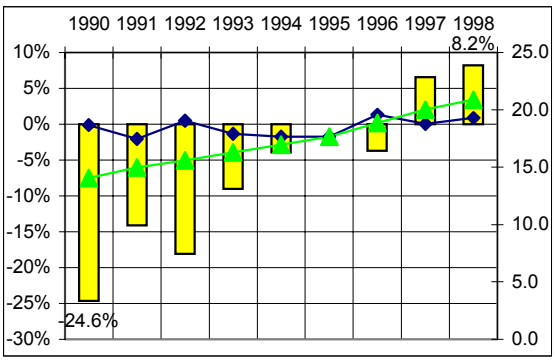
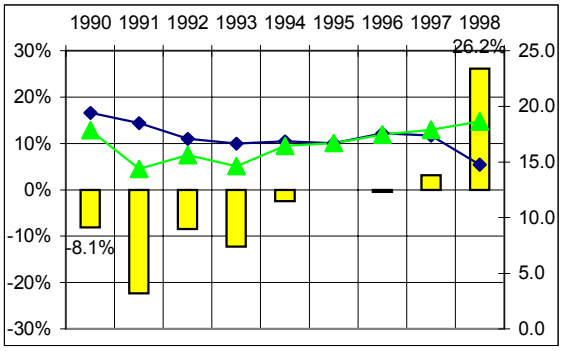
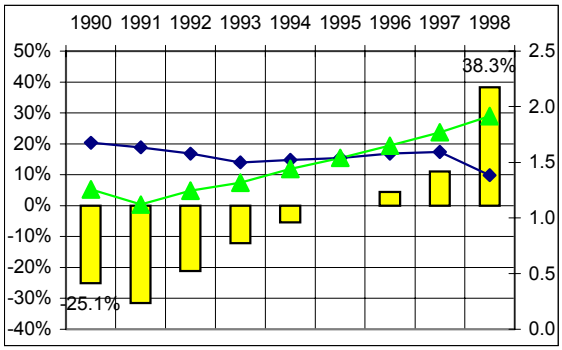


Figure. Actual output and results of simulations *(continued)*

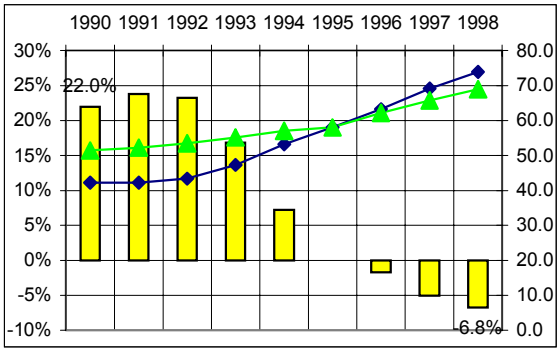
CA. Mining and quarrying of energy sources



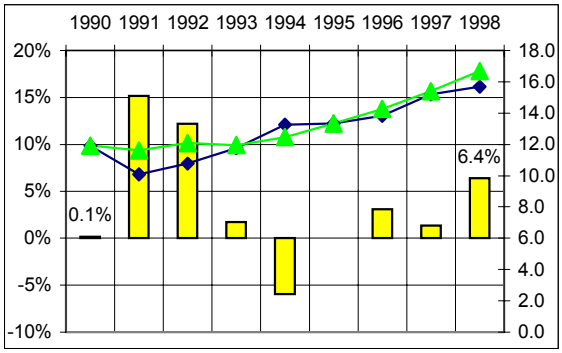
CB. Mining and quarrying of non-energy sources



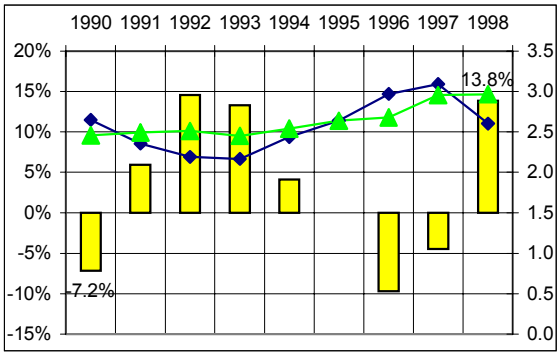
DA. Food, beverage, tabacco



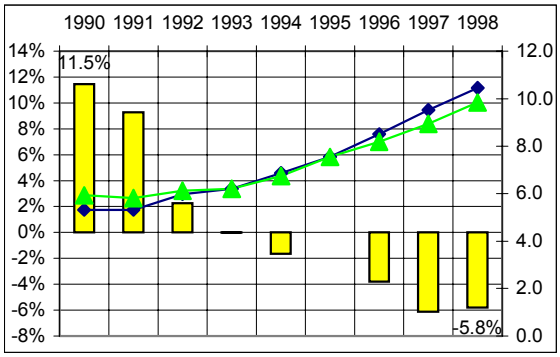
DB. Textiles, wearing apparel



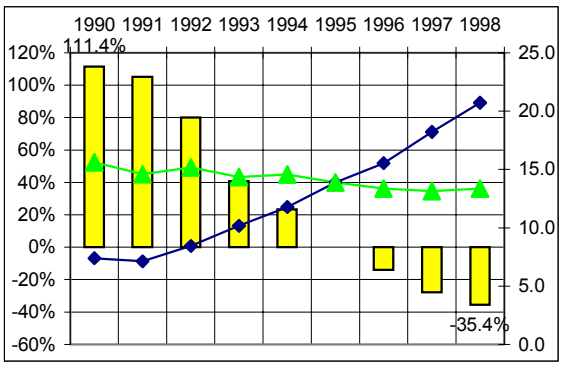
DC. Leather and leather products



DD. Wood and products



DE. Pulp, paper printed matter



DF. Coke, petroleum products

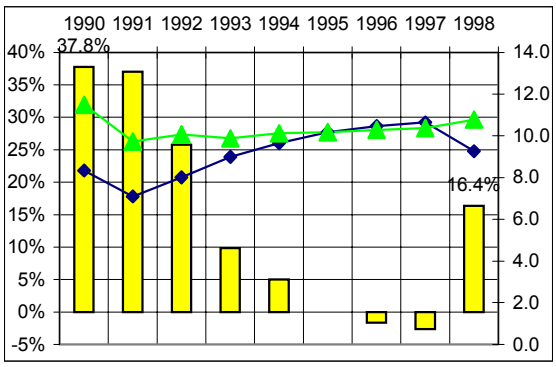
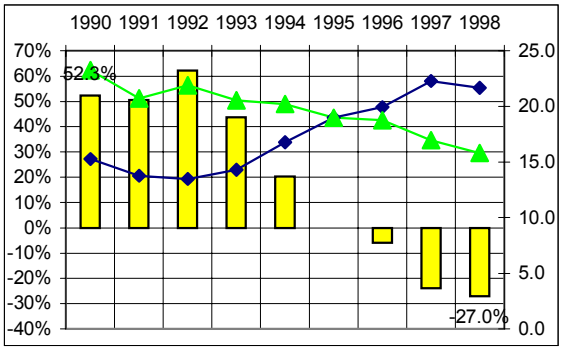
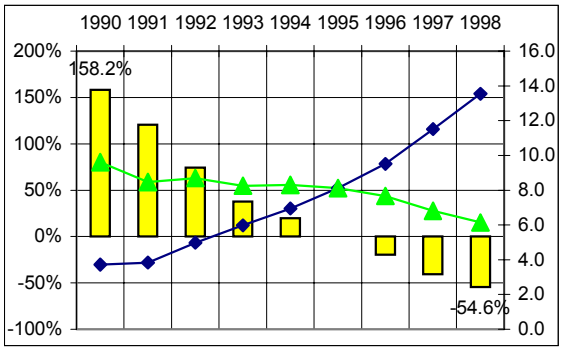


Figure. Actual output and results of simulations *(continued)*

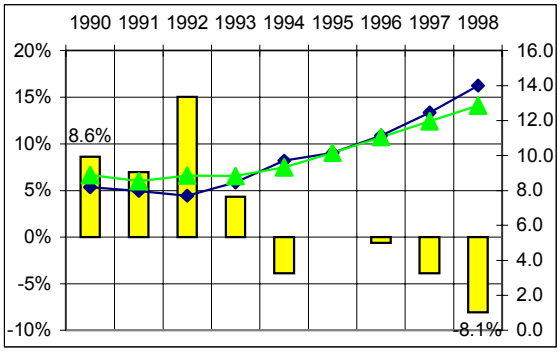
DG. Chemicals and products



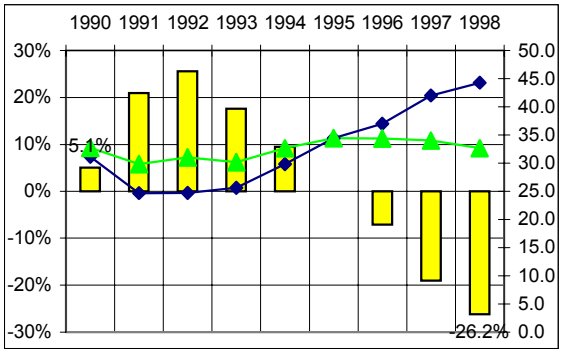
DH. Rubber and plastic products



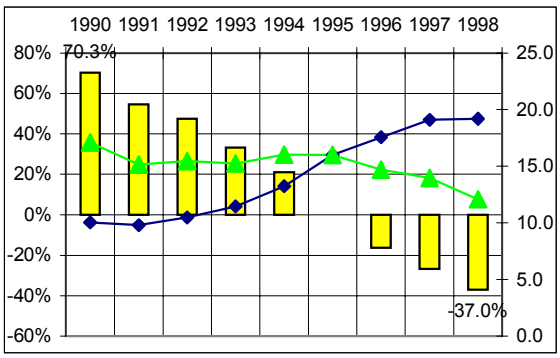
DI. Other non-metallic mineral products



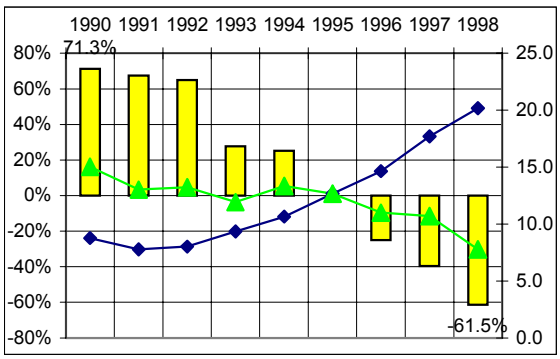
DJ. Metals and products



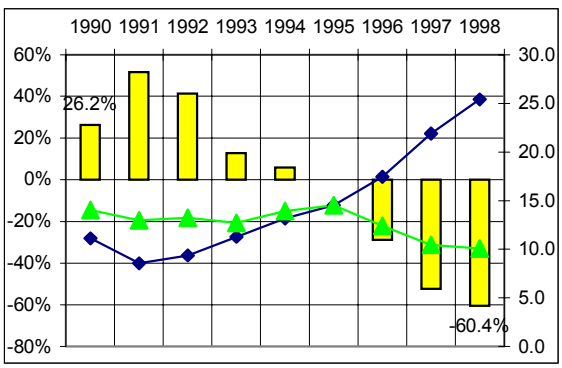
DK. Machinery and equipment n.e.c



DL. Electrical machinery and apparatus



DM. Communication equipment



DN. Other products n.e.c.