

Christie, Edward; Hunya, Gabor; Urban, Waltraut

**Research Report**

## Restructuring of Energy-intensive Industrial Branches in Romania and Proposals for Industrial Policy Measures

wiiw Research Report, No. 339

**Provided in Cooperation with:**

The Vienna Institute for International Economic Studies (wiiw) - Wiener Institut für Internationale  
Wirtschaftsvergleiche (wiiw)

*Suggested Citation:* Christie, Edward; Hunya, Gabor; Urban, Waltraut (2007) : Restructuring of  
Energy-intensive Industrial Branches in Romania and Proposals for Industrial Policy Measures, wiiw  
Research Report, No. 339, The Vienna Institute for International Economic Studies (wiiw), Vienna

This Version is available at:

<https://hdl.handle.net/10419/204111>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen  
Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle  
Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich  
machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen  
(insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten,  
gelten abweichend von diesen Nutzungsbedingungen die in der dort  
genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal  
and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to  
exhibit the documents publicly, to make them publicly available on the  
internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content  
Licence (especially Creative Commons Licences), you may exercise  
further usage rights as specified in the indicated licence.*

Forschungsberichte

# wiiw Research Reports | 339

*Gábor Hunya, Waltraut Urban et al.*

## **Restructuring of Energy-intensive Industrial Branches in Romania and Proposals for Industrial Policy Measures**

April 2007

Authors: Michael Landesmann is research director of wiiw and professor of economics at Johannes Kepler University, Linz, Austria. Edward Christie, Gábor Hunya and Waltraut Urban are wiiw research economists. Constantin Ciupagea, Bianca Pauna and Geomina Turlea are researchers at the Romanian Center for Economic Modelling (CERME). The original study was commissioned by OMV Aktiengesellschaft.

**Restructuring of Energy-intensive Industrial Branches in Romania and Proposals for Industrial Policy Measures**

# Contents

<i>Preface</i> .....	<i>i</i>
<i>Executive summary</i> .....	<i>ii</i>
<b>Introduction: Macroeconomic context and overview of the report</b> .....	<b>1</b>
<b>1 The position of energy-intensive industries in the Romanian economy</b> .....	<b>5</b>
1.1 Definition of energy-intensive industries.....	5
1.2 Relative position of the energy-intensive industries in Romania as compared to other Central and East European countries .....	9
1.2.1 The size of energy-intensive industries in Romania and other CEECs .....	9
1.2.2 Development trends .....	12
1.2.3 Productivity as a measure for restructuring.....	17
1.3 Foreign trade: relative position and development.....	20
1.4 Investment and FDI in energy-intensive industries in Romania .....	23
1.4.1 Investment in tangible assets.....	23
1.4.2 Foreign direct investment.....	24
1.5 Summary and conclusions .....	27
<b>2 Detailed analysis of energy-intensive sub-branches in Romania</b> .....	<b>27</b>
2.1 Key indicators and performance characteristics of individual energy-intensive sub-branches.....	29
2.1.1 Relative size of individual energy-intensive sub-branches .....	30
2.1.2 Unit labour costs rising strongly .....	32
2.1.3 Domestic market versus export orientation.....	32
2.1.4 Foreign trade development in individual sub-branches .....	33
2.2 Major characteristics of individual energy-intensive industries in Romania .....	36
2.2.1 Pulp and paper .....	36
2.2.2 Basic chemical products .....	37
2.2.3 Glass and glass products.....	42
2.2.4 Ceramic products .....	43
2.2.5 Cement, lime and plaster .....	45
2.2.6 Iron and steel .....	46
2.2.7 Non-ferrous metals.....	48
2.3 Summary and conclusions .....	48

<b>3 Economic policy, conclusions and recommendations</b> .....	<b>50</b>
3.1 Industrial policy in general .....	51
3.2 Sectoral policies .....	55
3.2.1 Iron and steel industry .....	55
3.2.2 Basic chemicals products .....	58
3.3 Energy policy .....	58
3.3.1 Electricity.....	58
3.3.2 Natural gas .....	60
3.4 Privatization and state assets management .....	62
3.5. Horizontal policies .....	64
3.5.1 Regional policy .....	64
3.5.2 Energy efficiency .....	66
3.5.3 Policy programmes applied by the MEC to increase competitiveness .....	66
3.5.4 Environmental policy .....	67
3.5.5 Labour market policy.....	69
3.6 Conclusions and recommendations .....	70
References .....	73
Appendix 1 .....	75
Appendix 2 .....	87

## List of Tables and Figures

Table 1.1	Definition of energy sources using 2-digit CPA categories .....	6
Table 1.2	Ranking of energy-intensive manufacturing sectors for Romania, 2003.....	7
Table 1.3	Selection of energy-intensive manufacturing sectors for Romania .....	8
Table 1.4	Overview on production and employment, 2005.....	10
Table 1.5	World market shares of energy-intensive industries in Romania and other CEECs, 1997-2004.....	22
Table 1.6	Foreign direct investment inflows to Romania and other CEECs, 1995-2005, in EUR million .....	25
Table 1.7	Inward FDI stock of individual countries in % of total manufacturing industry as of December 2004 .....	26
Table 2.1	Size indicators of energy-intensive sub-branches in Romania, 2003.....	30
Table 2.2	Unit labour costs in energy-intensive sub-branches in Romania, 1995-2003.....	32
Table 2.3	Exports as a share of output in energy-intensive sub-branches in Romania, 1995-2003, in %.....	33
Table 2.4	Main markets for Romanian exports of energy-intensive products, 2004 .....	35
Table 2.5	Main countries of origin for Romanian imports of energy-intensive products, 2004 .....	35
Table 2.6	Employment and financial indicators for selected companies in the pulp and paper industry in 2004.....	37
Table 2.7	Employment and financial indicators for selected companies in the basic chemicals industry in 2004 .....	38
Table 2.8	Employment and financial indicators for selected companies in the glass industry in 2004.....	42
Table 2.9	Employment and financial indicators for selected companies in the ceramics industry in 2004.....	44
Table 2.10	Employment and financial indicators for major companies in the cement industry in 2004 .....	45
Table 2.11	Employment and financial indicators for major companies in the steel industry in 2004.....	46
Table 2.12	Employment and financial indicators for important companies in the non-ferrous industry in 2004.....	48
Table 3.1	Restructuring of the Romanian steel industry based on the 2004 government programme .....	56
Table 3.2	Electrical energy prices for industrial consumers in Romania compared with other EU member and accession countries, EUR/kWh, second half of 2005 and first half of 2006.....	59
Table 3.3	Natural gas prices for industrial consumers in Romania compared with other EU member and accession countries, EUR/Gigajoules, second half of 2005 .....	61
Table A1	Romania: Selected economic indicators .....	75
Table A2	Production shares of individual industries in total manufacturing (at current prices), 2005, in % .....	76
Table A3	Employment shares of individual industries in total manufacturing, 2005, in % .....	77

Table A4	Production growth in energy-intensive industries in Romania and other CEECs, 2000-2005.....	78
Table A5	Employment in energy-intensive industries in Romania and other CEECs, 2000-2005.....	79
Table A6	Productivity, in national currency, at constant prices 1999, 2000-2005 .....	80
Table A7	Comparison of labour productivity, conversion at exchange rates and in PPS CAP 2004.....	81
Table A8	EU-25 share in total trade of Romania and other CEECs, 1997-2005.....	82
Table A9	Gross investment in tangible goods in Romania and other CEECs, EUR million .....	83
Table A10	Inward FDI stock of individual countries in the manufacturing industry, as of December 2004, EUR million.....	84
Table A11	Number of employees in individual energy-intensive sub-branches in Romania, 2000-2004.....	84
Table A12	Romania's foreign trade in energy-intensive sub-branches, 2000-2005, EUR million .....	85
Figure 1.1	Production value, 2004/05, energy-intensive industries, total (NACE 21, 24, 26, 27) ...	11
Figure 1.2a	Production shares in total manufacturing, 2004/05.....	12
Figure 1.2b	Employment shares in total manufacturing, 2004/05.....	12
Figure 1.3	Romania: production indices of energy-intensive branches relative to manufacturing total, 1995-2005 .....	13
Figure 1.4	Production indices of energy-intensive industries in Romania and other CEECs, 1995-2005, 2000 = 100 .....	14
Figure 1.5	Romania: employment indices of energy-intensive industries, relative to manufacturing total, 1995-2005, 2000 = 100.....	15
Figure 1.6	Employment indices of energy-intensive industries in Romania and other CEECs, 1995-2005, 2000 = 100 .....	16
Figure 1.7	Production, employment and change in labour productivity in energy-intensive branches in Romania, 2005, 2000 = 100 .....	18
Figure 1.8	Productivity levels of energy-intensive industries in Romania and other CEECs, 2004	19
Figure 1.9	Export indices of energy-intensive industries in Romania and other CEECs, 1997-2004, 2000 = 100 .....	21
Figure 1.10	Average annual investment per employee in Romania and other CEECs, 1999-2004.....	23
Figure 1.11	Foreign direct investment inflows to Romania (measured in EUR), 2000 = 100 .....	24
Figure 1.12	Foreign penetration (sales) of energy-intensive industries in Romania and other CEECs, 2001/2002 .....	26
Figure 2.1	Development of production (at constant prices) of energy-intensive sub-branches in Romania, 2000 = 100 .....	3
Figure 2.2	Development of gross value added (at constant prices) of energy-intensive sub-branches in Romania, 2000 = 100 .....	31
Figure 2.3	Trade balances of energy-intensive products in Romania, in EUR million, 2000-2005.....	34

## **Preface**

The present report, commissioned by OMV Aktiengesellschaft, was finalized in July 2006 and has been revised as of March 2007. Based on the analysis of energy-intensive manufacturing branches in Romania, the study focuses on the restructuring demand and the possibilities of policy support for these branches, with a view on international competitiveness and EU membership.

In Part 1, an overview is given of the position of energy-intensive industries in Romania as compared to other Central and East European economies. The industries identified as particularly 'energy-intensive' are the paper industry, the chemical, the non-metallic mineral products and the basic metals industries. The countries selected for benchmarking are the Czech Republic, Hungary, Poland, Slovakia and Bulgaria. The comparison includes production, employment, productivity and investment including foreign direct investment in the respective branches. Part 2 presents a more detailed analysis of the most energy-intensive sub-branches (pulp & paper, basic chemicals, glass, ceramics, cement, iron & steel and aluminium) focusing on major performance indicators such as value added and foreign trade developments; also included is information on the ownership structure, status of modernization, compliance with the acquis and the further demand for restructuring. Part 3 points out the demand for and possibilities of policy support for the energy-intensive branches in Romania with a view to EU membership. A special focus is on sectoral issues (steel and basic chemicals), energy pricing (electricity, gas), regional, labour market and environmental issues.

This study is a joint effort of the Vienna Institute for International Economic Studies (wiiw) and the Romanian Center for Economic Modelling (CERME). The research was coordinated by Michael Landesmann and Waltraut Urban (wiiw). Part 1 was written by Edward Christie and Waltraut Urban (both wiiw), Part 2 is based on research by Bianca Pauna, Constantin Ciupagea and Geomina Turlea (all CERME) and Part 3 was drawn up by Gábor Hunya (wiiw) also relying on inputs of Edward Christie (wiiw) and CERME.



## **Executive summary**

*This study has been motivated by the assumed restructuring needs and policy requirements of the energy-intensive sector in Romania.*

*The industries identified as particularly 'energy-intensive' are the paper and paper products industry, the chemical, the non-metallic mineral products and the basic metals industries. The most energy-intensive sub-branches are pulp and paper, basic chemicals, glass, ceramics, cement, iron & steel and aluminium. Among these, iron & steel and basic chemicals are the largest.*

*From the analysis of energy-intensive industries in Romania and the comparison with other Central and East European countries (CEECs), the following major characteristics were found:*

- Despite an over-proportionate decline during transition, the energy-intensive industries still play a prominent role as a producer and as an employer in the Romanian economy and are taking a larger share in total manufacturing production than in the other CEECs. In 2005, total production reached EUR 9.3 billion and the most energy-intensive branches employed about 150,000 persons. However, production growth was lower than in total manufacturing over the more recent period 2000-2005, as was typical of the other CEECs as well.*
- Production is focused on the low end of the production chain, with value added having a relatively small share compared to the final production value. This points to further restructuring needs and labour shedding in the energy-intensive branches which might still be ahead. But as profits are slim, funds available for investment are limited. For similar reasons, these industries are highly vulnerable with respect to increases in input costs, in particular energy prices, and wages. In most energy-intensive branches, unit labour costs (ULCs) were found to have risen dramatically over the past several years.*
- Labour productivity is relatively low, only a small fraction of the EU-25, and is also significantly below the levels in the other CEECs – but it varies strongly across industries. The best performing industry is the basic metals industry, where productivity reached 60% of the EU level and nearly matched the level in Slovakia (measured at purchasing power parities). The biggest productivity gaps were observed in the paper industry, with Romania reaching about 30% of the EU level and 40% of the level in the other CEECs only. But productivity has been rising very fast and faster than in the other CEECs over the past couple of years, pointing to a rapid process of restructuring and modernization, comparable to that of the more advanced CEECs in the 1990s.*
- Investment in energy-intensive industries increased substantially after 1999, when the second transformational crisis in Romania came to an end; nevertheless, for the period 1999-2004, average annual investment per employee is still lower than in the Romanian manufacturing industry on average and also lower than in the other CEECs, with the important exception of the basic metals industry. With regard to foreign direct investment, Romania used to lag behind the other CEECs, due to delayed privatization and an unfavourable business climate, but in 2003 and 2004 FDI flows accelerated dramatically. A very prominent FDI target is the metals industry, thanks to investment by Mittal Steel but also by two Russian companies, Mechel (steel) and Marco (aluminium). Only in Slovakia does the metals industry show a similarly high share in manufacturing FDI. The non-metallic mineral products industry (including glass, ceramics, cement) also shows a relatively high proportion of FDI.*

- *In exports, the energy-intensive branches accounted for a substantial share of 20% of total manufacturing exports in 2005, half of which came from the iron & steel industry. Furthermore, this branch was the only sub-branch with exports developing more dynamically than manufacturing exports as a whole, pointing to a certain specialization of Romania in this field. Imports of energy-intensive products are generally lower than exports and the resulting trade surplus (especially in iron & steel) makes an important contribution to compensating for the exploding trade deficit in other sectors of the economy.*
- *As regards the most energy-intensive sub-branches, the following broad picture emerges: Some branches are doing relatively well, such as the iron & steel, the aluminium and the cement industries. They are dominated by large producers and most of them are now part of multinational corporations (e.g. the Mittal Steel group; Marco, Lafarge, Heidelberg Cement). They benefited from large investments and foreign expertise and should not have major problems related to EU accession. In basic chemicals the picture is more mixed, as the branch has started attracting foreign capital only more recently; technological upgrading and compliance with EU environmental rules are still low and the negotiations for a new EU chemical directive ('REACH') to be completed by 2007 poses a certain threat. Also, natural gas is not only a source of energy, but an important material input as well (fertilizers!). The pulp and paper industry together with the glass and glass products industry seem to be in a vulnerable position right now. Pulp and paper performed over-proportionately well until 2003, but the recent price increases for important inputs (wood and energy) have impaired its international competitiveness. Privatization took place only a short while ago and modernization seems to start only gradually. In the glass industry, too, there seems to be a lack of investment which would help to bring down costs, and there is rising competition on domestic and foreign markets. The glass industry is particularly dependent on gas for heating and thus on gas prices, which are in the process of liberalization. In the ceramic industry, output growth in the past was relatively low, but the branch managed to cover a large part of domestic demand. However, many ownership changes took place between 2000 and 2003, the effects of which are not yet clear, and recent import competition (from China) has increased strongly.*

*The following observations can be made with regard to the policy environment of the energy-intensive sector:*

- *As energy-intensive industries in general have a high share in production and exports, this calls for special monitoring in times of rapid input-price adjustments.*
- *An energy price shock hit the Romanian industry in 2004-2005 independently of the world market prices for oil. The shock was related to an important step in the transition process: the termination of state aid which included artificially low electricity prices. Gas price adjustments will take place until the end of 2008.*
- *The state aid norms of the EU have not been set to tackle transition-related shocks. Thus either the energy price reform came belatedly in Romania or EU accession is premature. Now the policy tools for supporting adjustments are more limited than would have been the case outside the EU.*
- *The industrial policy framework of Romania has been adjusted to EU standards. Derogations apply in two broad areas: they help the steel industry to stretch out the adjustment process, and several industries can postpone the adherence to environmental*

*norms. In addition, low prices of domestic natural gas for industrial consumers can be maintained until the end of 2008. There is no derogation in Romania's Accession Treaty for the energy-intensive industries to adjust to increased electricity and rising gas prices.*

- *Most of the companies in the energy-intensive manufacturing industries have been privatized and the larger ones are predominantly in the ownership of foreign investors. This means that companies must come up with the necessary means and strategies for survival being aware of the future price liberalization programmes. But many SMEs and companies in the course of privatization need support from carefully implemented horizontal policies.*

*The following policy recommendations have been arrived at through the analysis conducted in this report.*

- *A detailed but comprehensive analysis of the competitive position of individual industries would be beneficial because each of them faces a rapidly changing business environment due to rising electricity and gas prices as well as to EU accession. Industrial policy has to decide whether it intends to smoothen the transformation and restructuring process going on in these industries, or to leave it completely to the market forces. We are not in a position to recommend one or the other way, but encourage a better founded decision-making. Probably, the 'National Export Strategy 2005-2009', outlined in a publicly available document of the Ministry of Industry and Trade, could be taken as a starting point for an improved industrial policy strategy.*
- *Industrial policy lacks the instruments to protect the energy-intensive producers against the adverse effects of high energy prices. What it may do to mitigate the impact is to foster restructuring both in the energy-intensive industries and in the power generation sector. In these efforts, the environment-related strategies can be combined with the innovation-oriented state aid programmes. Investments in energy generation are necessary to replace inefficient power plants with new ones in order to lower energy prices for industrial consumers in the future. Also, the international connection of the energy-grid has to be improved to allow for more imports at lower prices.*
- *As private owners are in charge of caring for the future of their companies, the privatization process should be finalized soon. It seems that the Authority for State Assets Recovery (AVAS) is on the right track to do so. But the involvement of the Ministry of Industry and Commerce is less transparent. In fact it is difficult to find good reasons for maintaining a second privatization and assets management agency, thus we recommend that AVAS takes over the tasks of the Office of State Ownership and Privatization in Industry (OPSPI).<sup>1</sup> Another important recommendation is that, when privatization has been completed, also post-privatization monitoring should come to an end. The state should finally give up its involvement in the business sector and concentrate on improving the business environment. A third problem related to privatization concerns the future development of SMEs privatized through management-employee-buyout and lacking access to capital for modernization. They need venture capital, management consulting, etc. that could be the subject of industrial policy programmes.*

---

<sup>1</sup> This recommendation was valid at the time of writing but meanwhile OPSPI has been merged into AVAS (as of December 2006).

- *Restructuring in the energy-intensive industries may lead to further lay-offs. The government has adequate experience with active labour market policies, retraining and severance payments which can be applied if necessary. Fortunately, layoffs in energy-intensive industries occur at a time when the Romanian economy is booming, which is supportive to finding new jobs. However, new jobs are rarely created in the same area of manufacturing and skilled labour from these industries may find it difficult to switch to services or skill-intensive manufacturing industries. The regional policy tools available under EU regulation could be concentrated in geographic areas most severely hit. But such a policy should be flexible, taking into account that past employment levels cannot be restored in restructuring areas, thus the regional mobility of the workforce should also be encouraged. The problem of restructuring regions should be integrated in the Regional Operational Programme. Also the labour code should allow more flexibility of employment. Employment conditions and salaries negotiated at the industry level may not be mandatory especially for SMEs.*
- *The overall modernization programme which is included in the government's industrial policy and export strategy should be adapted to the specific needs of the energy-intensive sectors. Application of ITC and R&D results should be part of the modernization investments which can decrease energy intensity in manufacturing, but these measures are far from sufficient because these industries usually rely on standard international technologies. Clustering, promotion of market access, etc. can reduce the cost of market entry and help maintain competitiveness on international markets. These policies should be applied not only centrally but also regionally in the country to allow for better access of companies, in particular SMEs, to existing facilities. The priority list of industries in the National Export Strategy is a good addition to horizontal policies. It would be necessary however to specify how the horizontal policy tools can be used to help these industries in particular. For the internationally more competitive Romanian companies it is time to go international, not only with products but also with production abroad.*
- *Delaying the full liberalization of natural gas prices for industrial consumers should be applied only if accompanied by specific programmes of modernization. Companies – most of them privately owned – are already increasing their investments. Specific co-financing schemes, based on EU funds and state aid destined for environmental protection, may represent a solution for increasing companies' competitiveness within the EU single market beyond 2008. The timetable of the price adjustments should be agreed with the EU Commission and anchored in the post-accession monitoring process.*
- *Investments into environment-related technology and R&D can be stimulated by using EU funds. The technological upgrading necessary for improving emission standards and for increasing energy efficiency are, in general, similar. To start with, companies should be supported to work out restructuring and environmental upgrading projects eligible for EU funding.*

**Keywords:** Romania, energy intensity, industrial policy, foreign trade, competitiveness

**JEL classification:** L1, L52, L61, L65, H32, Q43, Q48, Q58



# **Restructuring of energy-intensive industrial branches in Romania and proposals for industrial policy measures**

## **Introduction: Macroeconomic context and overview of the report**

### *Romania prior to EU accession and challenges to energy-intensive industries*

After a hesitant start and uneven reform progress all through the 1990s, Romania has been speeding up its reform efforts since 2000. Getting anchored in the EU enlargement process had a mobilizing effect and established a broad consensus among political parties. Recent progress has not been without setbacks due to vested interests of political-economic stakeholders but, by the end of 2004, the country managed to finalize all negotiation chapters with the EU and concentrate on the implementation. By this time the status of a functioning market economy could be achieved as privatization progressed, state aid was curtailed and competition policy improved. The areas where accession conditions were not fully met by 2005 are border security, juridical reform, fighting corruption and the ability to absorb European funds (see EU Regular Report 2005). Romania in 2006 is in a time-race to fulfil all obligations and join the EU at the beginning of 2007. Since 2003, changes of economic conditions reduced trade and investment risks and, as a result, credit ratings improved and foreign capital started to flow in massively.

Economic growth over the past five years has fluctuated between 8% in 2004 and 4% in 2005 (see Overview Table A1) due to heavy dependence on agriculture and the vulnerability of the export structure. In the first quarter of 2006, GDP expanded by 6.9% over the same period of the previous year. Growth was driven primarily by private consumption (+10.9%), which recovered from the slowdown in the second half of 2005 despite a more moderate increase in real wages. Another factor of growth was fixed capital formation, up 11.4% over the first quarter of the previous year. Construction sector value added expanded by as much as 20%, mainly due to road construction and real estate development. Domestic consumption grew to the detriment of the foreign trade balance. Net exports amounted to -9.8% of GDP, implying a one percentage point deterioration of the trade deficit as compared to a year earlier.

The Romanian government does not consider the external imbalance to be alarming and accepts the increasing inflationary pressure caused by the overheating in order to preserve the dynamism of economic growth. In order to speed up restructuring and infrastructure development, the budgetary stance which until recently has been restrictive was relaxed. The budget deficit reached 1.8% in 2006 but may expand to 3% in 2007. Still the budget deficit remains a lesser problem in comparison to the current account deficit which is about 10% of GDP.

The buoyant domestic demand did not much stimulate industrial output but mainly imports, which may be interpreted as a sign of structural weakness of the economy. The Romanian industry is mainly specialized on consumer goods of lower quality and prestige, not very much in demand by the better-off segment of the population which benefited most from the recent income surge. There has been a significant decline in textile, clothing and shoe production and exports. Romania was the 'tailor and cobbler of Europe' in the past several years and suffers heavily under increased Chinese competition. This competition appeared both on the Romanian and on export markets. Along with the effect of currency appreciation and wage-drift, profits have eroded, and a further shrinkage of these industries seems unavoidable. Fortunately there are also booming parts of Romanian manufacturing, in particular the production of cars and household appliances where large foreign multinationals have invested. These sectors support export growth but with a high import content.

As analysed in more detail below, energy-intensive industries are the third major group of the Romanian manufacturing sector with relatively high but slowly decreasing shares in output and exports. The most important characteristic of the energy-intensive industries (see list in Part 1) is the high energy consumption in relation to their output with respect to electricity, natural gas, coal and/or crude oil consumption, etc. In Romania these industries have at least twice the energy intensity of the Netherlands or Germany and they are also much higher than in Hungary or Slovakia (see Christie, 2006). As a consequence Romanian companies in these sectors are especially vulnerable to energy prices and their fluctuations. Since energy prices are not yet fully liberalized in Romania, although they should become so soon after joining the EU in 2007, and hence some companies are still receiving energy at below-market prices, these branches are expected to suffer from the soaring recent price developments (see Part 3). The increasing share of the cost of energy inputs in total output as a consequence of higher energy prices and despite energy saving investments has been manifest already. In metallurgy this share increased, and even more so in construction materials production. In other industries, such as the glass industry, pulp and paper, and basic chemicals, at least up to 2003, efforts to reduce energy intensity compensated for the price increases.

Further competitiveness problems appear due to the development of the exchange rate of the Romanian currency, RON. The real appreciation vs. the euro, PPI based, was 7.7% in 2004 and close to 6% in 2005 and 2006. Continuous appreciation has had a negative impact on export competitiveness and led to an erosion of profit margins. This comes at a time when EU accession further eases the access of European products to Romania. In consequence, prospects are not very good for companies that have not modernized and increased efficiency and are not prepared for competition in an increasingly open market.

The medium-term prospects of the Romanian economy depend on two main factors: restructuring and improving international competitiveness on the one hand, and the capacity to absorb EU funds after accession. If progress is slow in both respects, economic growth will be 4-5% annually, while under favourable conditions it may climb to 6%. In this take-off period Romania will be a rapidly growing market for investment goods, consumer goods and services alike. The 2007 outlook for the Romanian economy is moderately positive, with expected economic growth close to 6%. EU membership means limited access to new funds in the first two years after accession (as experienced by the earlier Central and Eastern European accession countries). Romania has no target for the introduction of the euro but will have to oblige to the rules of the Stability and Growth Pact. Fiscal and monetary policies will be moderately restrictive as none of the existing tensions will prompt decisive action.

## **The situation of the energy-intensive industries – structure and overview of the report**

### *Part 1*

In Part 1, we set out by identifying the most energy-intensive industries at the NACE 2-digit level;<sup>2</sup> we then look at the main characteristics of these sectors in an international comparison. An overview is given of the position of the energy-intensive industries in Romania as compared to other Central and East European economies. From this comparison we can gain some insight into the relative position of these industries in the process of restructuring and may identify possible stumbling blocks. The industries identified as particularly 'energy-intensive' are the paper industry (NACE 21), chemicals (NACE 24), the non-metallic mineral products (NACE 26) and the basic metals (NACE 27) industries. The countries selected for benchmarking are the Czech Republic, Hungary, Poland, Slovakia and Bulgaria. The comparison includes production, employment, labour productivity, investment and exports. We compare the size of production as well as the share of energy-intensive products in total manufacturing output of each country, which shows that energy-intensive industries in Romania occupy a prominent position in both respects. Account is taken of the development over time in production, employment and productivity; we compare productivity gains (2000-2005) on the one hand and productivity levels on the other. Analysing investment, special focus is put on foreign direct investment as a major source of modern technology. Export performance is measured by export growth and world market shares.

### *Part 2*

This part looks in more detail at the most energy-intensive manufacturing sub-branches in Romania at the NACE 3-digit level: pulp and paper (NACE 211); basic chemicals (NACE 241); glass and glass products (NACE 261); ceramic products (NACE 262); cement,

---

<sup>2</sup> NACE: Standard statistical classification used in the European Union (Nomenclature générale des Activités économiques dans les Communautés Européennes).



lime and plaster (NACE 265); iron and steel industry (NACE 271 to 273); non-ferrous metals (NACE 274 – mainly aluminium). In the first section some key indicators such as production, value added, unit labour costs, exports and imports are analysed. In section 2, we present for each sub-branch the main companies, the major goods produced, their ways of privatization, progress in modernization and compliance with the *acquis* and recent financial results of selected companies. It turns out from the analysis that companies are very different with respect to the technology and to the processes involved, to the input markets, to the end-customers of their products, to the concentration of market power, to the ownership structure, or to the number and size of firms. Most of the companies operate in a highly competitive environment, while others such as those in the cement industry, iron and steel and the aluminium industry are characterized by oligopolistic structures but exposed to import competition. In some companies, mostly in the larger foreign-owned ones, the technology is up-to-date or is currently in the process of modernization, and there is some discernible shift towards environmentally friendly technologies. Other companies, mainly smaller ones, are not well prepared to face the competitive and new regulatory challenges of full EU membership.

Given the fact that basic chemicals is the sub-sector with the highest energy intensity in Romania, we analysed this sector in more detail by way of a questionnaire survey carried out during June 2006. The survey had a high response rate among the most important companies. It allows for insights into the companies' problems and future plans. We found that larger companies expect the average growth rate of the Romanian chemical sector to be in line with that of overall manufacturing or slightly below, while smaller firms are more pessimistic. As for employment, all companies expect the number of employees to fall. Almost all companies perceive the regulatory framework and the prices of energy inputs, particularly in the case of natural gas, as the main uncertainty related to future competitiveness. In addition, they claim that meeting the environmental requirements of the *acquis* has absorbed too much of the investments in recent years instead of modernization targets. Companies formulated a number of suggestions how to improve the economic policy environment which we took into consideration in Part 3 of the paper.

### *Part 3*

In the final part of the paper we look at the industrial policy environment in which the energy-intensive companies are operating. Romania's industrial policy framework has been adjusted to EU standards. Derogations apply in two broad areas: they help the steel industry to stretch out the adjustment process, and several industries can postpone the adherence to environmental norms. In addition, low gas prices for industrial consumers of domestic natural gas can be maintained until the end of 2008. There is no derogation in Romania's Accession Treaty for the energy-intensive industries to adjust to increased electricity and gas prices. Still, industrial policy is possible in a number of areas and ways.

First we discuss problems related to the industrial policy conducted by the Ministry of Economy and Commerce in general. Then we turn to sectoral issues focusing on the steel and basic chemicals sectors. Further we pay attention to possible alternatives for energy pricing policy and recommend a stepwise adjustment of gas prices. Privatization policy has been one of the most important industrial policy instruments and we argue for a fast completion of the process. Horizontal industrial policies are discussed in the fields of regional policy, labour market policy and policies supporting competitiveness. Finally, we discuss the environmental policy and Romania's possible position in the EU-wide emission trading system. We close the part with a summary and recommendations. This section summarizes the overall policy lessons emerging from the analysis undertaken in this report.

## **1 The position of energy-intensive industries in the Romanian economy**

In this part, an overview is given of the position of the energy-intensive industries in Romania as compared to other Central and East European countries (CEECs). We set out by identifying the most energy-intensive industries at the NACE 2-digit level and then look at the main characteristics of these industries as compared to other CEECs. From this comparison we can gain some insight into the relative position of these industries in the process of restructuring and may identify possible opportunities and threats to their further development.

### **1.1 Definition of energy-intensive industries**

How is energy intensity defined? When is an industry deemed to be energy-intensive, while another is not?

Although there is a definition for energy intensity at the national level (gross domestic consumption of energy in physical units divided by real GDP)<sup>3</sup> there is no single definition or threshold to distinguish between energy-intensive and non-energy-intensive industries. A definition of an *energy-intensive business* was given at the European level in the EU's Energy Tax Directive<sup>4</sup> as 'a business entity (...) where either the purchases of energy products and electricity amount to at least 3% of the production value or the national energy tax payable amounts to at least 0.5% of the added value'. However, this refers to companies, not to industries. For quite separate purposes the EU also defined precise lists of industries in the Council Directive 96/61/EC of 24 September 1996 that would have to be considered for specific environmental measures, in particular the EU's CO<sub>2</sub> Emissions Trading Scheme (ETS). Such a selection however refers to emissions of pollutants more than it does to energy intensity, although the two are in many cases related.

---

<sup>3</sup> This is the definition used by the European Environment Agency (EEA).

<sup>4</sup> Council Directive 2003/96/EC of 27 October 2003.

In the absence of an institutional definition we may choose to measure energy either in physical units or in expenditure terms, and set it against either total output or gross value added. But, if we want to screen industries at a relatively detailed level, we find that energy data in physical units are not readily available. International databases such as the IEA's energy balances only distinguish 13 industrial branches, for example, while no such data are available from Eurostat.

On the other hand, every country periodically publishes input-output tables. Use tables, which are part of the input-output accounting system, provide us with the levels of purchased intermediate goods and services by CPA<sup>5</sup> category for each NACE industry in current purchaser's prices<sup>6</sup>. Identifying those categories of products which mainly consist of energy sources enables us to make estimations of the energy intensity of each industry. In particular, at the CPA 2-digit level, one may select the CPA codes 10, 11, 23 and 40, as shown in Table 1.1.

Table 1.1

**Definition of energy sources using 2-digit CPA categories**

<b>CPA Code</b>	<b>Description</b>
10	Coal and lignite; peat
11	Crude petroleum and natural gas;
23	Coke, refined petroleum products and nuclear fuels
40	Electrical energy, gas, steam and hot water

Source: Eurostat.

We then calculate the total of intermediate consumption in products from CPA categories 10, 11, 23 and 40 divided by the total output for each industry in turn. This gives us a measure of how much is spent on energy inputs per unit of output, and will thus enable us to rank industries according to how energy-intensive they are following this measure. Of course this methodology is not perfect: different industries use different combinations of fuels, fuels are priced in different ways, also taxed in different ways, so the method we use is not directly equivalent to measuring energy intensity with physical units of energy, i.e. joules per RON (new Romanian lei) of output. Yet there is the advantage that we have an economic concept of energy intensity which tells us something about how much companies actually need to pay for their energy inputs.

A separate issue concerns the use of energy products as material inputs (sometimes referred to as 'feedstock') rather than as an energy source *per se*. For example, the energy industries themselves are involved in transforming one type of fuel into another, and their

<sup>5</sup> CPA: Classification of products by activity.

<sup>6</sup> Purchaser's prices, sometimes also written as purchaser prices, are the prices the purchaser actually pays for his inputs, including all taxes and subsidies on products except deductible VAT (Eurostat, 1996).

actual use of energy is much lower than the energy content of the fuels they buy for transformation. We manage to partly circumvent this particular problem by excluding the energy sectors (10, 11, 23, 40) from our selection. We restrict our selection to manufacturing industries only. Other energy-intensive sectors such as air transport or mining are not included.

Based on these choices, and having at our disposal the Romanian use tables for the year 2003 (which was the most recent available in June 2006), we were able to produce a ranking for each year. In order to make the study as relevant as possible we filtered out those sectors that were below a certain threshold in terms of total output. In particular we chose to consider only those sectors for which total output represented at least 0.15% of total national output in 2003 (corresponding to RON 5727 billion at 2003 prices).

The result of this selection is given in Table 1.2, where we show the top ten industries as defined at the NACE 3-digit level.

Table 1.2

**Ranking of energy-intensive manufacturing sectors for Romania, 2003**

<b>NACE</b>	<b>Energy intensity<sup>1)</sup></b>	<b>Share in national output</b>	<b>Description</b>
24.1	0.2985	1.18%	Basic chemicals
27.1	0.2875	1.14%	Basic iron, steel and ferro-alloys
27.4	0.2511	0.59%	Basic precious and non-ferrous metals
27.2	0.2360	0.27%	Tubes
26.5	0.1943	0.33%	Cement, lime and plaster
27.3	0.1432	0.31%	Other first processing of iron and steel
26.1	0.1139	0.21%	Glass and glass products
26.2	0.1026	0.18%	Non-refractory ceramic goods other than for construction purposes; refractory ceramic products
21.1+21.2	0.0929	0.48%	Pulp, paper and paper products

*Note:* 1) Defined as intermediate consumption of products from CPA categories 10, 11, 23, 40 divided by the total output of the respective industry.

*Source:* Romanian input-output tables 2003, INSSE and own calculations.

The special classification used by the Romanian statistical agency for its input-output accounting (made up of 105 industries) imposes a grouping of NACE 21.1 (Manufacture of pulp, paper and paperboard) with NACE 21.2 (Manufacture of articles of paper and paperboard).

Furthermore we compared our selection with results for the UK as well as with the results of a similar selection exercise which was made for the EU as a whole in the framework of a research project funded by the European Commission and called COMETR

(‘competitiveness effects of environmental tax reform’)<sup>7</sup>. The issue is that NACE 21.1 is for technology reasons much more energy-intensive than NACE 21.2. For example, in the case of the UK, using exactly the same methodology with the country’s use table, but based on a slightly more detailed industrial breakdown (123 industries instead of 105) one finds NACE 21.1 among the ten most energy-intensive industries, while NACE 21.2 ranks much lower. In light of this fact we chose to exclude 21.2 from our selection in favour of 21.1 whenever feasible.

Comparing our selection with that made in the COMETR project, we find that the two are essentially identical. One further aspect worth commenting on is that it is rather convenient to group together industries 27.1, 27.2 and 27.3, as combined they form the entire manufacturing of basic ferrous metals (except casting), while 27.4 should be considered separately as it covers the manufacturing of basic non-ferrous metals, e.g. aluminium. These minor changes done, we conclude this section by presenting our final selection in Table 1.3. These are the industries we will cover in the present study.

Table 1.3

**Selection of energy-intensive manufacturing sectors for Romania**

<i>NACE</i>	<i>Description</i>
21.1	Pulp, paper and paperboard
24.1	Basic chemicals
26.1	Glass and glass products
26.2	Non-refractory ceramic goods other than for construction purposes; refractory ceramic products
26.5	Cement, lime and plaster
27.1+27.2+27.3	Basic ferrous metals
27.4	Basic precious and non-ferrous metals

In the first part of this study, however, when comparing energy-intensive industries in Romania with those in other CEECs, because of the lack of data at this level of aggregation for all countries, the analysis will be confined to the NACE 2-digit level of industries, namely: manufacture of pulp, paper and paper products (NACE 21), manufacture of chemicals and chemical products (24), manufacture of other non-metallic mineral products (NACE 26) and manufacture of basic metals (NACE 27).<sup>8</sup>

<sup>7</sup> See [http://www.wiwi.at/e/research\\_networks\\_cometr.html](http://www.wiwi.at/e/research_networks_cometr.html).

<sup>8</sup> At 2-digit level, the NACE rev. 1 classification is identical with the ISIC rev. 3 classification (international standard industrial classification).

## **1.2 Relative position of the energy-intensive industries in Romania as compared to other Central and East European countries**

### **1.2.1 The size of energy-intensive industries in Romania and other CEECs**

The energy-intensive branches as defined in section 1.1 (NACE 21, 24, 26 and 27) showed a combined output worth around EUR 9 billion in Romania in 2005 (see Table 1.4).

Their production value is similar to that of Hungary when converted at market exchange rates and somewhat higher when using purchasing power standards (PPS) for conversion (see Figure 1.1).<sup>9</sup> In this case, Romania ranks third (after Poland and the Czech Republic) as a producer of energy-intensive products among the CEECs investigated. The same is true with regard to the number of enterprises active in energy-intensive branches, amounting to about 4400 in Romania. However, when taking value added (production value minus intermediate inputs) as a measure, Romania ranks significantly behind Hungary. On the other hand, the number of persons employed in energy-intensive branches reached 186,000 in Romania in 2005; this is much higher than in Hungary and approximately the same as in the Czech Republic, stressing the important role of these industries as an employer in Romania, but also pointing to a relatively low labour productivity and thus delayed restructuring and modernization.

In relative terms, output of energy-intensive branches takes a share of about 26% in total manufacturing production in Romania, which is the highest of the CEECs selected (see Figure 1.2a). However, taking value added instead of output as a measure, the role of these industries is less prominent, with a share of 14% in total manufacturing value added and of about 3% in GDP, which is much less than, for instance, in the Czech Republic and Slovakia where the respective shares in GDP reached about 5%, pointing to a relatively low position in the value added chain but, on the other hand, to a relatively important role as a consumer of intermediate inputs (see Table 1.4). Interestingly, despite the comparatively high number of employees in these branches in Romania, their share in total manufacturing employment is lower than in the other CEECs because of the very prominent role which very labour-intensive industries such as wearing apparel still play in Romania, taking the lion's share of employment – comparable only with Bulgaria (see Figure 1.2b and Table A3 in the Appendix).

---

<sup>9</sup> As the currencies of the CEECs including Romania are still undervalued to a certain degree in terms of purchasing power parities, production values measured in national currency and converted to a common currency (EUR) by market exchange rates will not properly reflect the relative size of production in real terms. Among the countries selected, the 'exchange rate deviation indicator' (ERDI) and thus undervaluation is the highest for Romania and Bulgaria. Using purchasing power standards (PPS) for conversion instead of market exchange rates will reduce this bias. As no PPS for individual industrial branches are available so far and we are dealing with highly capital-intensive branches here, we have chosen the PPS for fixed capital formation (PPSCAP) as a proxy.

Table 1.4

### Overview on production and employment, 2005

#### Manufacture of energy-intensive industries, total (sum of NACE 21,24,26,27)

	Number of enterprises 2003	Production <sup>1)</sup>			Value added (2003) <sup>1)</sup>				Employment	
		mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	% of GDP	ths. persons	% of manuf.
<b>Romania</b>	<b>4409</b>	<b>9361.1</b>	<b>17576.9</b>	<b>25.6</b>	<b>1556.2</b>	<b>2876.1</b>	<b>14.2</b>	<b>2.9</b>	<b>186.0</b>	<b>12.7</b>
Czech Rep.	9818	15409.6	23907.1	22.8	3865.5	5996.8	20.6	4.9	180.9 <sup>3)</sup>	17.8
Hungary	4055	9792.1	13094.0	16.0	2651.6	3718.5	18.6	3.7	91.8	13.3
Poland	15972	28419.3	43701.1	19.2	7078.1	12259.3	20.7	3.6	336.9	14.7
Slovak Rep.	579	5546.3	7561.1	23.3	1591.6	2169.8	30.2	4.8	68.4 <sup>3)</sup>	18.8
Bulgaria	2084	3484.0	6314.1	23.6	378.9	990.0	23.6	2.8	86.8	13.9

#### Pulp, paper and paper products (NACE 21)

	Number of enterprises 2003	Production <sup>1)</sup>			Value added (2003) <sup>1)</sup>				Employment	
		mn EUR at exchange rates	mn EUR at PPS CAP <sup>2)</sup>	% of manuf.	mn EUR at exchange rates	mn EUR at PPS CAP <sup>2)</sup>	% of manuf.	% of GDP	ths. persons	% of manuf.
<b>Romania</b>	<b>673</b>	<b>459.4 <sup>3)</sup></b>	<b>862.6 <sup>3)</sup></b>	<b>1.3 <sup>3)</sup></b>	<b>198.6</b>	<b>367.1</b>	<b>1.8</b>	<b>0.4</b>	<b>13.0</b>	<b>0.9</b>
Czech Rep.	557	1547.1 <sup>3)</sup>	2400.3 <sup>3)</sup>	2.3 <sup>3)</sup>	377.1	585.0	2.0	0.5	18.9 <sup>3)</sup>	1.9 <sup>3)</sup>
Hungary	582	900.7	1204.4	1.5	247.7	347.3	1.7	0.3	17.9	2.6
Poland	1812	3640.2	5597.7	2.5	924.8 <sup>3)</sup>	1601.7 <sup>3)</sup>	2.7	0.5	40.8	1.8
Slovak Rep.	75	816.4 <sup>3)</sup>	1113.0 <sup>3)</sup>	3.4 <sup>3)</sup>	163.1 <sup>3)</sup>	222.3 <sup>3)</sup>	3.1	0.5	7.6 <sup>3)</sup>	2.1 <sup>3)</sup>
Bulgaria	380	317.0	574.5	2.1	42.5	83.8	2.0	0.2	12.6	2.0

#### Chemicals (NACE 24)

	Number of enterprises 2003	Production <sup>1)</sup>			Value added (2003) <sup>1)</sup>				Employment	
		mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	% of GDP	ths. persons	% of manuf.
<b>Romania</b>	<b>1208</b>	<b>2711.5 <sup>3)</sup></b>	<b>5091.27 <sup>3)</sup></b>	<b>7.4 <sup>3)</sup></b>	<b>491.5</b>	<b>908.28</b>	<b>4.5</b>	<b>0.9</b>	<b>50</b>	<b>3.4</b>
Czech Rep.	1193	3997.7 <sup>3)</sup>	6202.1 <sup>3)</sup>	5.9 <sup>3)</sup>	1016.7	1577.2	5.4	1.3	37.0 <sup>3)</sup>	3.6 <sup>3)</sup>
Hungary	788	4594.8	6144.2	7.5	1369.0	1919.8	9.6	1.9	31.0	4.5
Poland	2226	10559.3	16237.3	7.1	2456.6 <sup>3)</sup>	4254.8 <sup>3)</sup>	7.2	1.2	100.8	4.4
Slovak Rep.	162	932.9 <sup>3)</sup>	1271.8 <sup>3)</sup>	3.9 <sup>3)</sup>	195.0 <sup>3)</sup>	265.9 <sup>3)</sup>	3.7	0.6	12.3 <sup>3)</sup>	3.4 <sup>3)</sup>
Bulgaria	611	980.2	1776.4	6.6	196.4	387.5	9.2	1.1	24.3	3.9

#### Manufacture of other non-metallic mineral products (NACE 26)

	Number of enterprises 2003	Production <sup>1)</sup>			Value added (2003) <sup>1)</sup>				Employment	
		mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	% of GDP	ths. persons	% of manuf.
<b>Romania</b>	<b>2047</b>	<b>1572.9 <sup>3)</sup></b>	<b>2953.4 <sup>2)</sup></b>	<b>4.3 <sup>3)</sup></b>	<b>485.7</b>	<b>897.7</b>	<b>4.4</b>	<b>0.9</b>	<b>63.0</b>	<b>4.3</b>
Czech Rep.	7530	3567.5 <sup>3)</sup>	5534.8 <sup>3)</sup>	5.3 <sup>3)</sup>	1463.0	2269.7	7.8	1.8	65.0 <sup>3)</sup>	6.4 <sup>3)</sup>
Hungary	2685	1719.5	2299.3	2.8	629.9	883.4	4.4	0.9	24.7	3.6
Poland	11087	6956.6	10697.3	4.7	2362.8 <sup>2)</sup>	4092.4 <sup>3)</sup>	6.9	1.2	128.5	5.6
Slovak Rep.	267	944.8 <sup>3)</sup>	1288.1 <sup>3)</sup>	4.0 <sup>3)</sup>	331.3 <sup>2)</sup>	451.6 <sup>3)</sup>	6.3	1.0	20.7 <sup>3)</sup>	5.7 <sup>3)</sup>
Bulgaria	888	775.6	1405.7	5.3	140.0	276.2	6.6	0.8	25.9	4.2

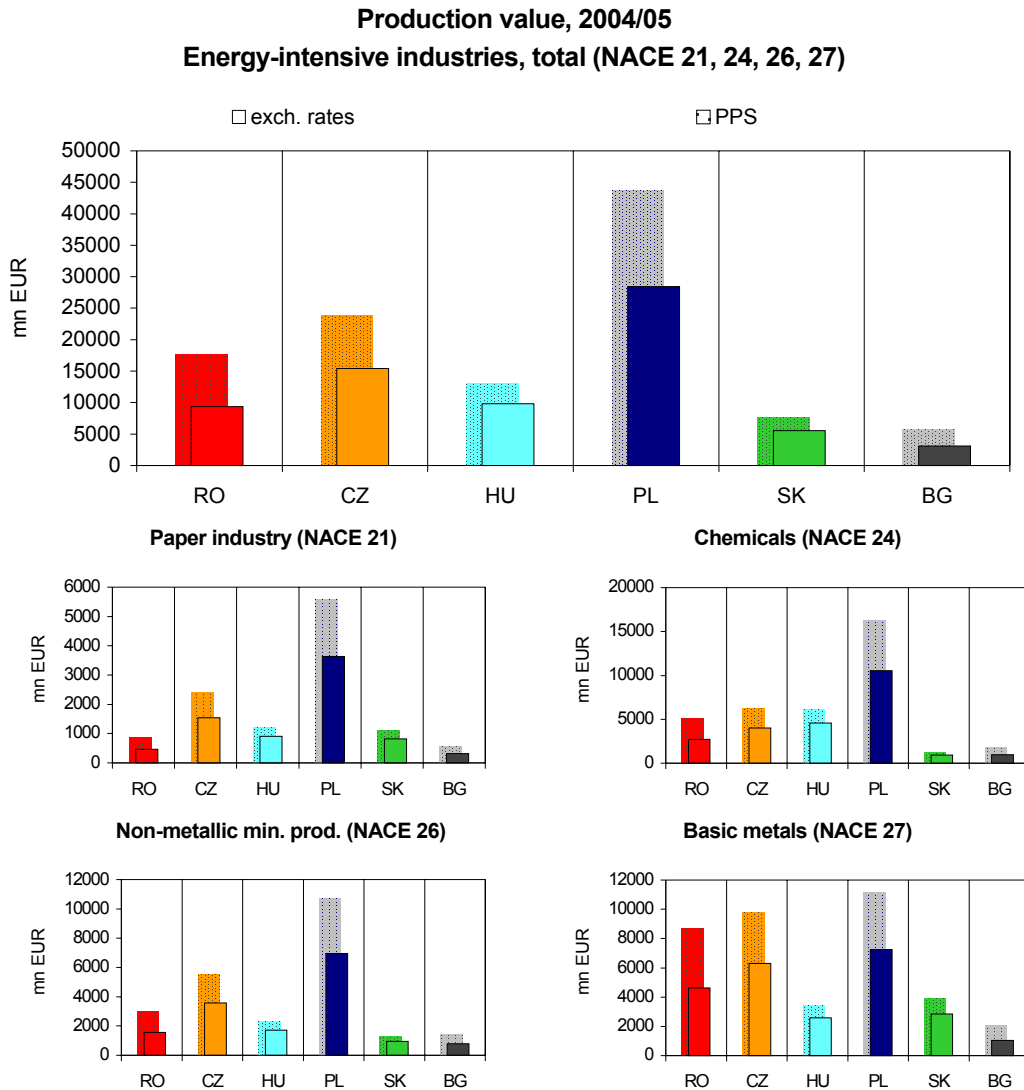
#### Manufacture of basic metals (NACE 27)

	Number of enterprises 2003	Production <sup>1)</sup>			Value added (2003) <sup>1)</sup>				Employment	
		mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	mn EUR at exchange rates	mn EUR at PPS CAP	% of manuf.	% of GDP	ths. persons	% of manuf.
<b>Romania</b>	<b>481</b>	<b>4617.3 <sup>3)</sup></b>	<b>8669.6 <sup>3)</sup></b>	<b>12.6 <sup>3)</sup></b>	<b>380.4</b>	<b>702.9</b>	<b>3.5</b>	<b>0.7</b>	<b>60.0</b>	<b>4.1</b>
Czech Rep.	538	6297.3 <sup>3)</sup>	9769.9 <sup>3)</sup>	9.3 <sup>3)</sup>	1008.7	1564.8	5.4	1.3	60.0 <sup>3)</sup>	5.9 <sup>3)</sup>
Hungary	.	2577.1	3446.1	4.2	405.0	568.0	2.9	0.6	18.2	2.6
Poland	847	7263.2	11168.8	4.9	1333.9 <sup>2)</sup>	2310.4 <sup>3)</sup>	3.9	0.7	66.8	2.9
Slovak Rep.	75	2852.2 <sup>3)</sup>	3888.3 <sup>3)</sup>	12.0 <sup>3)</sup>	902.2 <sup>2)</sup>	1230.0 <sup>3)</sup>	17.1	2.7	27.8 <sup>3)</sup>	7.6 <sup>3)</sup>
Bulgaria	205	1411.2	2557.5	9.6		242.5	5.8	0.7	23.9	3.8

Notes: 1) At current prices. - 2) Purchasing power standards for fixed capital formation. - 3) 2004.

Sources: wiw Industrial Database; Eurostat, SBS.

Figure 1.1

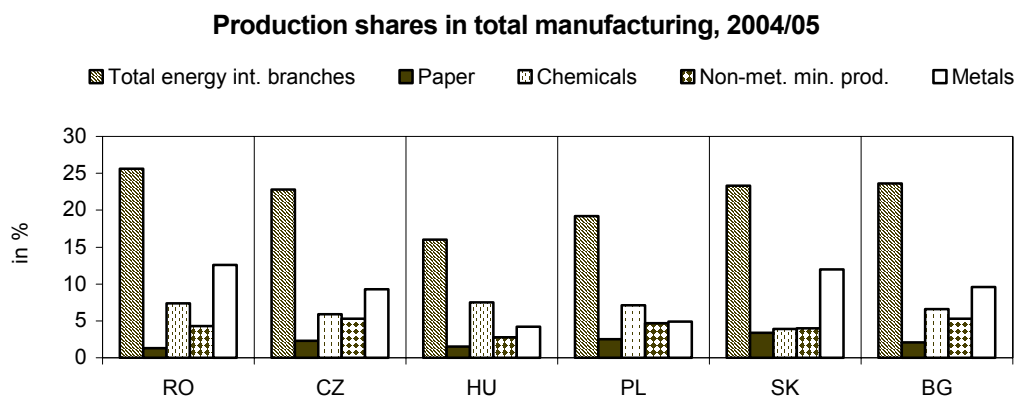


Source: wiiw Industrial Database; Eurostat, New Cronos, SBS.

As regards the *individual energy-intensive branches* in Romania, the following picture emerges: measured by output, the basic metals industry (NACE 27, comprising the iron & steel and the non-ferrous metal industry) is by far the largest industry, but value added (VAD) is higher in the chemical (NACE 24) as well as in the non-metallic mineral products industry (NACE 26, comprising the glass and the cement industry). The biggest number of enterprises can be found in the non-metallic mineral products industry, which includes many small and medium-sized enterprises. This industry is also the most important employer with 63,000 employees, closely followed by the basic metals industry, employing 60,000 persons. The smallest industry by far out of the four is the paper industry (NACE 21). Compared to the other CEECs, Romania is a relatively important supplier of basic metals (ranking third), of medium importance as regards chemicals and non-metallic mineral products and a minor supplier of pulp, paper and paper products (see Figure 1.1).

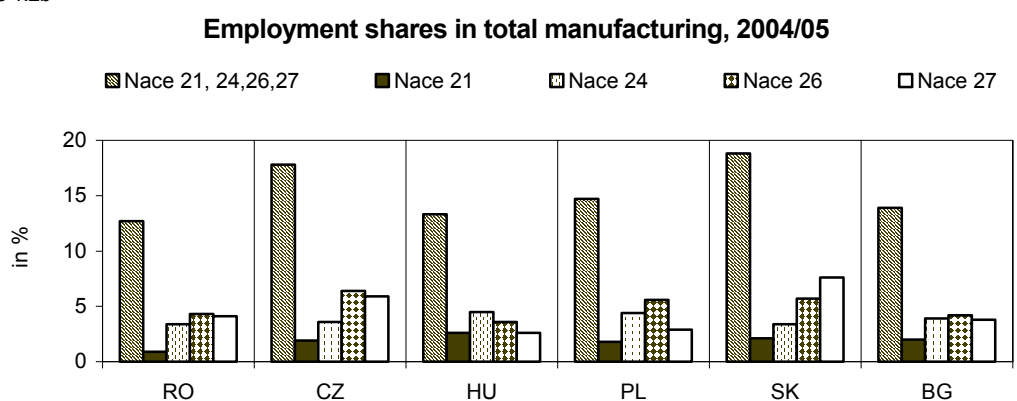


Figure 1.2a



Source: wiiw Industrial Database, Eurostat, SBS

Figure 1.2b



Source: wiiw Industrial Database, Eurostat, SBS

## 1.2.2 Development trends

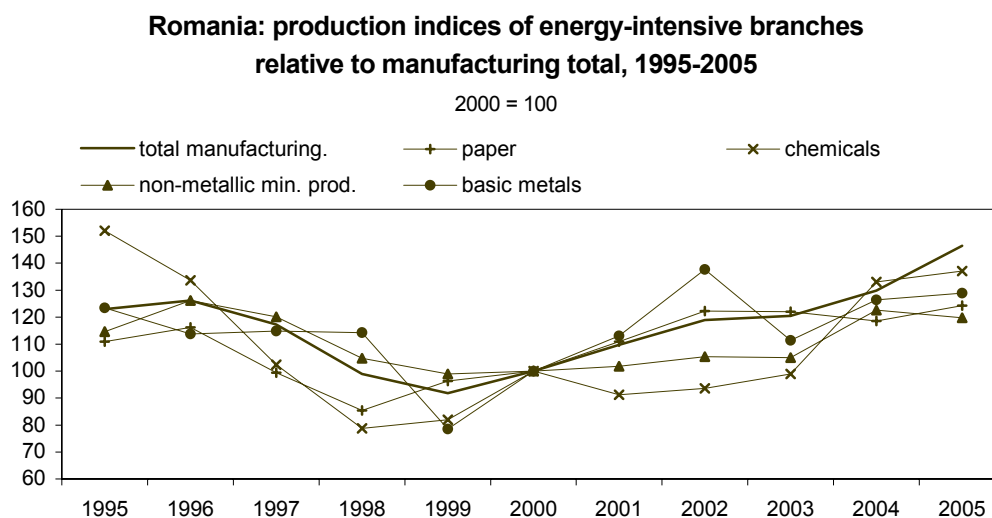
The development of *production* of the energy-intensive industries in Romania in 1995-2005 is presented in Figure 1.3. Typically, energy-intensive industries are fluctuating more strongly and between 2000 and 2005 these industries were developing on average less dynamically than total manufacturing (see negative growth differentials in Table A4 in the Appendix).

The Romanian *paper industry*, after declining strongly during the second transformational recession in 1997/98, developed more or less in line with the industry in the other CEECs or even better, but fell significantly behind after 2003, when a number of factors such as price hikes for domestic wood, a special environmental tax and strongly rising energy prices in the run-up to EU accession hit the industry (see Figure 1.4 and compare Part 2, section 2.2.1).

*The chemical industry* in Romania suffered from a particularly strong decline between 1995 and 1998 and recovered only very slowly until it was supported by foreign direct investment more recently. Thus between 2003 and 2005 the development of the chemical industry in

Romania was more dynamic than in the other CEECs, with the exception of Bulgaria (see Figure 1.4).

Figure 1.3



Source: wiiw Industrial Database, Eurostat, SBS.

The *non-metallic mineral products* industry in Romania was not affected over-proportionately by the 1997/98 economic setback, yet the industry grew rather slowly thereafter – similarly as in the other CEECs except Bulgaria, where the industry expanded vigorously (see Figure 1.4).

The production of *basic metals* in Romania is plagued by strong cyclical fluctuations, which seem to be more extreme than in the other CEECs. However, the overall trend looks better than in most CEECs compared, with the exception of the recent surge of production in Bulgaria and the persistent strong growth in the Czech Republic (see Figure 1.4).

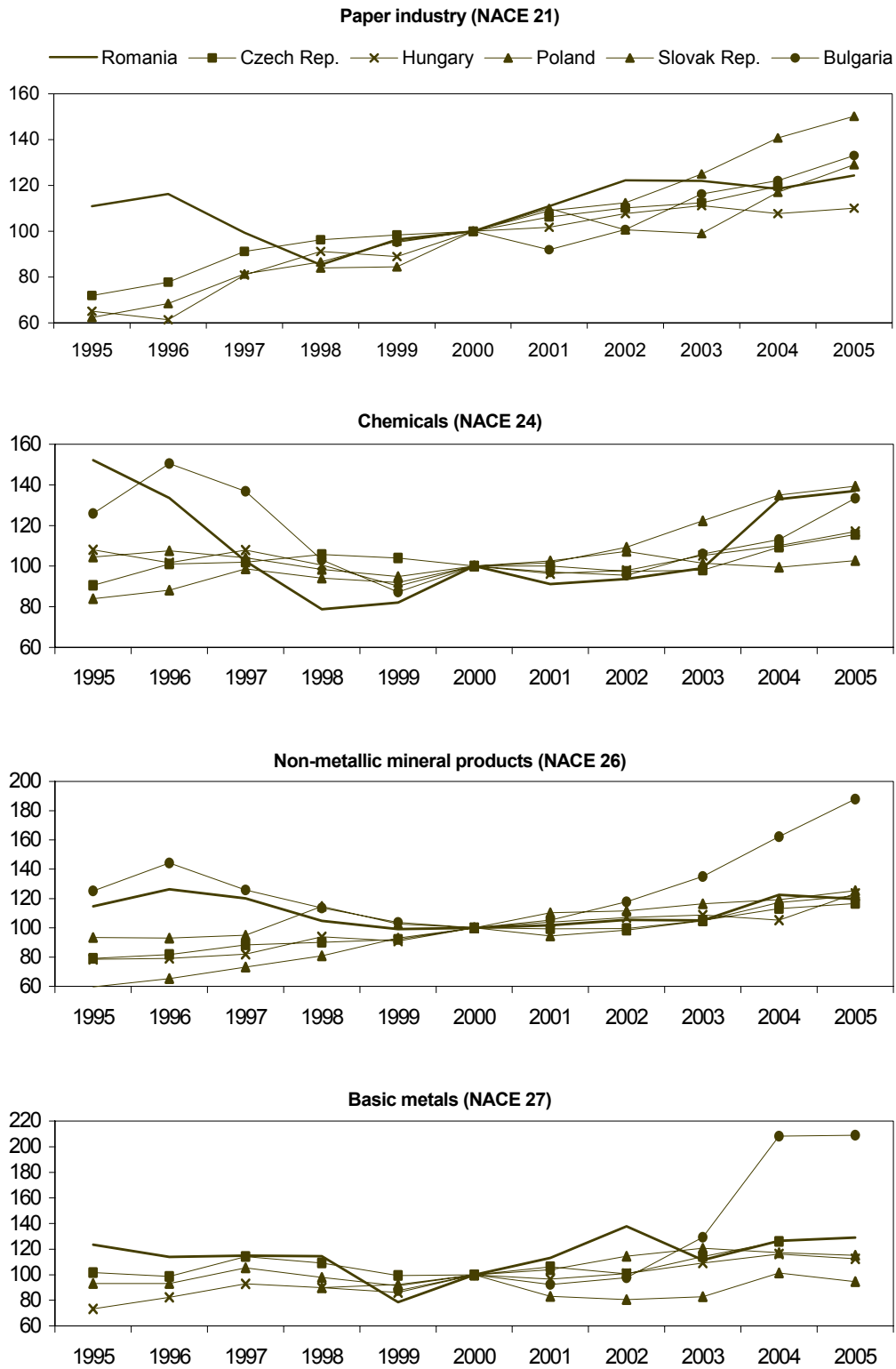
Contrary to production, which declined first but recovered later, *employment* in the energy-intensive branches in Romania is still showing a downward trend, although some stabilization can be observed in 2005 (see Figure 1.5).

In the *paper industry*, employment remained more or less constant during the first years after the 1997/98 recession, while output expanded vigorously, but started to decline again in 2003, along with a slump in production. However, when production recovered in 2005, employment continued to fall, reflecting a new wave of restructuring in the Romanian paper industry. The picture of the industry in the other CEECs looks rather mixed. Still, overall employment losses in the Romanian paper industry are higher than in the other CEECs, in particular Poland, which showed a significant increase of employment from 2003 (see Figure 1.6 and Table A5).

Figure 1.4

**Production indices of energy-intensive industries in Romania and other CEECs, 1995-2005**

2000 = 100

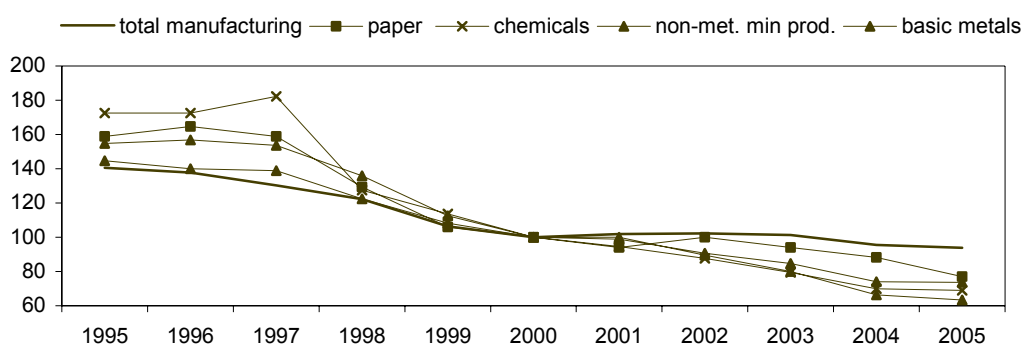


Source: wiiw Industrial Database, Eurostat, SBS.

Figure 1.5

**Romania: employment indices of energy-intensive industries relative to manufacturing total, 1995-2005**

2000 = 100



Source: wiiw Database.

Employment losses in the *chemical industry* in Romania were particularly high, also when compared to the other CEECs, with 76,000 jobs gone between 1995 and 2005. Rigorous labour shedding continued after 1999, and only in 2005 did a certain slowdown occur (see Figure 1.6 and Table A5).

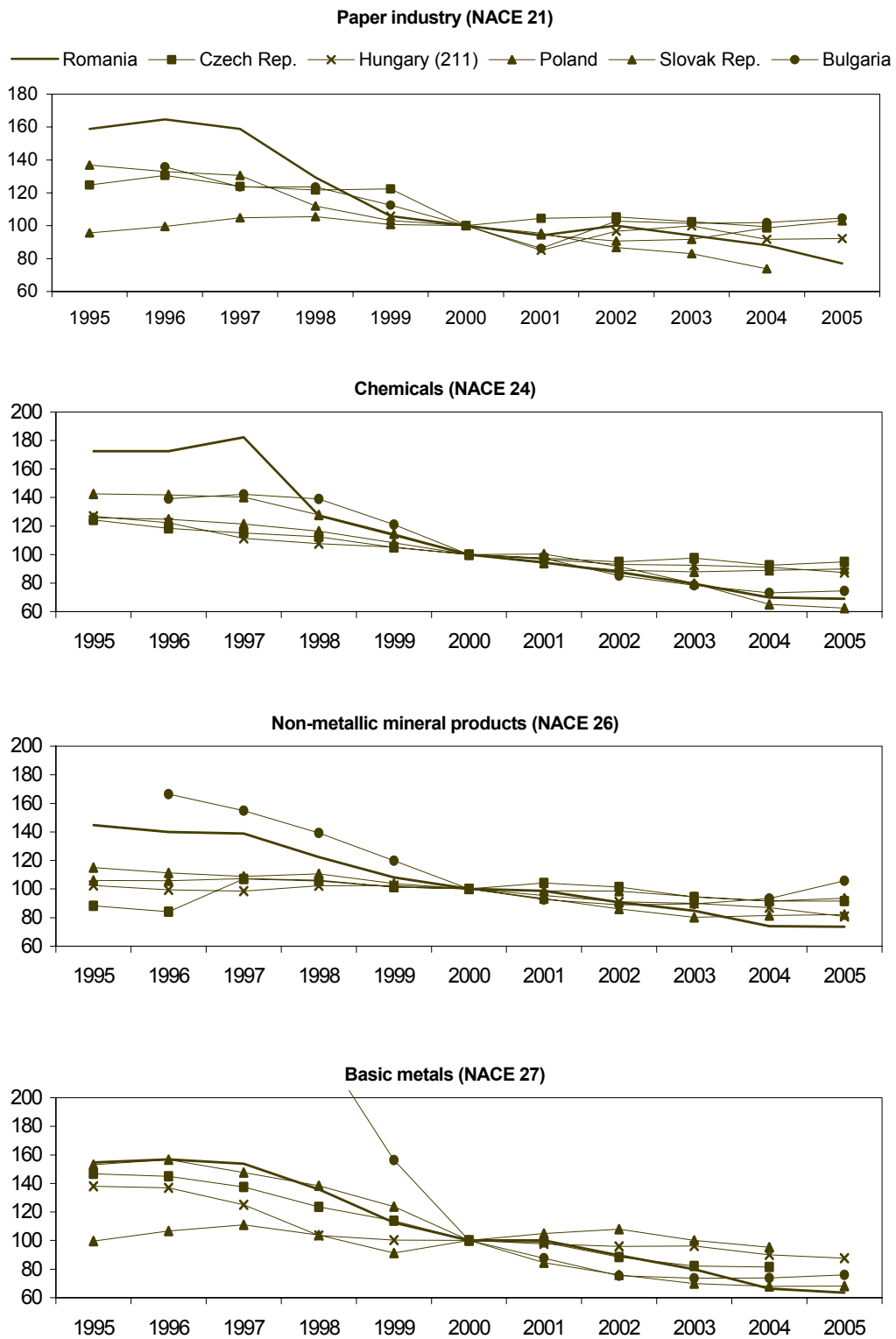
Employment in the *non-metallic mineral products* industry followed the general pattern for energy-intensive industries in Romania indicated above, and also followed more or less the employment patterns of this industry in the other CEECs, except for displaying a much stronger labour shedding before 2000 (see Figure 1.6 and Table A5).

In the *basic metals* industry, labour shedding was the highest of all energy-intensive industries in Romania: 87,000 jobs were lost in the period 1995-2005, which is a reduction by 60%. Rigorous labour shedding continued after 2000 (with a certain deceleration in 2005), despite a surge in production. The average annual employment decline in 2000-2005 reached 8.7%, much more than in total manufacturing (-1.3%). However, there was an above-average decline of employment in this industry in all other CEECs as well, pointing to the enormous restructuring demand in this industry in all former socialist economies. An interesting exception is Slovakia, where employment in the metal industry has remained more or less constant since 1995 due to some special circumstances, such as the heritage of a new, semi-finished modern aluminium plant from the former Czechoslovakia upon partition and relatively early substantial foreign direct investment in both the aluminium and the steel industries.

Figure 1.6

**Employment indices of energy-intensive industries in Romania and other CEECs, 1995-2005**

2000 = 100



Source: wiiw Database.

### 1.2.3 Productivity as a measure for restructuring

Labour productivity (LP) is defined as output per unit of labour. LP is considered a measure for the efficiency of production and is determined by factors such as the capital intensity of production, the technology used, the skills of the labour force and the efficiency of management. An improvement in labour productivity is regarded as a sign of successful restructuring and modernization within an industry or a country.

Ideally, LP should be measured in physical units, e.g. tons of steel per working hour, but in practice it is measured as output (production) value per employee (prod/emp). However, when analysing productivity developments over time, we use production at constant prices (1999) to represent output growth in real terms, i.e. excluding the effect of price changes.<sup>10</sup>

#### *Fast rise in productivity*

By definition, labour productivity will rise when production growth is faster than employment growth, which was the case in all energy-intensive industries in Romania in 2000-2005, as production expanded strongly and employment even declined. In Figure 1.7, the 100% line represents the situation in the year 2000, the bold line represents the production index in 2005 and the dotted line the corresponding employment index. The difference between the two lines reveals labour productivity growth during the period 2000-2005.

As illustrated by Figure 1.7, the Romanian chemical and basic metals industries showed the highest productivity growth of all CEECs in this period. In the paper industry, productivity gains in Romania were higher than in the Czech Republic, Hungary and Bulgaria but comparable to those in Poland and in Slovakia. In the non-metallic mineral products industry the picture was rather similar for all CEECs.

#### *Productivity levels still low*

The international comparison of productivity levels is hampered by the problem that production data in national currency have to be converted into a common currency, the result of which should reflect production in *real* terms in the countries compared. As mentioned earlier, due to the undervaluation of CEECs' currencies, market exchange rates may underestimate the real production in these countries to a certain extent. Using purchasing power standards (PPS) for conversion instead will reduce this bias. The results are presented in Figure 1.8.

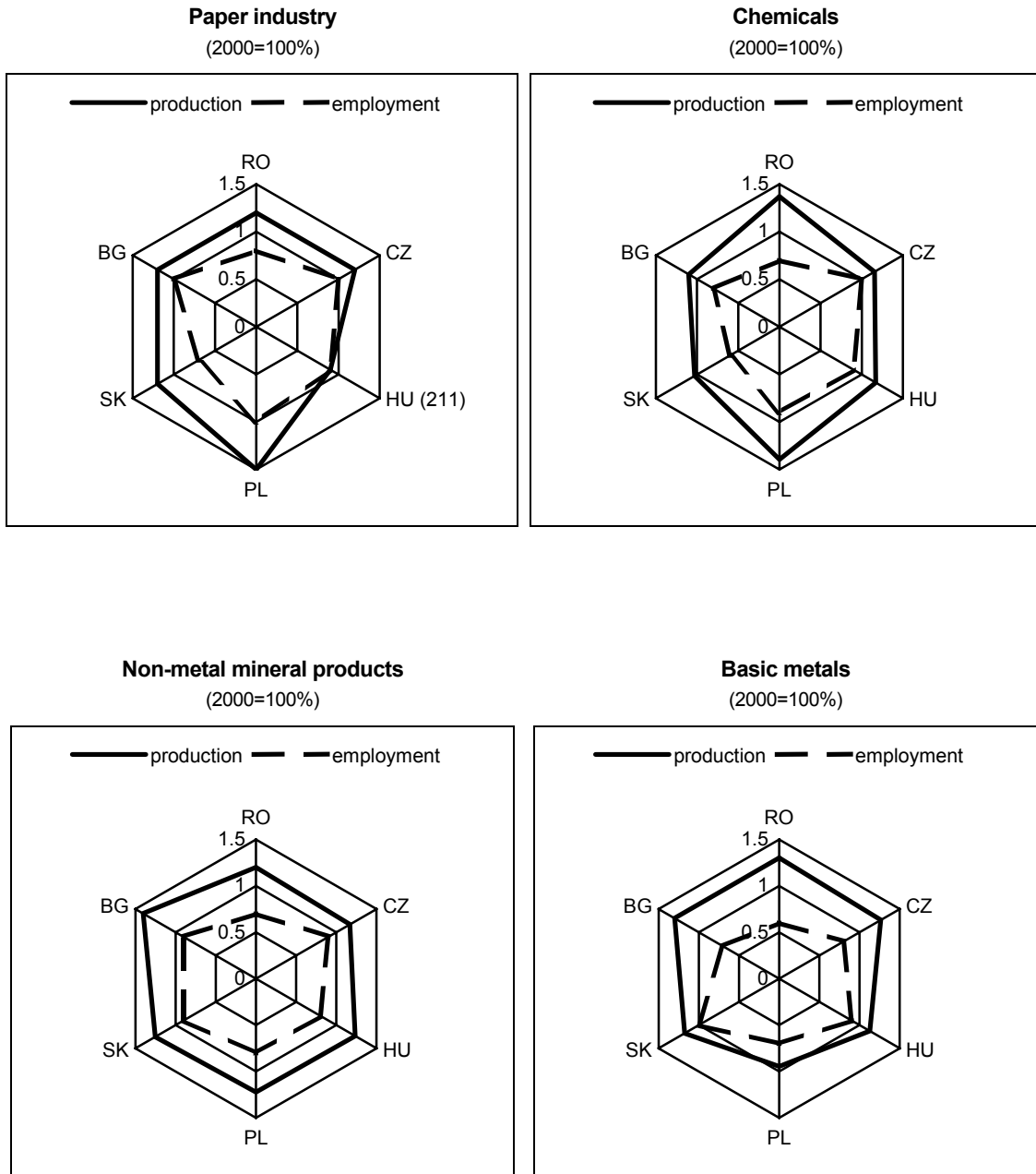
---

<sup>10</sup> Although value added is preferable as a measure for output from an analytical point of view as it measures the increment of value during the production process, there are various reasons for using output values instead. For instance, output data are considered more accurate as they can be derived directly from the business accounts, they fluctuate less over the business cycle and are more readily available at constant prices.

Figure 1.7

**Production, employment and the change of labour productivity  
in energy-intensive branches in Romania, 2005**

2000 = 100



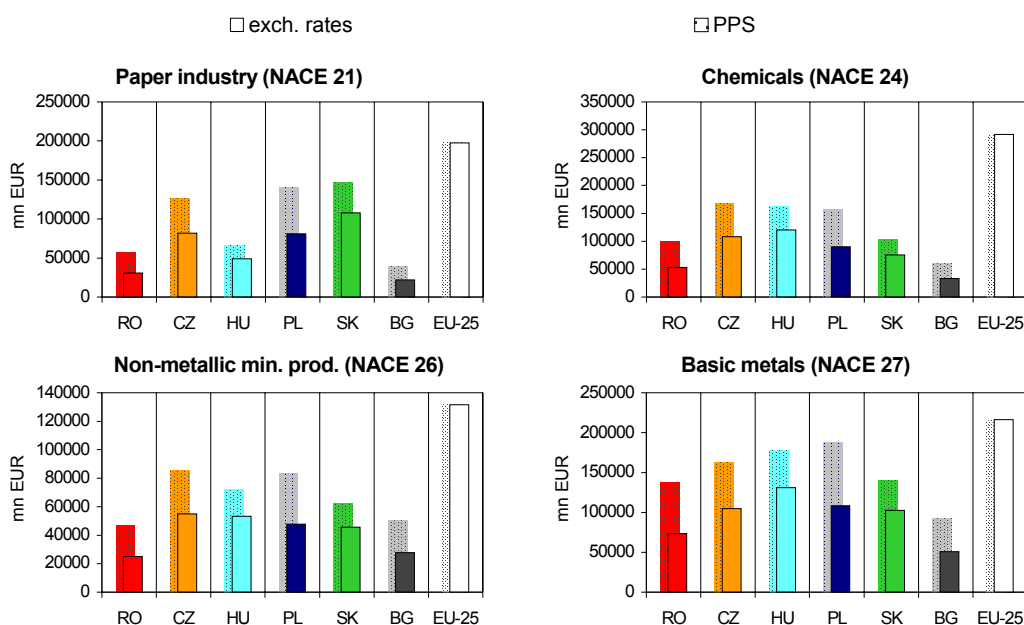
Source: wiiw Industrial Database.

Broadly speaking, productivity levels in the energy-intensive branches in Romania are still much lower than in the other CEECs (except in Bulgaria) and come up to only a small fraction of the EU-25 level. In the basic metals industry, where the productivity level was the highest in Romania in 2005 (EUR 73,290), it reached about 70% of the levels in the Czech Republic, Poland and Slovakia but 34% of the EU-25 average level only. Nevertheless, productivity was 44% higher than in the Bulgarian basic metals industry. However, conversion of output at purchasing power standards narrows the gaps significantly. According to this measure, productivity in the basic metals industry in Romania was nearly the same as that in Slovakia (98%), about 80% of the productivity levels in Hungary and the Czech Republic and 73% of that in Poland; the difference to the EU is reduced to about 60% of the average EU-25 level (see Table A7).

The biggest productivity gaps were observed in the paper industry, with Romania reaching about 40% of the level in the other CEECs and 30% of the EU-25 level only, if measured at PPSCAP<sup>11</sup>. But the level in Romania was still 45% higher than in Bulgaria. In the chemical and in the non-metallic mineral products industry, Romania reached about 60% of the productivity levels in the Czech Republic, Hungary and Poland. Vis-à-vis Slovakia and Bulgaria the difference was significantly smaller. In particular in chemicals the productivity level was nearly the same as in Slovakia and in non-metallic minerals very close to that of Bulgaria.

Figure 1.8

**Productivity levels of energy-intensive industries in Romania and other CEECs, 2004**



Source: wiiw Industrial Database; Eurostat, New Cronos, SBS.

<sup>11</sup> See footnote 9.



Summarizing the results, the rapid rise in labour productivity indicates a process of fast restructuring and modernization under way in all energy-intensive industries in Romania, perhaps comparable to the development in the more advanced CEECs during the second half of the 1990s – but productivity levels still remain significantly below the levels in these economies. Romanian productivity levels are coming close to those in Slovakia only, which started economic restructuring later than the other CEECs, after the fall of the Mečiar regime in 1998. Bulgaria, on the other hand, shows a very fast pace of restructuring, with productivity increases sometimes higher than in Romania, but productivity levels still lagging behind.

### **1.3 Foreign trade: relative position and development**

The energy-intensive industries play a significant role in Romanian exports, together with machine building and electrical equipment (24.4%) and textiles & clothing (22%).

When comparing the export performance of the individual energy-intensive branches across countries, the paper industry in Romania performed generally better than in the other CEECs, and the non-metallic mineral products industry rather worse; chemicals and basic metals ranged in the middle (see Figure 1.9).

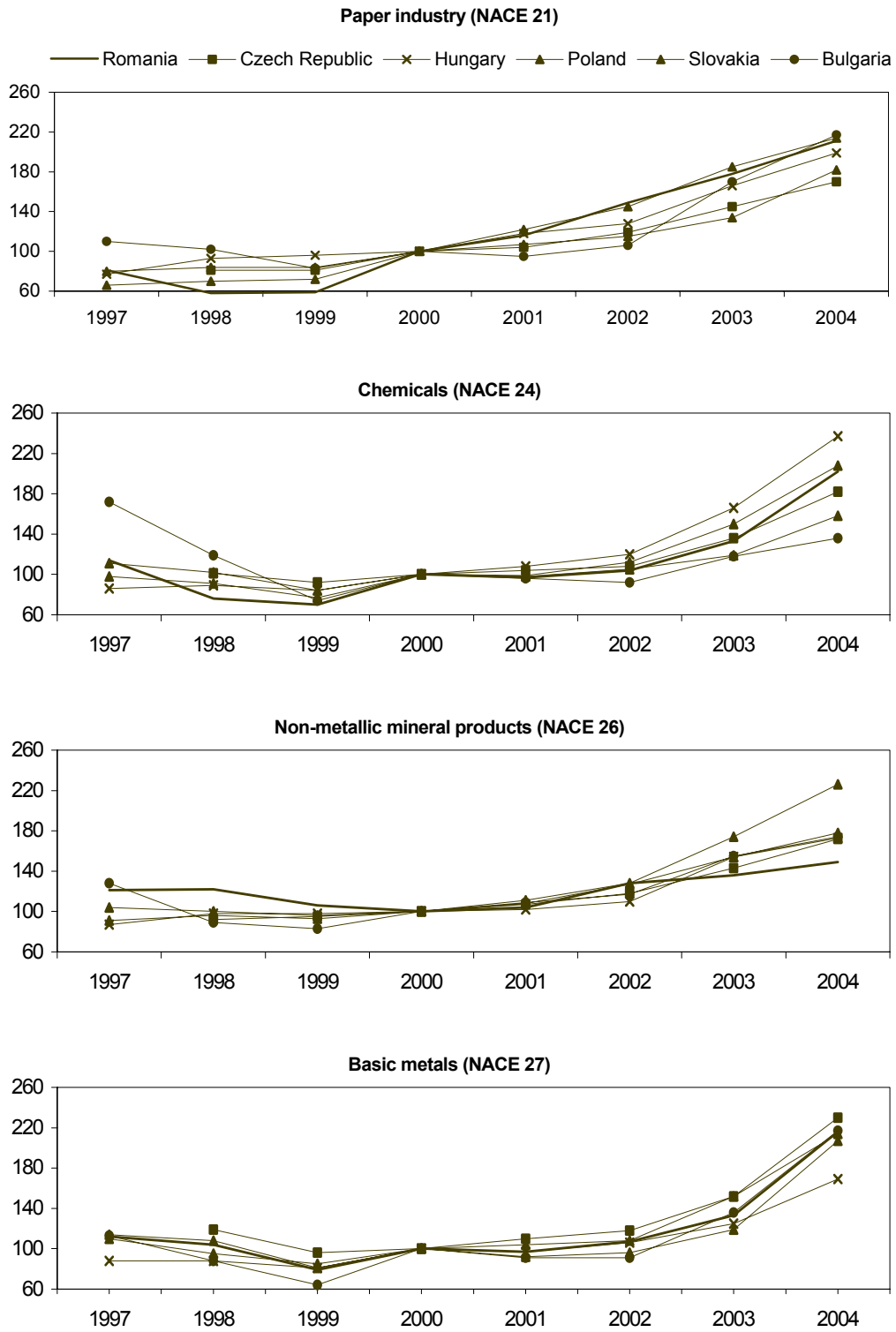
The position of Romania's energy-intensive industries on the world market is generally very weak and smaller than the market share in total manufacturing trade (2004: 0.26%; 2005: 0.62%, see Table 1.5); this is due to labour-intensive products such as clothing, where Romania has a relatively strong position on the world market. Only in the case of basic metals is the world market share of Romania significantly higher, reaching 2.5% in 2004, thanks to massive foreign direct investment and restructuring in the steel industry. In general, market shares in the energy-intensive industries are also much smaller than in the other CEECs, which are more integrated in the world market (except Bulgaria, see Table 1.5). However, Romanian market shares declined in the case of chemicals (similar to the other CEECs) and in non-metallic mineral products (in contrast to the other CEECs).

The EU market plays a prominent role for Romania, with exports to the EU accounting for 80% of total manufacturing exports in 2004, comparable to the CEECs which have become EU members already in 2004. In Bulgaria, the share of EU-25 trade is still significantly smaller. However, in Romania's energy-intensive industries, the EU-25 share in exports is much lower than in total manufacturing – especially in chemicals and basic metals (37% and 43% respectively) and EU-25 shares have also been declining contrary to the overall trend in trade with the EU. The EU also plays a major role as a supplier of energy-intensive products for Romania, in particular of paper & paper products, with its share in total imports reaching 89% in 2004 (see Table A9).

Figure 1.9

**Export indices of energy-intensive industries in Romania and other CEECs, 1997-2004**

2000 = 100



Source: wiiw Industrial Database, Eurostat, SBS.

Table 1.5

**World market shares of energy-intensive industries in Romania and other CEECs, 1997-2004**

	1997	1998	1999	2000	2001	2002	2003	2004	Cumulated growth rate in % 97-04
<b>Paper and paper products (NACE 21)</b>									
Romania	0.06	0.04	0.04	0.06	0.07	0.10	0.10	0.11	80
Bulgaria	0.06	0.05	0.04	0.04	0.04	0.05	0.07	0.08	36
Czech Republic		0.51	0.46	0.50	0.55	0.68	0.73	0.77	49
Hungary	0.25	0.29	0.27	0.25	0.31	0.36	0.41	0.45	79
Poland	0.59	0.61	0.56	0.69	0.89	1.14	1.27	1.32	125
Slovakia	0.39	0.40	0.35	0.38	0.42	0.49	0.50	0.61	57
<b>Chemicals (NACE24)</b>									
Romania	0.15	0.09	0.07	0.09	0.09	0.10	0.10	0.13	-11
Bulgaria	0.18	0.12	0.07	0.08	0.07	0.07	0.08	0.07	-60
Czech Republic		0.38	0.29	0.29	0.29	0.31	0.32	0.36	-7
Hungary	0.28	0.28	0.22	0.24	0.25	0.28	0.32	0.39	40
Poland	0.41	0.37	0.27	0.31	0.29	0.34	0.38	0.44	8
Slovakia	0.22	0.20	0.14	0.15	0.14	0.15	0.14	0.16	-28
<b>Non-metallic mineral products (NACE 26)</b>									
Romania	0.39	0.38	0.29	0.26	0.27	0.34	0.31	0.30	-22
Bulgaria	0.22	0.15	0.12	0.14	0.15	0.17	0.19	0.19	-14
Czech Republic		1.93	1.77	1.74	1.85	2.15	2.24	2.35	22
Hungary	0.52	0.57	0.50	0.48	0.49	0.55	0.66	0.65	25
Poland	1.08	1.12	0.95	0.96	1.06	1.29	1.50	1.70	58
Slovakia	0.56	0.53	0.45	0.44	0.47	0.58	0.60	0.61	8
<b>Basic metals (NACE 27)</b>									
Romania	2.17	1.97	1.32	1.56	1.50	1.75	1.86	2.64	22
Bulgaria	1.48	1.13	0.72	1.06	0.96	1.01	1.29	1.80	22
Czech Republic		2.87	2.06	1.99	2.18	2.47	2.71	3.59	25
Hungary	1.17	1.15	0.93	1.07	1.04	1.19	1.20	1.42	22
Poland	3.99	3.35	2.64	2.91	2.68	2.93	3.11	4.74	19
Slovakia	2.47	2.29	1.52	1.74	1.80	1.98	2.38	2.92	19
<b>Total manufacturing (NACE D)</b>									
Romania	0.16	0.16	0.14	0.15	0.18	0.21	0.23	0.26	58
Bulgaria	0.08	0.06	0.05	0.05	0.06	0.07	0.08	0.08	11
Czech Republic	0.48	0.60	0.48	0.48	0.57	0.64	0.70	0.80	64
Hungary	0.36	0.45	0.43	0.45	0.50	0.55	0.60	0.66	81
Poland	0.47	0.53	0.43	0.47	0.55	0.61	0.69	0.80	72
Slovakia	0.20	0.22	0.17	0.19	0.20	0.23	0.31	0.32	58

Source: UN Comtrade database.

## 1.4 Investment and FDI in energy-intensive industries in Romania

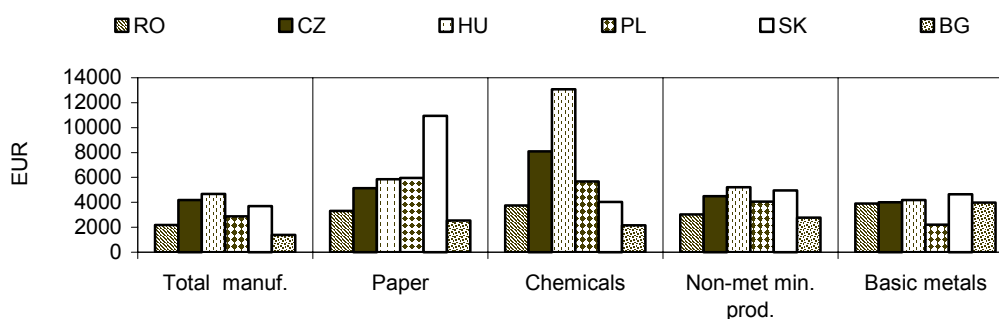
Investment in fixed assets is a necessary precondition for restructuring and modernization in any particular country and industry respectively; this is especially true for capital-intensive industries such as the energy-intensive sector discussed here. Foreign direct investment (FDI) plays a special role in this respect. Apart from providing capital, FDI is considered a very important source of technology and know-how reinforcing the modernization process in the recipient industry. Also, due to their corporate linkages, firms partially or fully foreign-owned usually gain better access to foreign markets.

### 1.4.1 Investment in tangible assets

Table A9 in the Appendix shows the total amounts invested in tangible assets (in EUR million) in the energy-intensive industries in Romania and in five other CEECs, for the period 1995-2004. After 1999, when the general economic crisis in Romania came to an end, investment increased substantially in all industries except the paper industry where annual investment kept fluctuating at around EUR 50 million. In 2004, investment was highest in the *basic metals* industry (EUR 436 million), followed by non-metallic mineral products (EUR 319 million), chemicals (EUR 308 million) and the paper industry (EUR 48 million).

Figure 1.10

#### Average annual investment per employee, in Romania and other CEECs, 1999-2004



Source: Eurostat, Structural Business Statistics (SBS), wiiw Industrial Databases, own calculations.

When comparing Romanian investment to the other CEECs, one has to control for the relative size of the industries in the individual countries first. And, as investment is typically fluctuating heavily from year to year, average values are preferable. Therefore, average annual investment per employee for the period 1999-2004 has been calculated to compare investment activity and thus the modernization drive across countries and industries. The results are presented in Figure 1.10. According to this indicator, investment is still at a significantly lower level in Romania in the manufacturing industry on average and in the paper, chemicals and non-metallic mineral products industry than in the other CEECs. But it is at a relatively high level comparable to the other CEECs in the case of the *basic metals*

industry, even significantly overtaking Poland in this field. The biggest negative gap exists in the paper industry, especially vis-à-vis Slovakia. In chemicals, the gap is also relatively wide, in particular when compared to Hungary and the Czech Republic. Notably, in both branches, *foreign direct investment* is comparatively small, as demonstrated below. However, in all industries with the exception of the basic metals industry, average investment per employee in Romania is higher than in Bulgaria.

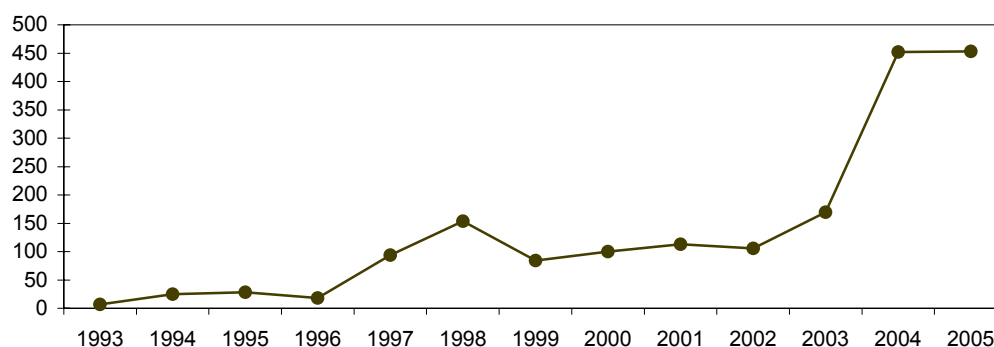
#### 1.4.2 Foreign direct investment

In the 1990s, Romania was still lagging behind the other CEECs as a target of foreign direct investment, due to delayed privatization, a non-transparent legislative framework<sup>12</sup> and an unfavourable business climate (see Table 1.6). But in 2003 and 2004, *FDI flows* accelerated dramatically, as a consequence of some 'big deals' related to the privatization process (e.g. the acquisition of 51% of the Romanian gas and oil corporation Petrom SA by the Austrian company OMV in 2004)<sup>13</sup>, but a significant number of smaller investments as well, and capital inflows sustained their high level in 2005 (see Figure 1.11).

Figure 1.11

#### Foreign direct investment inflows to Romania (measured in EUR)

2000 = 100



Source: wiiw FDI Database.

However, as shown in Table 1.6, at the end of 2005 the *stock of FDI* in Romania was still far below that in Poland, Hungary and the Czech Republic, and in terms of FDI stock per capita and FDI stock per GDP, Romania also ranked behind Slovakia and Bulgaria.

As regards investment in the individual sectors of the economy, the share of manufacturing (NACE D) in total FDI is significantly higher in Romania than in the other CEECs, which is quite typical of the earlier stages of foreign direct investment in transition countries (see

<sup>12</sup> MEC (2005b), p. 20.

<sup>13</sup> See Hunya (2007).

Table 1.7).<sup>14</sup> Within manufacturing, 'basic metals and fabricated metal products' (NACE DJ)<sup>15</sup> is taking a very prominent share (mainly due to large investments, e.g. of the Mittal Steel company), while in other CEECs the electrical industry (NACE DL) and the transport equipment industry (NACE DM), respectively, typically attract more FDI. Only in Slovakia does the metals industry show a similarly high share in manufacturing FDI (28%) as in Romania (see Table 1.7, last column). FDI in the non-metallic mineral products industry is also relatively high. As regards the other energy-intensive branches, FDI in Romania is relatively small in comparison to the other CEECs, but also in relation to production shares. All energy-intensive industries combined account for about 45% of the total inward stock of FDI in Romanian manufacturing, more than in the other CEECs. (The absolute amount of inward FDI stocks in the individual industries at the end of 2004 is presented in Table A11 in the Appendix.)

Table 1.6

**Foreign direct investment inflows to Romania and other CEECs, 1995-2005, in EUR million**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	FDI inward stock EUR mn	Stock per cap. EUR 2005	Stock per GDP EUR 2005
Romania	324	210	1077	1763	964	1147	1294	1212	1946	5183	5197	20130	930	25.4
Czech Rep.	1982	1140	1152	3317	5933	5404	6296	9012	1863	4007	8837	50404	4932	51.2
Hungary	3696	2625	3681	2988	3106	2998	4391	3185	1888	3754	5356	51737	5133	58.9
Poland	2831	3592	4343	5676	6824	10334	6372	4371	4067	10279	6132	70000 <sup>1)</sup>	1835	29.1
Slovakia	209	305	205	629	402	2089	1768	4397	593	1016	1694	13000 <sup>1)</sup>	2414	34.8
Bulgaria	70	137	570	605	866	1103	903	980	1851	2727	1789	8531	1105	39.8

Note: 1) wiiw estimate.

Source: Respective National Banks. Inflows according to balance of payments statistics, stock data according to international investment position.

Information on the degree of *foreign penetration* of the individual industries, measured as the share of output value (sales) of foreign invested enterprises in the output value of all enterprises (FIE + others)<sup>16</sup>, were available until 2002 only, which is before the FDI boom in Romania began. Nevertheless, foreign penetration was relatively high, reaching around 50% for manufacturing on average, comparable to the Czech Republic and Poland at that time, but lower than in Hungary and Slovakia and somewhat higher than in Bulgaria (see Figure 1.12).

<sup>14</sup> Notably, the acquisition of the Romanian oil industry by the Austrian company OMV in 2004 has been registered under 'mining and quarrying' (NACE C) and not under manufacturing. Accordingly, the FDI stock in mining increased from EUR 21 million in 2003 to EUR 1225 million in 2004, raising the share of mining in the total FDI stock from 0.2% to 8.1%.

<sup>15</sup> Internationally comparable data for FDI where available at the level of NACE subsections (DA-DN) only.

<sup>16</sup> This data set (wiiw FIE Database) is the result of a special project at wiiw with support from the statistical offices in the respective countries. For details see Hunya (2004).

Table 1.7

**Inward FDI stock of individual countries in % of total manufacturing industry**

as of December 2004

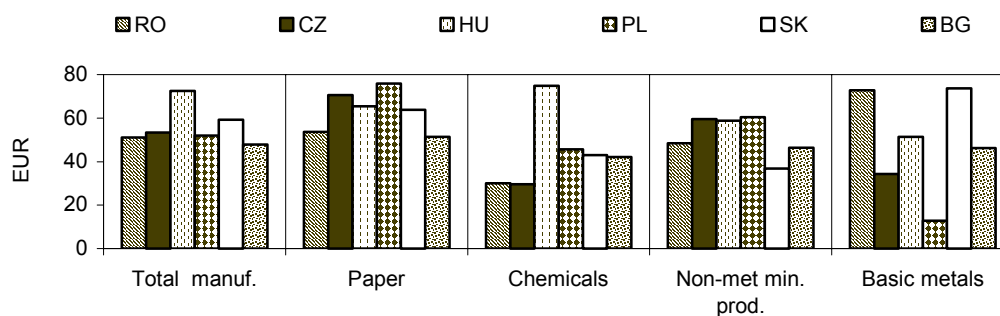
	RO	CZ	HU	PL	SK	BG	Production shares RO
DA Food products, beverages and tobacco	16.1	10.7	11.7	15.9	12.2	.	19.1
DB Textiles and textile products	.	2.2	1.9	1.4	1.0	.	0
DC Leather and leather products	7.3 <sup>1)</sup>	0.0	0.3	.	0.7	.	10.1
DD Wood and wood products	7.4	1.9	1.1	12.0	1.2	.	3.7
DE Pulp, paper & paper products; publishing & printing	2.4	6.3	3.4	.	3.5	.	3.1
DF Coke, refined petroleum products & nuclear fuel	-0.7	1.6	3.3	0.2	15.1	.	11.7
DG Chemicals, prod. & man-made fibres	4.7	6.6	13.0	10.3	7.2	.	7.4
DH Rubber and plastic products	1.7	6.7	3.6	6.2	4.3	.	3.1
DI Other non-metallic mineral products	8.8	9.9	3.8	.	4.3	.	4.3
DJ Basic metals and fabricated metal products	28.8	13.3	6.7	8.5	28.2	.	16.7
DK Machinery and equipment n.e.c.	4.0	6.0	6.3	3.8	7.4	.	4.1
DL Electrical and optical equipment	6.3	14.1	19.9	3.4	6.6	.	4.4
DM Transport equipment	12.5	19.9	24.6	18.8	7.3	.	7.1
DN Manufacturing n.e.c.	.	1.0	0.6	.	1.1	.	5.2
Other not elsewhere classified industries	3.2	.	.	19.5	.	.	
<b>D Manufacturing industry total</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	<b>100.0</b>	.	<b>100.0</b>
Total energy-intensive ind. (DE, DG, DI, DJ), in % of D	44.7	<b>36.1</b>	<b>26.8</b>		<b>43.3</b>		
D Manufacturing industry in % of total FDI inward stock	45.7	40.1	44.2	37.9	39.9	28.1	

Notes: 1) DB and DC together.

Remarks: Romania (RO): equity capital, reinvested earnings, loans.  
 Czech Republic (CZ): equity capital, reinvested earnings, loans.  
 Hungary (HU): equity capital and reinvested earnings.  
 Poland (PL): equity capital, reinvested earnings, loans.  
 Slovakia (SK): equity capital and reinvested earnings.  
 Bulgaria (BG): equity capital, reinvested earnings, loans.

Source: Respective National Banks according to international investment position (IIP).

Figure 1.12

**Foreign penetration (sales) of energy-intensive industries in Romania and other CEECs, 2001/2002**

Source: wiiw FIE Database.

Among the energy-intensive industries, foreign penetration was lowest in the chemical industry, but compared to the other CEECs it was also relatively low in the paper industry. On the other hand, foreign penetration was very high in basic metals, reaching 73%, matched only by Slovakia. Existing information on foreign investment after 2002 gives no indication of a significant change in this pattern, perhaps with the exception of chemicals, where the penetration may have increased.

## **1.5 Summary and conclusions**

Despite an over-proportionate decline during transition, the energy-intensive industries still play a prominent role as a producer and as an employer in the Romanian economy and occupy a larger share in total manufacturing production than in the other CEECs. But similar to the other CEECs, the growth of the energy-intensive sector is below the manufacturing average over the period 2000-2005. Production is focused on the low end of the production chain, with value added having a relatively small share compared to the final production value. Labour productivity is relatively low, only a small fraction of the EU-25, and is also significantly below the levels in the other CEECs – but it varies strongly across industries. However, over the period 2000-2005, productivity has been rising very fast and faster than in the other CEECs, pointing to a rapid process of restructuring and modernization, comparable to that of the more advanced CEECs in the 1990s.

Investment in energy-intensive industries increased substantially after 1999, when the second transformational crisis in Romania came to an end; nevertheless, for the period 1999-2004, average annual investment per employee is still lower than in the Romanian manufacturing industry on average and also lower than in the other CEECs, with the important exception of the basic metals industry. With regard to foreign direct investment, Romania used to lag behind the other CEECs, due to delayed privatization and an unfavourable business climate, but in 2003 and 2004 FDI flows accelerated dramatically. A very prominent FDI target are the metals industry and the non-metallic mineral products industry. The position of energy-intensive industries on the world market is rather weak and smaller than Romania's share in total manufacturing trade. Only in the case of basic metals is the world market share of Romania significantly higher, thanks to massive FDI and restructuring in the steel industry.

## **2 Detailed analysis of energy-intensive sub-branches in Romania**

This part of the report analyses in more detail the most energy-intensive manufacturing sub-branches in Romania. These are defined according to the NACE classification at the three-digit level:<sup>17</sup>

---

<sup>17</sup> See section 1.1 for the selection criteria used.



NACE 211	Pulp and paper
NACE 241	Basic chemicals
NACE 261	Glass and glass products
NACE 262	Ceramic products (e.g. sanitary ceramics, insulators etc.)
NACE 265	Cement, lime and plaster
NACE 271 to 273	Iron and steel industry
NACE 274	Non-ferrous metals (mainly aluminium)

The sub-branches analysed differ with respect to the technology and the processes involved, the input markets, the end-customers of the products, the concentration of market power, the ownership structure and the number and size of companies. In some sub-branches small firms, highly specialized (with less than 20 employees) coexist side by side with large firms (over 1000 employees). While for the majority of the branches under study, the end product is input for another sector such as construction, the electrical industry, the car industry, etc., there are other branches whose output is destined for the consumption of households and firms, for example parts of the paper industry, the glass and the ceramics industries. In most of the sub-branches, companies operate in highly competitive environments. Other industries such as the cement industry, iron and steel and the aluminium industry, however, are characterized by oligopolistic structures. In some companies the restructuring process is under way or nearly finished, the technology is up-to-date or is currently in the process of modernization, and there is some concern for environment-friendly, ecological technologies. Other companies are not that well prepared for the accession to the EU. In some cases, companies are certified for using control systems, generally ISO 9001/9002, and some even have environment certifications as well (ISO 149001).

The most important characteristic shared by the companies in all branches is the high energy consumption with respect to electricity, natural gas, coal and/or crude oil consumption. This makes them vulnerable to energy prices and their fluctuations. Since energy prices have not yet been fully liberalized – although they should be so before or immediately after joining the EU in 2007 – and some companies are still receiving energy at below-market prices, the respective branches are expected to suffer in particular, given their increasingly high exposure to this input.<sup>18</sup> In addition, the recent appreciation of the Romanian currency had a negative impact on the companies' exports and made competitive imports relatively cheaper, eroding profit margins severely. Therefore the prospects are not very bright for companies that have not modernized their technologies and are not prepared for competition in an increasingly open market.

---

<sup>18</sup> The increase in the share of energy inputs in total output (nominal value terms) as a consequence of higher energy prices has been manifest already since 2003 in branches such as metallurgy (from 25% in 2002 to 27% in 2003) and construction materials (ceramics, cement, etc.). On the other hand, efforts to reduce energy intensity compensated for the price increases, thus showing up in a decreasing trend of this indicator in sectors such as the glass industry, pulp and paper, or basic chemicals (where, in 2003, the share remained constant in comparable prices, as compared to 2002).

In section 2.1 we analyse the relative importance of the individual sub-branches, the evolution of value added, unit labour costs and their trade performance.

In section 2.2 we draw on expert interviews and firm-level information to assess the current development and prospects of individual branches. For the basic chemicals industry, showing the highest dependence on energy sources of all sub-branches and being the second biggest sub-branch selected, a special questionnaire was designed for this purpose.

## **2.1 Key indicators and performance characteristics of individual energy-intensive sub-branches**

At the sub-branch level, no up-to-date information on production and employment is supplied by the *industrial statistics* of Romania. Alternative sources of information available are: input-output tables, Eurostat, and foreign trade statistics. These can be supplemented by qualitative information from industry experts and firm-level data.

*Input-output* tables exist on an annual basis in Romania and provide information at a detailed level of industries; but, unfortunately, they are available with a significant delay only; the last year currently available is 2003. Given the fact that the Romanian economy is engaged in a very rapid process of restructuring, many relevant developments especially with regard to the energy-intensive industries took place after 2003: for example, the strong rise in electricity prices, the increase in wood prices (relevant for the paper industry) and the significant appreciation of the Romanian currency. Also foreign direct investment began to accelerate in 2003 only, and the effects of privatization, which started on a large scale after the year 2000, take time to become effective. However, some useful information on the structural characteristics of the energy-intensive sector in Romania, such as the relative size of individual sub-branches, the share of VAD in output and the market orientation (domestic or foreign) of individual branches are not changing rapidly and will be presented below.

*Eurostat* (Structural Business Statistics, SBS) provides information on important business indicators at the 3-digit NACE level of industries for all EU member countries and the candidate countries as well, but again with a certain delay. Currently, the last year available is 2003 (preliminary: 2004). As the input-output tables of Romania do not present the number of employees, the only source available is Eurostat.

*Foreign trade statistics*: there is very detailed and up-to-date information on foreign trade available from the Romanian customs statistics, which allows for a thorough analysis of exports and imports at the level of individual sub-branches.

Furthermore, we may draw on expert interviews and firm-level information to assess the current development and prospects of individual branches. The comprehensive results for each individual sub-sector are presented in section 2.2 of this study.

### 2.1.1 Relative size of individual energy-intensive sub-branches

Measured by output, the largest sub-branch is the iron & steel industry (NACE 271-273), which contributed almost 6% to total manufacturing output in 2003, followed by basic chemicals (NACE 241), the output of which fluctuates around 4% of manufacturing. Glass and glass products (NACE 261) and ceramic products (NACE 262) are relatively small, covering less than 1% of total manufacturing production. However, measured at gross value added, the glass industry ranks significantly higher, before non-ferrous metals, the cement and the ceramic products industries.

Table 2.1

**Size indicators of energy-intensive sub-branches in Romania, 2003**

<b>NACE group</b>	<b>Name of sub-branch</b>	<b>Share of output in total manufacturing (2003) in %<sup>1)</sup></b>	<b>Share of gross value added in total manufacturing (2003) in %<sup>1)</sup></b>
211	Pulp and paper	1.56	1.81
241	Basic chemicals	3.80	1.85
261	Glass and glass products	0.69	0.89
262	Ceramic products	0.78	0.76
265	Cement, lime and plaster	1.06	0.13
271-273	Iron and steel industry	5.53	2.28
274	Non ferrous metals	1.91	0.86

*Note:* 1) The special classification used by the Romanian statistical agency for its input-output accounting (made up of 105 industries) imposes a grouping of NACE 211 (Manufacture of pulp, paper and paperboard) with NACE 212 (Manufacture of articles of paper and paperboard).

*Source:* Romanian input-output tables 2003.

#### *Low GVAD, declining relative to output*

Gross value added (GVAD) is considered a better measure than output for the contribution of an industry to the production effort of an economy, as it reflects the new value created during the production process.<sup>19</sup> As illustrated by Table 2.1, GVAD shares for the most energy-intensive branches (with the exception of the paper and the glass industries) are lower than the respective output shares, indicating a below-average share of VAD in output in these industries. And, as demonstrated at the level of 2-digit NACE industries, this gap is much larger in Romania than in the other CEECs (see Table 1.4). It is further important to observe that the gap has emerged and widened, respectively, during the economic upswing in 2000-2003, with GVAD growing more slowly than output (both measured at constant prices) in all energy-intensive sub branches (except paper), as illustrated in Figures 2.1 and 2.2.

A relatively small value added means that Romanian producers of energy-intensive products are typically operating in the lower ranges of the VAD chain and that (gross) profits are typically slim and funds available for investment are very limited. Also, these

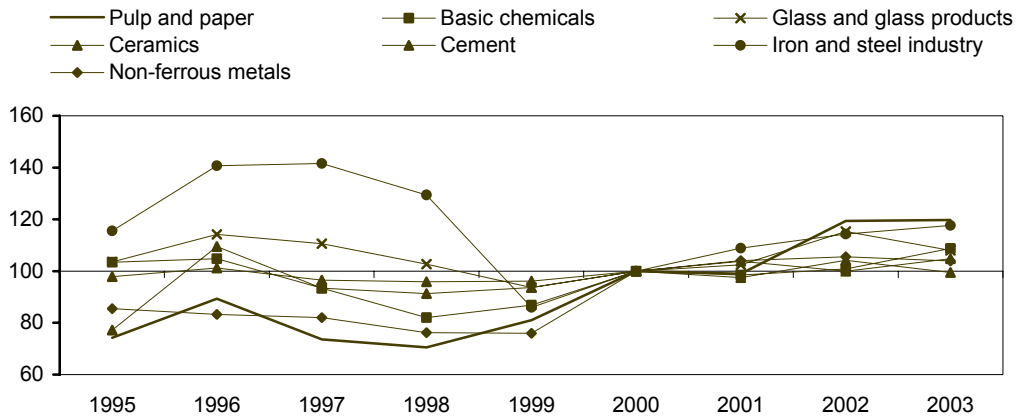
<sup>19</sup> Gross value added is defined as output – intermediate consumption. It comprises the compensation of employees ('wage bill'), taxes minus subsidies and the gross operating surplus (compensation for capital consumption and profits).

branches are highly vulnerable with respect to increases in input costs and wages, especially when output prices are fixed at global levels, such as for standard products of the steel and non-ferrous metals industry and for many basic chemicals as well. Given the fact that domestic input prices and wages are on the rise and currency appreciation is putting substantial pressure on prices in local currency, moving up the value added chain and looking for niche products will be the only viable solution for these branches in the future.

Figure 2.1

**Development of production (at constant prices) of energy-intensive sub-branches in Romania, 1995-2003**

2000 = 100

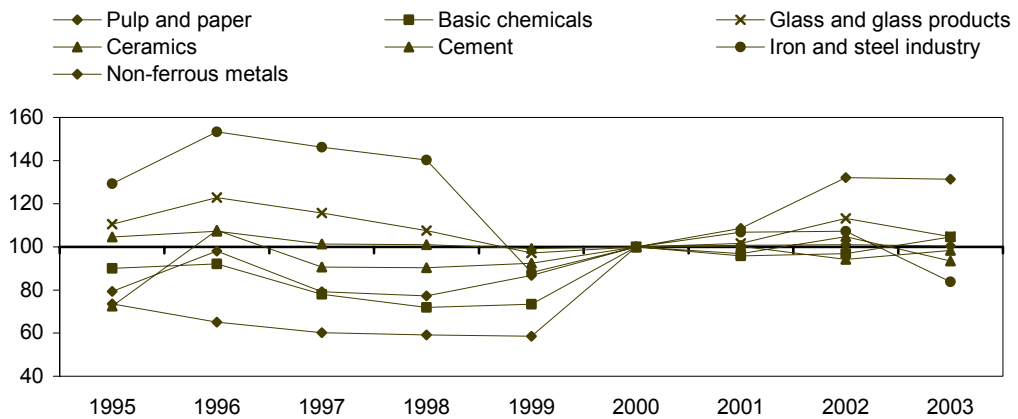


Source: Input-output tables for Romania, 1995-2003, INSSE.

Figure 2.2

**Development of gross value added (at constant prices) of energy-intensive sub-branches in Romania, 1995-2003**

2000 = 100



Source: Input-output tables for Romania, 1995-2003, INSSE.

### 2.1.2 Unit labour costs rising strongly

Unit labour costs (ULCs) are defined as the compensation of employees per unit of output or value added. Table 2.2 presents the ULCs calculated as the compensation of employees ('wage bill') divided by GVAD (at current prices in local currency). It shows that between 2000 and 2003 the wage bill rose much faster than GVAD and, accordingly,

Table 2.2

#### Unit labour costs in the energy-intensive sub-branches in Romania, 1995-2003

	1995	1996	1997	1998	1999	2000	2001	2002	2003	% cum. 2000-03
Pulp and paper	0.37	0.33	0.36	0.39	0.32	<b>0.33</b>	0.32	0.24	0.28	<b>-14.9</b>
Basic chemicals	0.70	0.69	0.79	0.90	1.06	<b>0.82</b>	0.94	0.95	0.91	<b>11.6</b>
Glass and glass products	0.60	0.58	0.38	0.54	0.52	<b>0.61</b>	0.64	0.62	0.73	<b>19.4</b>
Ceramics	0.79	0.73	0.62	0.67	0.60	<b>0.60</b>	0.75	0.81	0.73	<b>23.2</b>
Cement	0.31	0.32	0.33	0.39	0.41	<b>0.48</b>	0.52	0.44	0.58	<b>20.9</b>
Iron and steel industry	0.54	0.55	0.44	0.60	0.86	<b>0.66</b>	0.84	0.86	0.95	<b>44.2</b>
Non-ferrous metals	0.48	0.59	0.51	0.82	0.91	<b>0.77</b>	0.74	0.77	0.77	<b>0.1</b>
EIS	0.54	0.55	0.49	0.61	0.68	<b>0.62</b>	0.71	0.67	0.72	<b>15.1</b>
Manufacturing	0.40	0.38	0.34	0.46	0.50	<b>0.51</b>	0.54	0.50	0.51	<b>-0.3</b>

Source: Input-output tables for Romania, 1995-2003, INSSE.

the share of labour costs in GVAD and thus ULCs increased dramatically in many energy-intensive branches, such as iron & steel, glass, ceramics and cement, while in manufacturing on average ULCs remained more or less constant over the same period. In the basic chemicals and the steel industries, for instance, the wage bill reached more than 90% of GVAD in 2003, up from already high levels in 2000 (80%), despite a severe reduction of employment levels (see Table A11 in the Appendix<sup>20</sup>). This points to a serious erosion of profits in these sub-branches in Romania and brings up the question of how these branches can raise the funds for restructuring and modernization to escape the trap. Only the paper industry did show a reduction of ULCs, and in the non-ferrous metals industry ULCs stayed more or less in line with total manufacturing.

### 2.1.3 Domestic market versus export orientation

Table 2.3 presents the development of exports as a percentage of output in the energy-intensive branches using the information from the input-output tables. Some of the energy-intensive sub-branches are more export-oriented than the Romanian manufacturing industry on average, some are less. In the iron & steel industry, the export share was 76%, and it reached more than 50% in basic chemicals and non-ferrous metals in 2003. Export orientation is particularly low in the cement industry, but also quite low in the paper industry. Cement, and more generally construction materials (including parts of the ceramic

<sup>20</sup> As employment data do not seem compatible with output and value added data respectively, no labour productivity could be calculated.

industry) are commodities that are not well suited for exports as transport costs make products too expensive in comparison to domestic supply. The paper industry here includes paper products, which usually have a smaller transport radius than pulp. Notably, with the exception of basic chemicals and cement, export shares have increased over time and the energy-intensive industries in Romania have thus become more open and dependent on foreign markets.

Table 2.3

**Exports as a share of output in energy-intensive sub-branches in Romania, 1995-2003, in %**

	1995	1996	1997	1998	1999	2000	2001	2002	2003
<b>Pulp and paper</b>	22	13	21	13	15	20	25	24	25
<b>Basic chemicals</b>	61	55	50	39	48	58	56	52	54
<b>Glass and glass products</b>	48	41	36	37	48	51	48	48	50
<b>Ceramics</b>	25	19	23	23	29	29	30	34	34
<b>Cement</b>	28	26	33	25	19	15	13	11	9
<b>Iron and steel industry</b>	53	36	48	53	73	77	64	72	76
<b>Non-ferrous metals</b>	<b>27</b>	<b>28</b>	<b>38</b>	<b>44</b>	<b>45</b>	<b>46</b>	41	54	53
<b>EIS</b>	47	37	43	42	50	54	49	52	54
<b>Manufacturing</b>	<b>26</b>	<b>24</b>	<b>28</b>	<b>28</b>	<b>36</b>	<b>42</b>	<b>42</b>	<b>47</b>	<b>48</b>

Source: Input-output tables for Romania, 1995-2003, INSSE.

#### 2.1.4 Foreign trade development in individual sub-branches

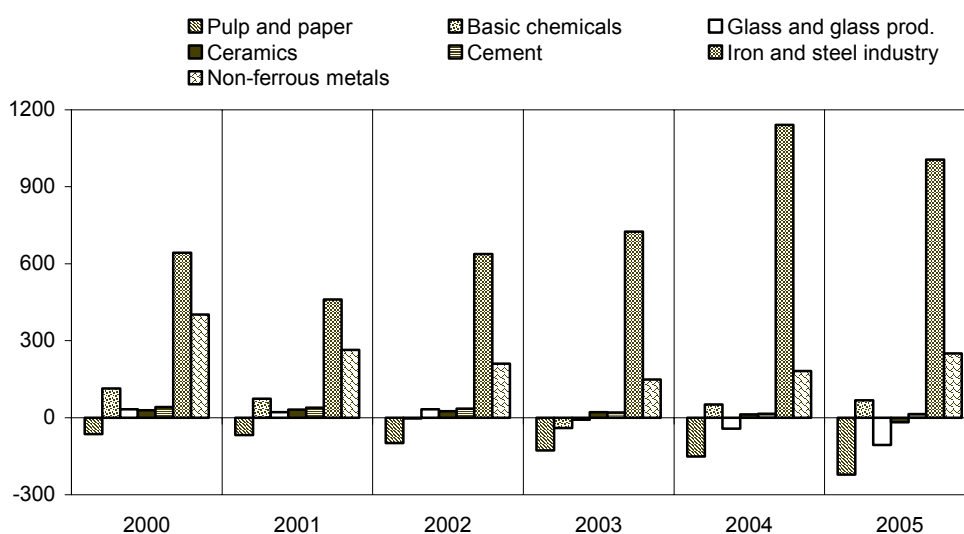
Together the energy-intensive branches took a substantial share of 20% in total manufacturing exports in 2005. The lion's share of exports comes from the iron & steel industry (10%), followed by basic chemicals (5%) and non-ferrous metals (2.8%); the other industries are playing a minor role. Furthermore, the iron & steel industry was the only sub-branch whose exports developed more dynamically than manufacturing exports, which is also reflected in growing shares on the world market (see Tables 1.5 and A12). A certain deceleration of export growth in 2004 and 2005 respectively (e.g. pulp and paper) may be the combined effect of rising costs, especially energy prices, and a significant appreciation of the Romanian currency.

Imports were significantly smaller and reached a share of 10% in total manufacturing imports of Romania. The major import categories were the same as in exports, namely iron & steel, chemicals and non-ferrous metals. Over the period 2000-2005, imports of steel, glass and ceramics increased relatively fast, pointing to a stronger domestic market penetration than in the case of the other sub-branches such as paper, basic chemicals and non-ferrous metals. Notably, imports may also contain inputs for the respective industries, classified under the same product group (e.g. components for basic chemicals or steel alloys).

The *sectoral trade balances* are positive for most energy-intensive products, in contrast to the large overall trade deficit of Romania. Especially for iron and steel products the trade balance is highly positive and improving. Exports exceed imports also in the case of non-ferrous metals, basic chemicals and cement, although less pronouncedly so and to a falling degree over the period 2000-2005. In ceramics there was a trade surplus until 2004 and in glass & glass products until 2002 only, pointing to a deterioration of international competitiveness in these sub-branches (see Figure 2.3). Export values, import values and trade balances for the individual sub-branches in 2000-2005 are presented in Appendix Table A12.

Figure 2.3

**Trade balances of energy-intensive products in Romania, 2000-2005, in EUR million**



Source: UN Comtrade database – see Table A12.

The overall trade surplus of the energy-intensive branches has been rather stable over the past years and makes an important contribution to compensating for the exploding trade deficit generated in other sectors of the economy. In 2005, the combined trade surplus of the energy-intensive branches reached about EUR 1000 million, which is equivalent to 17% of the Romanian trade deficit in manufactured goods (EUR 5859 million).

Regarding its *main trading partners*, Romania in general shows a split between the EU-25 on the one hand and the larger Southeast European region on the other. Given the fact that energy-intensive products often involve high transport costs, we may expect their export radius to be typically smaller than for trade in general, which is largely confirmed by Tables 2.4 and 2.5, showing the main target countries and the major sources, respectively, for energy-intensive imports of Romania in the year 2004. Germany is probably an exception to this rule: together with Italy it is the most prominent exporter to as well as importer of energy-intensive products from Romania. Outside the EU, Turkey is the most

prominent export market for Romanian pulp and paper, basic chemicals and iron & steel. As regards imports, Turkey is also an important supplier of energy-intensive products along with Russia (iron & steel, non-ferrous metals) and Ukraine (iron & steel, basic chemicals).

Table 2.4

**Main markets for Romanian exports of energy-intensive products, 2004**

<b>Pulp and paper</b>		<b>Basic chemicals</b>		<b>Glass and glass products</b>		<b>Ceramics</b>	
Turkey	17.4	Turkey	32.5	Germany	19.3	Germany	19.6
France	13.7	Italy	9.8	United States	12.8	France	17.3
Italy	11.5	United States	4.6	Italy	11.7	Hungary	12.1
Germany	9.5	Hungary	4.2	Moldova	6.4	Italy	10.2
Yugoslavia	5.9	Bulgaria	3.9	France	6.3	United Kingdom	7.0
Greece	3.2	Yugoslavia	3.8	Netherlands	5.6	Greece	5.0
Egypt, Arab Rep.	3.1	Germany	3.7	Bulgaria	5.0	Netherlands	5.0
<b>Cement</b>		<b>Iron and steel industry</b>		<b>Non-ferrous metals</b>		<b>EIS</b>	
Nigeria	41.2	Turkey	29.1	Italy	29.4	Italy	23.1
Cameroon	15.3	Italy	11.4	Greece	12.4	Germany	16.7
Yugoslavia	9.5	United States	10.1	Germany	6.0	France	9.6
Cote d'Ivoire	8.0	Germany	8.9	Hungary	5.7	United Kingdom	7.5
Spain	6.0	Egypt, Arab Rep.	4.4	Russian Federation	5.6	Turkey	5.0
Guinea	4.9	United Kingdom	3.2	Poland	5.6	Hungary	4.1
Hungary	4.5	United Arab Emirates	2.5	Turkey	4.2	Netherlands	3.6

Source: United Nations database.

Table 2.5

**Main countries of origin for Romanian imports of energy-intensive products, 2004**

<b>Pulp and paper</b>		<b>Basic chemicals</b>		<b>Glass and glass products</b>		<b>Ceramics</b>	
Germany	17.8	Germany	14.2	Czech R.	11.9	Germany	18.9
Italy	12.5	Italy	10.6	Poland	11.8	China	18.6
Austria	9.7	France	7.8	Turkey	9.9	Austria	9.3
Finland	8.1	Ukraine	6.7	Hungary	9.8	Italy	9.0
Hungary	6.3	Hungary	5.9	Germany	9.7	Czech R.	8.6
<b>Cement</b>		<b>Iron and steel industry</b>		<b>Non-ferrous metals</b>		<b>All energy int. branches</b>	
Ukraine	50.3	Italy	16.3	Greece	16.0	Italy	17.4
Moldova	11.1	Ukraine	15.4	Italy	15.0	Germany	15.1
Austria	8.9	Russia	7.5	Germany	13.5	France	7.2
Germany	7.7	Germany	7.0	Russia	8.3	Russia	6.9
Turkey	5.9	Poland	6.2	Turkey	5.5	Turkey	4.2

Source: United Nations Comtrade database.



## **2.2 Major characteristics of individual energy-intensive industries in Romania**

### **2.2.1 Pulp and paper**

The Romanian pulp and paper industry (NACE 211) performed very well until 2003, but has been facing certain problems recently. Most companies are private, but in general privatization took place only a short while ago. The inputs of this branch are wood waste (almost 60% of inputs are in this form), small pieces of wood and scrap paper (40%). These inputs are mostly domestic, since Romania is quite rich in this natural resource, and therefore has an advantage in this area.

The pulp and paper industry is very inhomogeneous, in the sense that its output can be used either for final consumption of households and firms, or as inputs for the industry or other sectors. Some examples of products are packing paper, writing paper and printing paper used for newspapers, books, etc. Important producers of packing and writing paper are, e.g., SOMES SA, AMBRO SA or CELOHART SA. Another important product of this industry is pulp: it represents the raw material for the production of paper and board, artificial fibres, pulp ethers and esters used for lacers, films, explosives, etc. At present around 93% of the world production of pulp is used in paper production. Romania has the only producer (SOMES SA, Cluj) of long fibre pulp in the Southeast of Europe. In addition to the already mentioned products, which are mainly inputs, other important products are tissues, kitchen towels, napkins, toilet paper and handkerchiefs. Companies specialized in the above type of products are COMCEH SA, PEHART TEC SA and CAMI HART.

All large companies from this industry have been privatized, but in some cases the modernization of the companies has started only quite recently. COMCEH SA Calarasi, bought by an Italian company around 2000, was modernized and started exporting in 2005; CELOHART SA from Brasov was acquired in 2001 by a Romanian investor, SC Ecopack SA Ghimbav. SOMES SA became a member of the Romanian group SCR (Servicii Comerciale Romane) from 2004. SC AMBRO SA from Suceava was privatized in 1996, when the French group Rossmann bought 56% of the stocks, but through repeated capital increases they became the sole stakeholders. Thus, the ownership structure of this sector is mixed, but private, with some companies in domestic hands and others in foreign hands.

Within this industry there is an increasing interest for environment-friendly technologies. Some companies (SOMES SA) have implemented both quality and environment systems, and others such as ECO PAPER are using only waste as inputs and are thus producing 100% recycled paper.

In recent years, the industry has been severely hit as the price of wood went up by 85% during 2004. At the end of 2005 an additional environment tax was introduced on any transaction involving wood or wood produces. This increase comes on top of the utility

price increases (in particular electricity), and the appreciation of the currency, which severely affected the exports of this branch in 2005. As a result many large companies from the pulp and paper sector reported high losses in the first half of 2006.

Table 2.6

**Employment and financial indicators for selected companies  
in the pulp and paper industry in 2004**

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
SOMES SA	1,090	149.0	36.7	2.5	0.63
AMBRO SA	1,035	220.0	54.3	2.9	0.72
CELRPOM	904	91.3	22.5	0.1	0.02
CELOHART DONARIS	866	73.5	18.1	3.6	0.90
LETEA	835	92.8	22.9	-4.0	-0.98
COMCEH SA	427	73.5	18.1	-12.8	-3.17
ECOPAPER	244	71.1	17.6	8.2	2.03
ECOPACK	218	49.4	12.2	2.2	0.55

Source: Data from the National Registry of Commerce, 2004.

The large majority of the firms operating in the pulp and paper sector are complying with EU environmental norms and regulations, after having taken the necessary measures and making the required investments in recent years. However, the National Guard for Environment (National Authority for Environment Protection) reports delays in implementing the environment protection measures associated with the privatization process in the case of loss-making LETEA Bacau. The required investment (aimed at reducing the soil pollution), which was supposed to be financed starting 2002-2003, was delayed and switched to a more efficient technological solution only in 2006.

### 2.2.2 Basic chemical products

The basic chemicals sector (NACE 241) has a long tradition in Romania, but its potential to develop in the future is under serious risk. It still accounts for an important proportion of total manufacturing, but this share decreased steadily during the transition, due to growth rates below average. Most of the companies are private, but major players registered in the sector are still state-owned or in the process of privatization (Oltchim SA, Uzinele Sodice Govora, Nitramonia group of companies).

The sector is heterogeneous in terms of products and performance. Under NACE classification 241 enters, for example, the Romanian Authority (Regie Autonoma) for Nuclear Activities, the largest producer of heavy water, deuterium depleted water and high grade heavy water in Europe. Generally, companies registered in this sector have often a

mix of output, products and services belonging to general chemical products, not only basics, such as fertilizers, rubber and plastics, as well as research in the field of chemicals.

Table 2.7 presents the situation of some important companies from this sector, in the year 2004, considering only those companies that produce traditional basic chemical products.

Table 2.7

**Employment and financial indicators for selected companies  
in the basic chemicals industry in 2004**

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
OLTCHIM SA	6048	1,374	339	83.6	20.7
AZOMURES SA	3030	651.2	161.4	35.3	8.8
AMONIL SA	1018	261.5	64.8	1	0.3
SOFERT SA	624	102.7	25.5	-22.9	-5.7
CHIMCOMPLEX SA	1001	118.3	29.3	11.3	2.8
LINDE GAZ ROMANIA	237	180.9	44.8	51.3	12.7
NITRAMONIA SA	547	28.6	7.1	-6.2	-1.6
PUROLITE SRL	228	71.7	17.8	11.3	2.8
VIROMET SA	1371	87.7	21.7	0.8	0.2
DONAU CHEM Srl	843	8.7	2.2	0.02	0.01
CARBID FOX SA	643	100.4	24.9	-2.6	-0.7
GHCL UPSOM ROMANIA SA	881	102.7	25.5	1.6	0.4

Source: Data from the National Registry of Commerce, 2004.

Given the fact that basic chemicals represent the sub-sector with the highest energy intensity in Romania, we analysed this sector in more detail, by collecting also answers to questionnaires that we sent to selected large companies operating in Romania. The questionnaire contains questions addressing mainly qualitative issues (see Appendix 2).

The sector is not very concentrated and the competitive pressure is not perceived as a major constraint, due mainly to the diversity of products that are delivered to the domestic and external markets and the relatively large number of equally-sized players. Over the period 1998-2002<sup>21</sup>, the degree of concentration remained almost constant in the NACE sector 24, comparable to that measured for NACE sectors 22, 25 and 26 (using several indices, such as the Herfindhal index or the share of the top 3 or 5 companies in the total of the sector). The number of companies has not changed too much recently either. In 2004, there were 284 firms registered and functional under NACE 241 classification. Companies with more than 250 employees account for less than 10% of this number; however, the general perception of respondents is that they are more numerous. The same applies to

<sup>21</sup> Study on competitive pressures in Hungary, Romania, Bulgaria and Slovenia, COMPPRESS project under the 5<sup>th</sup> Framework programme, see [www.econ.core.hu](http://www.econ.core.hu) for details.

medium-sized companies (between 20 and 250 employees), whose share in the total number is estimated at about 60-70%.

From 2005, in an attempt to strengthen their market positions prior to Romania's accession to the EU, one could observe a process of concentration of companies through simple acquisitions or acquisitions by existing groups (holdings), involving Romanian, EU and non-EU owners; the best examples are the Interagro Group (Romanian-British joint venture) and the Indian-based GHCL group. The latter acquired, in late 2005, Upsom Ocna Mures (main producer of soda ash) and was one of the bidders for the main share in Uzinele Sodice Govora (also a soda producer). As for the Interagro Group, it succeeded in gathering under its main-shareholder ownership the following companies: Sofert SA, Azochim SA, Donau Chem Srl and Viromet SA. A decision of the Competition Council stated that the latest partial acquisition of Turnu SA (now Donau Chem) by Viromet SA, although seen as a concentration and consolidation of Interagro's position on the Romanian market, does not create a dominant position, nor impede competition.<sup>22</sup>

The main products of the sub-sector are inorganic products (soda, chlorines, hydrochloric acid, peroxide, etc.), macromolecular products (polyvinyl chloride, polyetherspolyols), synthesis organic products, agrochemicals and fertilizers, ammonium, carbide, etc. Large producers such as Oltchim or Azomures cover many of these groups of products, while other companies try to reach a high market share in specific market niches (Linde Gaz, Upsom).

Most of the companies perceive that the average technological level in the sector has progressed at a medium pace lately. The average age of plants is 20-30 years (the majority was built in the late 1970s and at the beginning of the 1980s), but there was investment in smaller modern capacities, increasingly after 2002. In the case of the biggest loss-maker, Nitramonia (five plants forming the group), undergoing privatization, the average age is 40 years, and there is little hope for any modernization. The perception is that there was sufficient-to-low investment granted in the sector lately, with a very large range in the degree of importance assigned to foreign investment. Intentions for future investment are however optimistic, particularly in the case of the owners of newly acquired companies. According to interviews with the media, the GHCL group intends to increase its production capacity for soda ash in Upsom by a factor of 3.5 within the next four years, with turnover rising from currently EUR 20 million to 100-110 million.

The use of computers and IT is widespread in the chemicals sector, with practically 100% of management services using them and around 80% of the production capacities benefiting from the utilization of IT.

---

<sup>22</sup> Decision 195/2005 of the Competition Council.

The expectations concerning the evolution of output and employment over the next five years are cause for scepticism and worries. The large companies expect the average growth rate of the Romanian chemical sector to be in line with that of the manufacturing sector or below it, while smaller firms are more pessimistic. As for employment, all companies expect the number of employees to fall further, leading to an increase in productivity (as a condition for improving competitiveness).

The main products delivered by the basic chemicals companies are certified internationally, with ISO 9001/9002. However, when it comes to special orders and small batch products (destined for the domestic market), certification is quite often missing. There is an increasing number of firms that have also environment certification (ISO 149001) or management certificates.

There is little innovation and research activity in the basic chemicals sector in Romania and, in addition, companies do not cooperate, but usually maintain linkages with the former public research institutes of the sector. Most of the companies do not report research expenditures in their annual financial reports. They require external funds to develop innovation capacity.

Almost all companies perceive the regulatory framework and the prices of energy inputs, particularly in the case of natural gas, as the major constraint related to production inputs. The permanent changes in the distribution of eligible companies for subsidized pricing and in the associated quota, together with the ascending trend in the real price of energy inputs, affect the profitability of firms and impinge negatively on the planning capacity and the investment decision process.

In terms of intermediary materials, the foreign products are generally endowed with superior quality, but the quality/price ratio is perceived as similar between domestic and foreign products.

In recent years, investment activity has recovered, but is mainly financed from own resources; this puts additional pressure on profitability of companies facing increasing input costs and shallow demand. The majority of companies complain about environmental regulations, recently enforced and enhanced in order to comply with EU standards. The own resources are not generally sufficient for the investment needs regarding modernization/technology improvement/capacity enlargement as well as for investment destined for environmental protection. Firms usually choose to invest for production purposes, but the number of environment-related fees enforced by the National Authority for Environment has multiplied several times and the level of fees even more, thus making non-compliance with environmental regulations extremely costly. The large companies allocated between 50% and 75% of their investment financing for environmental projects

during 2000-2005, in order to avoid the risk of potential interruptions to their production processes.

A large share of total fees and corrective decisions taken by the National Authority for Environment is targeted at the companies operating in the basic chemicals sector, impeding the granting of environmentally integrated authorization. In 2005, Sofert SA and Amurco Srl did not receive this authorization, given non-compliance with specific requirements in the process of their acquisition by the Interagro Group. Several production units were closed waiting for the needed measures to be implemented and the authorization to be given.

Most of the companies consider that the competitiveness position of the sector will be upgraded in the years to come and do not perceive a high risk for their business on the Romanian market or on their specific foreign markets. Lately, some of the exporting firms (using direct channels or foreign trade intermediaries) widened the destinations of their exports by countries situated on other continents, such as Argentina and Australia.

Among the strengths of the basic chemicals sector in Romania, respondents see the skilled and cheap labour force, the well-established client networks and – primarily – the tradition and experience based on their brands. Among other factors mentioned (see point 8a of the questionnaire) is also the existence of underutilized production capacities.

As for the weaknesses, lack of investment resources, the fragmented domestic market and the erratic energy pricing policy are frequently mentioned as the most important barriers to business development.

The questionnaire mentions several opportunities and threats under points 8c and 8d to which most of the companies allocate significance to a high or very high extent, most of the threats being related to increased competition and lack of financing for investment (upgrading technology and environmental standards compliance).

The companies are asking for policy measures aimed at:

- improving the business environment, particularly for SMEs in production services;
- favourable energy pricing schemes;
- enhanced inter-regional cooperation;
- supporting research, innovation and training activities;
- enhancing information transparency and circulation.

Concluding, the companies in the basic chemical products sector have taken important steps on their way to increasing their competitiveness and strengthening their market position prior to Romania's accession to the EU, and they generally are optimistic but

cautious regarding the effects of integration on their positions on the Romanian market. The major problems to be solved are related to the envisaged further increase of real prices of energy inputs (in particular natural gas), the volatility of administered prices of energy and the very high costs associated with the compliance with EU environmental regulations.

### 2.2.3 Glass and glass products

The glass and glass products industry (NACE 261) still needs a lot of modernization and investment in order to become competitive and to comply with the environment and quality requirements that EU membership brings about. This industry now produces around half of its 1989 production level, due to the competition it has encountered on the domestic as well as foreign markets. But it has some strong advantages, one of them being the raw material it uses, 90% of which comes from domestic sources; it is relatively cheap as the majority of inputs consist of sand or minerals: sand (59%), soda ash (19%), limestone (13%), dolomite (5%), etc. Another strong point is the long tradition and experience in this field, which ensures the presence of a skilled labour force. The manufacturing process requires temperatures of over 1600°C and for that mostly natural gas is used. Consequently, the prices of the final products are quite sensitive to the fluctuations in the gas price. In Romania intermediate consumption is much higher than is the case for its competitors, which reflects the need to introduce new technologies and the complete dependence on natural gas in the production process. In this industry there are some delays in the implementation of quality and environmental control systems, which must be followed as Romania has become part of the EU.

Table 2.8

#### **Employment and financial indicators for selected companies in the glass industry in 2004**

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
STIROM	1,046	121.1	29.9	20.8	5.14
GECSAT SA	826	50.5	12.5	3.3	0.81
GEOMED SA	895	56.0	13.8	1.5	0.39
STICLA TURDA	808	15.5	3.8	-1.1	-0.26
GEROM SA	304	24.5	6.1	1.6	0.38

Source: Data from the National Registry of Commerce, 2004.

Most companies from this industry were privatized through management and employee buy-outs around 1995, with mostly the management becoming the majority stakeholder in the company. In general the situation of the companies is not very good due to the lack of modernization and investments. The recent increase in utility prices has eroded the

profitability of most companies bringing them close to bankruptcy. Still, some of the companies from this field are exporting a wide range of products.

One of the most important companies in the field is STIROM SA (Bucharest), which was established in 1966, and privatized through a management and employee buy-out; it was listed on the Romanian Stock Exchange in 1997. In 2003 it was acquired by the Greek company YIOULA GLASSWORKS SA which spent about EUR 20 million in investment in the company. Currently it is a very successful company, with numerous awards: 'Excellent Services as a Supplier' in 2005, and three times the 'Trophy of Worth' (2003, 2004, 2005) in recognition of its export activities. STIROM produces both glass packaging products (bottles, jars) as well as glass tableware products (glasses for different beverages). In 2006, the company started an important investment programme in order to upgrade the production process. The production process of STIROM is in line with the ISO 9001 quality standard.

STIROM SA represents an exception; the other glass manufacturers such as STIMET SA (Sighisoara), GECSAT SA (Tarnaveni) and GEROMED SA (Medias) are in dire situations. The lack of investments, due to banks' reluctance to lend money for needed capital investments, coupled with the severe increase in utility prices which has eroded the already small profit margins, has contributed to the accumulation of debts mainly to the utilities suppliers. In consequence, STIMET SA has closed production in autumn 2005 but may have restarted production in late 2006. The main reason for the closedown, besides increased utility prices, lies with the inability to produce at competitive prices and thus to compete with other companies – such as STIROM SA, which is a strong competitor, especially after the modernization of its production facilities.

GECSAT SA and GEROMED SA, which are manufacturers of window glasses, are in no better shape either. They have undergone several reductions in activity. GEOMED ended 2005 with 380 employees, down from 840 at the beginning of the year, and another 200 are could have been laid off in the second half of 2006. Despite these drastic measures the company is still not able to compete on the market.

FIROS SA (Bucharest) is a fibre glass manufacturer established in 1976. It is the only manufacturer from Romania, and its products are very competitive in Europe. Over 80% of its production is exported to western European markets.

#### **2.2.4 Ceramic products**

Unlike the glass industry, the ceramic products industry (NACE 262, but also including NACE 263, manufacture of ceramic tiles and flags) is a very dynamic and competitive industry in Romania. There has been significant investment and consolidation in the industry, and the products are competitive on foreign markets. About 60% of the raw



material inputs for this industry are obtained from the domestic market, as they are mainly natural resources. In Table 2.9 we present the current situation of several firms from the industry.

Most companies were transformed into joint-stock companies in 1990, and privatized through management and employee buy-outs in the following years. This type of privatization process resulted typically in managers having a majority stake in the company. Over time, as a result of transactions and capital increases, the major stockholder changed.

Foreign companies have manifested their interest in the ceramic industry. The Lasselsberger Group (Austria), one of the most important manufacturer of tiles in Central and Eastern Europe, entered the Romanian market in 2004, when they acquired SANEX SA (Cluj Napoca), and CESAROM SA (Bucharest), which was later renamed Lasselsberger SA. CESAROM previously bought the tile section of the MONDIAL SA company. In total the Lasselsberger Group now has in Romania nine lines of production of ceramic tiles and sanitary ware. Most of the ceramic tile production is for the domestic market (95%), while almost 60% of the sanitary ware are exported.

MONDIAL SA (Lugoj) was acquired by Villeroy & Boch (French) in 1997, the ceramic tile production line was sold to CESAROM in 2004 and the sanitary ware line was modernized and transformed into one of the best products in the market. Now it is a successful company which exports a large share of its production.

APULUM SA (Alba Iulia) is now the largest household and hotel porcelain producer of Romania. The company's privatization in 1993 was the decisive factor contributing towards the development of the company. The investment schedule modernized the technology and made their products competitive both on internal and international markets. The internal market is dominated by APULUM products, and in 2002, 75% of the revenues were generated by exports.

Table 2.9

**Employment and financial indicators for selected companies  
in the ceramics industry in 2004**

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
CESIRO SA	1,642	71.4	17.6	4.4	1.10
APULUM	1,414	55.6	13.7	0.4	0.10
SANEX SA	1,142	125.6	31.0	14.9	3.65
CESAROM (Lasselsberger)	1,072	100.5	24.8	8.4	2.08
MONDIAL SA	886	122.4	30.2	40.1	9.89

Source: Data from the National Registry of Commerce, 2004.

CESIRO SA (Sighisoara) emerged as a spin-off of the glass and porcelain company in 1991. The company, privatized by MEBO in 1995, had in mid-2006 almost 600 shareholders, current and past employees. It started an extensive investment programme after privatization, in the value of EUR 15 million. The main products are household porcelain and decorative objects. In 2006, 90% of the production is exported.

## 2.2.5 Cement, lime and plaster

The cement industry (NACE 265) in Romania is a very modern and environmentally friendly industry. Its inputs consist of minerals such as limestone, silica, aluminates, and typically a cement factory is located in the neighbourhood of quarries where these minerals can be easily obtained. The main problem with this branch is the fact that it is dominated by three large producers who between them cover almost all the domestic market: LAFARGE ROMCIM, HOLCIM Romania and HEIDELBERG CEMENT. In 2005 the Competitiveness Council ruled for the second time that the 3 companies acted as a cartel and fixed the price on the domestic market. As a result all three companies were fined with over EUR 27 million each.

Table 2.10

### Employment and financial indicators for major companies in the cement industry in 2004

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
CARPATCEMENT Holding	2,030	259.5	64.0	85.6	21.1
HOLCIM Romania	1,296	52.7	13.0	126.6	31.2
LAFARGE Ciment Romania	986	580.4	143.2	220.4	54.4

Source: Data from the National Registry of Commerce, 2004

LAFARGE (France) entered the Romanian market through the acquisition of ROMCIM SA in 1997. The company followed an ambitious investment programme aimed at the modernization of the production process, with the goal of increasing the efficiency and protecting the environment. Presently the company owns three cement factories: at Medgidia, Hoghiz and Târgu-Jiu.

HOLCIM Romania (Switzerland) has entered the Romanian market in 1997 when it bought SC CIMENTUL Turda. Currently the company owns three cement factories at Turda, Campulung and Alesd, 14 ecologic concrete stations, and has approximately 1300 employees. Since 1997 the company has invested EUR 334 million in modernization of production technology, implementing measures for environment protection.

Heidelberg Cement Group is the largest German investor in Romania. In 1998, the Group entered Romania by acquiring its first cement factory MOLDOCIM Bicz. In 2000 it

became the major stakeholder at CASIAL Deva, and in October 2002 they become the majority stakeholder at Tagrimpex Romcif Fieni (currently ROMCIF SA). The company named its cement business in Romania CARPATCEMENT Holding. The total investments by Heidelberg Cement amounts to around EUR 200 million. All three cement factories are conforming to the required environmental standards and have quality systems implemented.

## 2.2.6 Iron and steel

The iron and steel industry (271) is the most important in terms of output amongst the energy-intensive branches. Its inputs are in the form of iron ore, scrap iron, coke, and energy, which are typically bought from the domestic market. In terms of privatization, the industry was privatized in early 2000, and the companies are now nearly 100% in private hands. This industry has attracted a lot of foreign capital and most of the large firms are foreign-owned. There is substantial vertical integration as well. Table 2.11 presents the situation of some selected companies in 2004.

Table 2.11

### Employment and financial indicators for major companies in the steel industry in 2004

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
MITTAL STEEL GALATI SA	18,456	6861.7	1,692.9	1374.64	339.1
MITTAL STEEL HUNEDOARA SA	2,275	508.7	125.5	740.9	182.8
MITTAL STEEL IASI SA	1,392	335.1	82.7	1.3	0.3
MITTAL STEEL ROMAN SA	3,062	513.2	126.6	6.4	1.5
MECHEL CAMPPIA TURZII SA	5,379	416.3	102.7	-6.8	-1,7
MECHEL TARGOVISTE SA	4,898	639.6	157.8	-5.5	-1.3

Source: Data from the National Registry of Commerce, 2004.

In addition to other sectors, iron and steel is and will be a major beneficiary of state aid. Between 1993 and 2003 the industry received EUR 1.3 billion in state aid, the major beneficiary was SIDEX Galati which received around EUR 1 billion. The state aid for 2003-2010 is expected to amount to another EUR 1.1 billion. This industry closed many of its non-profitable production facilities, amounting to around 9 million tonnes of production, between 1994 and 2002. In 2002 the production capacity of the iron and steel industry was around 9 million tonnes, but companies operated below that capacity.

MITTAL STEEL (an Indian company registered in the Netherlands), one of the biggest global steel companies, is the largest investor in this industry in Romania. It has several companies in its portfolio. ISPAT SIDEX (Galati) is the largest integrated iron and steel manufacturer from Romania. The company was privatized in 2001 when it was bought by

MITTAL STEEL. The restructuring measures together with the investments it undertook transformed SIDEX into a profit-making company again. Two-thirds of its production is exported, to more than 40 countries. ISPAT PETROTUB (Roman) is the largest seamless carbon and low alloyed steel pipes manufacturer. It was privatized in December 2003 and started an important investment programme both in technology and environment. As a result the company's products are now in line with EU and US standards. The effects of that investment were starting to show up in the financial results for 2005 and the first months of 2006. ISPAT TEPRO (Iasi) is one of the leading manufacturers of longitudinally welded carbon steel tubes and cold formed profiles in Romania. The company was acquired by MITTAL STEEL upon its privatization in 2003. The company's products comply with national standards, and most international standards. ISPAT SIDERURGICA (Hunedoara) produces long products – continuous cast billets, hot rolled profiles, hot rolled bars, structural steel and wire rod. The company will invest USD 12 million over the next ten years in order to improve the quality and technology of MITTAL STEEL Hunedoara's production facilities. The main focus of that investment will be the modernization of the electric arc furnace and the upgrading of the finishing mills. A further USD 4.1 million has been set aside for environmental projects.

Generally, MITTAL STEEL is complying with the required environmental standards. Nonetheless, incidental irregularities at the site in Galati were reported in 2005, due to the sliding of coal waste into a nearby lake. However, measures aimed at the elimination of the pollution were taken in due time, indicating a responsible attitude towards the treatment of environment-related incidents.

The other important investor in the iron and steel industry in Romania is the Russian company MECHEL. It has acquired SC INDUSTRIA SARMEI (Campia Turzii), currently known as MECHEL Campia Turzii, and COS (Targoviste), currently known as MECHEL Targoviste. MECHEL Campia Turzii is a company that produces rolled products in carbon and low-alloy steels for machinery manufactures such as steel rebar, wire rod and hardware, including various kinds of wire, cable, mesh, electrical cable and nails. The company is certified under ISO 9001, and the plant has received the environmental certification ISO 14001 as well. MECHEL Targoviste is the largest metallurgical company producing rolled products in carbon and alloy steels and forged and calibrated products for machinery and automobile manufactures. The company complies with the ISO 9001 quality standards. While the Group's companies are doing very well in Romania, the opposite is true for the Targoviste company. Two years after its privatization, MECHEL Targoviste accumulated debts of over RON 1700 billion. At the beginning of 2006 there has been talk about stopping the production process at MECHEL Campia Turzii for a limited period of time.

### 2.2.7 Non-ferrous metals

The non-ferrous metals industry (274) in Romania consists mainly of the production of aluminium and aluminium products. Similarly to the iron and steel industry, the industry is dominated by a large investor – the MARCO Group (a Russian investor), which acquired the largest companies in the field: the aluminium smelter, the company producing aluminium alloys and other products, as well as the company making alumina, the input into the primary aluminium production.

One of the members of the MARCO group is ALRO (Slatina). ALRO was privatized in 2002 when the MARCO group became the major stockholder. Since privatization the group invested around USD 140 million in the company, mainly in environmental improvements and technological modernization. As a result there has been a 20% increase in production. More than 80% of ALRO's production is sold on the international market in 25 countries. ALRO's technological process and products are certified under ISO 9001, ISO 14001 (compliance with environmental standards) and ISO 18001. The second company in the MARCO Group portfolio is ALPROM, which is an aluminium products enterprise linked technologically to the ALRO aluminium plant. ALPROM was privatized in 2002 when it was acquired by the Group. ALPROM produces wrought aluminium and aluminium alloys. Over the past five years, ALPROM has invested about USD 15 million in the modernization and development of production, including USD 3 million spent on environmental improvements. A share of 20% of the output is sold domestically, 80% is exported. ALPROM production processes and products are certified according to the international standards ISO 9001 and ISO 14001. ALUM is the third company of the MARCO group portfolio. ALRO SA bought 70% of ALUM shares on the Romanian Stock Exchange in 2005.

Table 2.12

#### Employment and financial indicators for important companies in the non-ferrous metals industry in 2004

Name	Employment	Turnover		Profit/Loss	
		RON mn	EUR mn	RON mn	EUR mn
ALRO SA	3618	1406.4	347.0	167.2	41.2
ALPROM SA	1682	68.2	16.8	-12.6	-3.1
ALUM SA	1194	293.3	72.4	29.0	7.2

Source: Data from the National Registry of Commerce, 2004.

### 2.3 Summary and conclusions

The largest and at the same time most energy-intensive sub-branches in Romania are the iron & steel, the basic chemicals and the aluminium industries. The glass and the ceramic industries are relatively small, covering less than 1% of total manufacturing production. Besides their high energy consumption, another common characteristic of all sub-branches can be observed: the relatively low value added as compared to the final production value.

As a consequence, profits are typically slim and funds available for investment are very limited. Also, the branches are highly vulnerable with respect to increases in input costs and wages, especially when output prices are fixed at global levels such as for standard products of the steel and aluminium industry and for many basic chemicals as well. Given that domestic input prices and wages are on the rise and currency appreciation is putting substantial pressure on prices in local currency, moving up the value added chain and looking for niche products will be the only viable solution for these branches in the future. In fact, after the year 2000, unit labour costs have increased dramatically in many energy-intensive branches such as iron & steel, glass, ceramics and cement, despite a severe reduction of employment levels.

Export orientation was found to be very different across the individual branches, with the iron & steel, basic chemicals and the aluminium industry being the sub-branches with the strongest export orientation and the cement and the paper industries being the least export-oriented sub-branches.

In 2005, the energy-intensive branches altogether accounted for a substantial share of 20% of total manufacturing exports, half of which came from the iron & steel industry. The latter was the only sub-branch to feature exports developing more dynamically than manufacturing exports as a whole, pointing to a certain specialization of Romania in this field. Imports of energy-intensive products are generally lower than exports and the resulting trade surplus (especially in iron & steel) makes an important contribution to compensating for the exploding trade deficit in other sectors of the economy

As regards the detailed characteristics of individual energy-intensive industries in Romania, the evidence is rather mixed.

There are some sectors which are clearly doing well, mostly branches that are dominated by large producers, such as cement, iron and steel, non-ferrous metals, and branches where competition is more accentuated, such as basic chemicals and ceramics. Cement, iron and steel, and non-ferrous metals are branches which were very attractive for foreign investors, and most large companies are now part of multinational corporations. They have benefited from large investments and foreign expertise and should face no major problems due to Romania's entering the EU. Recently, companies operating in basic chemicals as well have become attractive for foreign investors; there is an increasing tendency of concentration in this sector, although markets remain highly fragmented. Ceramics sector companies did well during transition, as no production capacity had to be closed down, and there were no employment cuts between 2000 and 2003. This sector manages to cover a large part of the domestic demand; it also has the smallest proportion of imports in comparison to the sector's output.

Other branches which have enjoyed advantages such as a long tradition, an experienced workforce and the availability of domestic inputs, are facing problems in restructuring and have seen their activity declining. The pulp and paper industry together with glass and glass products are in a more vulnerable position now. Pulp and paper seemed to be the better performer over the period 2000-2003 as it had the largest output increase, the strongest increase in productivity, and it was the only branch with a decrease in unit labour costs. But recent price increases in inputs (wood as well as energy) together with the decrease in exports due to currency appreciation have contributed to the deterioration in the companies' ability to withstand competition. The situation in the glass and glass products industry is similar: the lack of investment which would help to bring costs down, together with strong competition both on domestic and foreign markets have eroded its profit margins. Companies face strong competition on the foreign market, and exports have been severely hit by the currency appreciation. Along with basic chemicals, these were the sectors least prepared for admission into the EU in terms of quality and compliance with environmental standards, thus they face serious problems after Romania's entry into the EU.

### **3 Economic policy, conclusions and recommendations**

Romania has aligned its legislative and economic policy framework including industrial policy, competition rules and state aid legislation with the European Union norms. EU industrial policy consists of mainly horizontal rules and policies, aimed at strengthening competitiveness and improving the business environment through R&D, employment and regional cohesion (EU Commission, 2002 and 2005c). The industries in the newest member state with still incomplete market economic transformation are exposed to shocks that do not occur in old member states. A transformation-related shock for the Romanian industry was the increase in electricity prices in 2005. A similar shock is unfolding due to the alignment of domestic gas prices with import prices. This part describes the industrial policy environment in which these shocks occur and finds that policy has not been in a position to react to these in a specifically helpful way. What else could have been done, what can be done right now – these are the questions to be tackled below.

In 2001-2004 the government formulated policy assessments and sectoral studies to support the EU accession negotiations. Later on the new, current government passed policy documents based on the EU Accession Treaty. One can identify five sets of policies of relevance to the energy-intensive industries. These are outlined below, along with some comparisons with other countries and critical assessments. The five fields are the following:

- (1) Industrial policy in general. An industrial policy document for 2005-2008 and an export strategy paper are available and can be compared. In addition the accession treaty of Romania provides the main policy guidelines. A comparison with new EU members is only partially possible.

- (2) Sectoral programmes. Sectoral economic policies are by and large excluded, except in some sensitive areas such as mining, the defence industry and the iron and steel sector. The policy towards sensitive areas and related derogations are specified in the accession treaty. Among the energy-intensive industries, the iron and steel sector is subject to special arrangements. Romania's steel industry programme will be compared with that of the Czech Republic.
- (3) Energy policy. For the energy-intensive industries the price of energy is a major component of overall cost and thus of competitiveness. An international comparison shows that Romanian industrial producers face an unstable environment both concerning electricity and gas prices.
- (4) Corporate restructuring and privatization. Private companies work out their own development programmes with no government interference. But there are still companies in the course of privatization and many privatized companies have residual state shares. These issues need to be resolved in the near future as the government envisages all pending privatizations in manufacturing to be finalized by the end of 2007.
- (5) Horizontal industrial policies. These are the policies of primary importance, aimed at supporting the efficient functioning of the business sector. They are concentrated on regional policy, research and development policy, SME policy, labour market policy, and environmental policy. These have specific impacts on individual industrial activities and some of them refer to the energy-intensive industries more than other measures.

### **3.1 Industrial policy in general**

The 'Industrial Policy of Romania 2005-2008' was worked out under the leadership of the Ministry for Industry and Commerce (MEC) in September 2005 (Box 1). It focuses on the 'consolidation and support for horizontal factors which enhance competitiveness'. Basic elements are human resources, research, innovation, entrepreneurship and environmental policy.

The Romanian industrial policy stresses the necessity of sectoral policies too, but those are subordinated to horizontal ones. It lists specific industries with a seemingly bright future from different competitive advantages points of view. But it fails to bring together these advantages and to formulate a comprehensive list of industries with good and bad prospects. The following of the energy-intensive industries are included:

- based on natural resources, some branches of the chemical and non-metallic minerals industries have perspectives;
- based on the country's geographic position, which allows rapid access to mineral resources, the iron, steel and non-ferrous metals industries as well as the production of lacquers and paints have perspectives.



It is not clear from the industrial policy how policy would treat these sectors as opposed to those without specific competitive advantages. A more detailed and at the same time comprehensive analysis would be required because the energy-intensive industries face a rapidly changing business environment due to rising energy prices and the EU accession. Industrial policy has to decide whether it intends to smoothen the transformation and restructuring process going on in these industries or to leave it completely to the market forces.

Box 1

*Industrial policy outline (quoted from MEC, 2005a)*

The main objectives of industrial policy are defines as:

- increased competitiveness;
- increased role of research & development and innovation;
- promoting a sustainable management for resources and environmental protection;
- improvement of professional qualification and employment;
- development of cooperation and industrial services as well as of public-private partnership.

In the government's vision, the main factors that will have a major influence in reaching the strategic objective of the industrial policy are:

- consolidation of a stable and predictable business environment, supported by an appropriate legal framework, in harmonization with that of the European framework;
- support for research-development-innovation and infrastructure for conformity evaluation of industrial products and services;
- development of a free competition market, by continuously harmonizing legislation and effectively putting into practice the competition policy;
- support for sectoral policy, for every sector, for the time period 2005-2008;
- direct investment promotion, by ensuring a transparent, stimulating and predictable investment climate;
- support for the development of small and medium-sized enterprises, by facilitating access to financial resources and assistance, consultancy and information;
- support for exports, having in view the increase of Romania's export quota of highly processed industrial products;
- support for privatization and restructuring of companies, based on an efficient economic activity; completing the privatization of state-owned companies;
- environmental compatibility by consolidation of the legal and organizational framework, which will lead to a reduced impact of industrial activity on the environment;
- human resources development policy and promotion of social cohesion by permanent consultations of all social partners, strengthening the dialogue between managements and trade unions.

In the medium term, the priorities that will focus on actions aiming at the implementation of industrial policy are:

- applying the industrial policy in accordance with the needs of each sector;
- improvement/amelioration of the regulative framework for industry;
- synergy between different policies that impact on competitiveness.

The industrial policy focuses on the improvement of R&D, the application of IT solutions and shifting to more knowledge-intensive and higher value-added production. It would be interesting to see how individual industries would be affected. But this modern focus is perhaps not enough for Romania as most of Romania's industry, including the energy-intensive branches, applies standard international technologies with no or little local knowledge input. New technology is usually imported. For local R&D and ITC solutions one has to find specific niches.

A more sophisticated presentation of an industrial policy is found in the framework of the Export Strategy, the elaboration of which was coordinated by another part of the Ministry of Industry and Commerce than industrial policy itself (MEC, 2005b). The Export Strategy is a detailed strategy relying on SWOT analysis for various industries. It comes up with a very selective strategy when individual industries are concerned. While the Industrial Policy could not get rid of the traditional viewpoint of a Ministry for Industry which would support all activities and preserve existing structures, the Export Strategy is more dynamic and selective. Also the general priorities and policy tools are better worked out in the Export Strategy than in the Industrial Policy. Regional development, R&D policy, SME development and various other industrial policy tools applied in EU member states are integrated in the policy recommendations of the export strategy. Thus it would be of advantage if the industrial policy consequences of the export strategy became the guidelines of an improved industrial policy paper.

There are four energy-intensive industries on the priority list of the Export Strategy:

- plastics production, which adapted well to the changing structure of demand after transition;
- fertilizer production, based to a large extent on local natural gas. The domestic market has shrunk but export opportunities have remained promising;
- metallurgy: here the keywords are increased specialization and downstreaming, with positive effects for other industrial exporters;
- glassware, including houseware, glass yarns and window sheets benefit from a long tradition and local knowledge.

Part of this priority list represents an integral part of the automotive sector in a wider sense (metals, tires, plastics, glass) which has good development perspectives in Romania. Others build on traditional specialization and skills. We consider such prioritizing a useful addition to horizontal policies. It would however be necessary to specify how the horizontal policy tools can be used to help these export-oriented industries in particular.

The list of policy tools mentioned in the Export Strategy includes all modern instruments in compliance with EU rules (for more details see Box 2):

- quality management, standardization, certification-accreditation;
- foreign trade information service;
- competency development;
- export financing;
- R&D, innovation, technological transfer access.

These tools can improve market access and technological development. The Export Strategy reflects ample knowledge in these fields at least with those who wrote the paper. Their knowledge should be spread along the decision-making process to facilitate implementation.

What Romania, like other medium-developed countries, is missing is an internationalization strategy. Policy aims only at attracting FDI to benefit from the knowledge and capital of transnational companies. Inward FDI has usually a positive impact on economic development, competitiveness and exports. But the development of domestic companies is also better founded if they establish subsidiaries abroad. Support for going international is thus more than just trade facilitation. An example for this approach is practised in Austria, which supports a more complex market entry strategy than just selling existing products abroad (<http://www.go-international.at/>).

#### Box 2

##### *Tools of the Romanian export promotion policy (quoted from MEC, 2005b)*

In Romania there is a legal framework dedicated specifically to export stimulation and promotion. According to the law, the following programmes are in force:

- (1) Financial and banking instruments, managed by EXIMBANK.
- (2) An export promotion programme, managed by the Ministry of Economy and Trade/Foreign Trade Department, through which the following types of expenses are partially or totally supported from the state budget:
  - participation in international trade fairs and exhibitions;
  - setting up economic missions abroad;
  - registration fees and running costs (for at least one year) of Romanian commercial representations abroad;
  - publishing and distributing abroad Romanian export offer info bulletins;
  - publicity and advertising materials.
- (3) The Competitiveness Programme for industrial products, managed by the Ministry of Economy and Trade.
- (4) The Competitiveness Programme for agricultural and food products, managed by the Ministry of Agriculture.
- (5) Export bonuses for agricultural and food products selected in accordance with the Agreement for agriculture – Part III, Section II – Subsidies for export, in the framework of the World Trade Organization, with priority on a larger proportion of certified biological agricultural and food products of vegetable and animal origin.

- (6) The Programme for the support of small and medium-sized enterprises, for the development of export, managed by the National Agency for Small and Medium-sized Enterprises and Cooperation, for encouraging private operators to set up and develop small and medium-sized enterprises.

The budget allocation for all export promotion programmes was ROL 2200 billion in 2003, ROL 4000 billion in 2004 and ROL 4350.2 billion in 2005, increasing year by year. The budget allocation distribution for all six Export Promotion and Support programmes showed that more than two thirds of the budget allocations were directed at credit instruments. One major constraint related to these allocations is the fact that part of the money was not effectively used. There was also a lack of motivation to use instruments such as market studies or opening branches, difficulties in data collection for collective sector catalogues, and lack of information.

The Export Strategy denotes, but the Industrial Policy document neglects the regional aspect. Facilities must be accessible at the regional level, not only in the capital city. Romania is a large and diverse country where regionalization would certainly have its advantages. For comparison, Austria – a much smaller country – has a federal system, where business promotion is facilitated at the central, state and local levels alike. This system ensures better targeting of policy and the direct contact with SMEs.

### **3.2 Sectoral policies**

Romania's energy balance clearly shows that the most energy-intensive sector is industry, with a share in overall demand for energy of about 40%, decreasing lately. Among the industry branches, metallurgy is responsible for more than 10% of the country's overall energy demand, while the chemical industries (mainly basic chemicals, fertilizers, rubber and plastics) account together for another 9%. We therefore analyse these two industries, steel and basic chemicals, in more detail.

#### **3.2.1 Iron and steel industry**

Steel is a protected industrial sector in the European Union. The production levels of member states are regulated by quotas, and state aid is especially strictly scrutinized. At the same time this is an industry with many structural problems, and the modernization of the sector typically implies more state aid than in other more competitive industries. A special annex to the Accession Treaty of Romania (Annex VII, in particular Appendix B) deals with transitory rules referring to this sector (EU Commission, 2003, 2005a, 2006). Romania, under the guidance of the Commission, worked out a national restructuring programme for this industry which lays down the production levels and the efficiency improvement measures for each product as well as business plans for individual companies operating in this sector.

As known from the steel industry restructuring framework of the first-tier enlargement countries, 'in line with the Europe Agreements, candidate countries were obliged to adopt

strategies resulting in the viability of their steel industries. National restructuring plans and business plans for individual companies had to be developed. In order to be acceptable, these plans had to be linked to global rationalization and reduction of capacities, had to conclude that state aid granted was strictly limited to what was absolutely necessary to assure the viability of the benefiting firms. Assisted by external consultants, the Commission assessed the restructuring plans submitted by Poland and the Czech Republic in 2002 and formulated the conditions for restructuring in view of the enlargement negotiations and the drafting of the EU Common Position. Special protocols in the Accession Treaty outline the conditions for a transitional regime for steel restructuring (until the end of 2006). The Commission will monitor its implementation.’ (EU Commission, 2002) Later on, in 2004, the same approach was applied to Romania and Bulgaria. Transitional regimes for steel restructuring have been agreed until the end of 2007 and 2008 respectively.

The need for a special treatment in the steel sector derives from the facts that Romania used to have over-capacities, privatization started late, restructuring plans included large amounts of state aid, and the industry was unable to meet the environmental standards. In addition, privatization contracts were signed with investors such as Mittal Steel which contain clauses violating EU legislation.

In general no state aid can be paid after 2005. The terms set out in the national restructuring programme and individual business plans allow Romania to extend additional state aid and adhere to existing contracts with private owners up to the end of 2008. 2005-2008 is thus considered as a ‘restructuring period’ during which pre-determined aid can be given to predetermined ‘benefiting companies’. The same companies shall also follow a capacity reduction programme.

---

Table 3.1

**Restructuring of the Romanian steel industry based on the 2004 government programme**

**a. Number of workforce**

	1990	1993	1995	1997	1999	2001	2003	2005 (P)	2007 (P)	2010 (P)
Number of workforce	151000	143600	125000	105800	86700	75000	60000	51000	45000	42000

**b. Production capacity**

	1990	1993	1997	2000	2003	2010 (P)
Steel	18000	16800	12570	8200	9000	9000
Rolled products	28500	26000	21500	17000	15400	14700

Source: MEC (2004).

---

The accession treaty prescribed the reduction of the steel production capacity between 1993 and 2008 by a minimum of 2.05 million tonnes to 9.5 million tonnes. This means that hot-rolled steel production capacities of this amount shall be destroyed; bankruptcy of the company is not enough. That capacity reduction is in fact smaller as compared to what has been achieved by the decline of the industry, although the capacities may not have been physically destroyed. The MEC steel industry strategy of 2004 envisages a capacity of only 9 million tonnes in 2010. The accession treaty also sets restructuring programmes for the six largest steel mills in a way that capacity reduction goes hand in hand with efficiency improvement and a shift to higher value added products. In addition, the business plans envisage financial restructuring and compliance with environmental legislation.

The restructuring programme of the Romanian steel industry (Accession Treaty Appendix A to Annex VII) lists six companies involved in the programme: Ispat Sidex Galati, Siderurgica Hunedoara, COS Targoviste, CS Resita, IS Campia Turzii and Donasid Calarasi. Among them, Siderurgica Hunedoara has to close one line of production by mid-2008; CS Resita has to close one line by the end of 2007 and another by mid-2008. All companies have been given benchmarks for operating results relying on the prescribed improvement of productivity and cost reduction. These targets have to be achieved by increasing investment and reducing the workforce.

To assess Romania's restructuring programme we compared it with the progress of restructuring in the Czech steel industry (Gratiasová, 2006). In the Czech Republic the detailed firm level programmes have been closely monitored, but deviations from the initial programme were possible. Slower progress in privatization and delays in restructuring have been noted. The Czech Republic finalized the privatization of the last steel mill only in 2005, more than a year after becoming a member of the EU. For the closing down of selected capacities, the end of 2006 was the final deadline in three cases. This deadline had been set at 2.5 years after accession, while in the case of Romania at only 1.5 years. Despite progress in restructuring, the Czech steel industry still had problems with high inventories and delayed payments of customers in 2005.

The May 2006 monitoring Report of Romania (EU Commission, 2006) stated that the steel industry restructuring programme was in delay, and the Romanian government proposed changes to the individual business plans of companies. The Commission has not denied the government's request for modification but will scrutinize it for being in line with state aid rules. It also warns the government not to give state aid to sectors outside the provisions of the Accession Treaty. The Commission does not specify in what sectors and what kind of state aid it suspects. Based on consultations in the Ministry of Industry and Commerce, the impression arises that this institution understands its role as a defender of the interests of the industrial sector. This attitude may give rise to protective action and generate suspicion.

### **3.2.2 Basic chemicals products**

The production of chemicals is not found in the priority group of industries for which Romanian policy-makers developed specific strategies during the transition and pre-accession years; nor is the industry benefiting from any special programme within the EU industrial policy framework in the form of state aid, research and innovation programmes, etc. The negotiations for the REACH (Registration, Evaluation and Authorization of Chemicals) policy, to be completed in 2007, are going on with uncertainties and misalignments. Romania had prepared until mid-2006 any specific programme complying with the future potential EU common policy in this area (EU Commission, 2005b, 2005c, 2005d).

However, the inclusion of fertilizers among the priority products within the National Strategy for Exports has opened some opportunities also for basic chemicals companies. Basic chemicals account for more than 40% of the Romanian exports of chemical products, and fertilizers for another 25%. Domestic demand for basic chemicals products is covered by domestic producers in a proportion of more than 40%. Investments have recently been higher than before and there is an ongoing process of modernization. That process may be helped by specific research programmes (including allowed state aid destined for innovation and environmental protection) that could be supported using EU funds and domestic budget co-financing during 2007-2013.

In the case of companies operating in the basic chemicals industry, the prolongation of the differentiated pricing policy for natural gas may give time for adjustment and allow these companies to improve their efficiency in order to cope with the competitive pressure after fully opening to the Single European Market (see section 3.2).

## **3.3 Energy policy**

### **3.3.1 Electricity**

In Romania, the energy (electricity, thermal energy and natural gas) markets have been opened gradually, starting from 2001. As of 1 January 2005 the opening degree of the electricity market was 55%, and the target 100% is to be attained in 2007. Romania has own production and imports of various energy carriers. Although the mix of different types of energy inputs is quite well balanced between oil, natural gas, coal, hydro and nuclear, the efficiency of electrical energy production is still below the average in the EU due to delays in modernization in many older production plants. The mix of own production and imports as well as the mix of electricity produced by different power stations plus distribution costs make up the final price to the consumer, to which various taxes are added. The energy regulator ANRE mixes the prices of different power stations and offers energy at an average price. Electricity prices are expected to stabilize or even come down

once the market exchange becomes fully functional and covers the majority of electricity transactions.

The restructuring of the energy sector thus introduced cost-covering prices ensuring also profits for producers and distributors. The new price system makes the sector more transparent and excludes the subsidization of industrial consumers through artificially low energy prices. Prices now cover the costs of inefficient power stations and pass over the problem to the consumers.

Table 3.2

**Electrical energy prices for industrial consumers in Romania  
compared with other EU member and accession countries**

EUR/kWh, second half of 2005 and first half of 2006

	Small consumer without tax		Small consumer with tax		Large consumer without tax		Large consumer with tax	
	2005 II	2006 I	2005 II	2006 I	2005 II	2006 I	2005 II	2006 I
<i>Romania</i>	0.149	0.086	0.177	0.103	0.068	0.059	0.081	0.070
Austria	0.094	0.091	0.138	0.136	0.047	0.051	0.081	0.086
Bulgaria	0.050	0.054	0.059	0.065	0.038	0.041	0.046	0.050
Czech Republic	0.079	0.103	0.093	0.123	0.050	0.057	0.060	0.068
Germany	0.155	0.162	0.194	0.202	0.071	0.077	0.097	0.104
Greece	0.095	0.098	0.103	0.107	0.054	0.056	0.059	0.061
Hungary	0.112	0.111	0.141	0.134	0.059	0.058	0.075	0.070
Italy	0.120	0.124	0.159	0.171	0.082	0.093	0.101	0.120
Poland	0.090	0.092	0.115	0.119	0.044	0.053	0.059	0.071
<i>EU-25</i>	<i>0.109</i>	<i>0.117</i>	<i>0.139</i>	<i>0.149</i>	<i>0.060</i>	<i>0.069</i>	<i>0.076</i>	<i>0.088</i>

*Remark:* Small industrial consumer, annual consumption: 50 MWh; maximum demand: 50 kW; annual load: 1000 hours; large industrial consumer, annual consumption: 24,000 MWh; maximum demand: 4000 kW; annual load: 6000 hours.

*Source:* Eurostat.

In Romania electricity prices for industrial consumers were among the highest in the EU-25 in 2005 (Table 3.2). The country featured the second highest tariffs (after Germany) for small consumers and the third highest (after Germany and Italy) for large consumers. With taxes included, large consumers paid the same amount as in Austria, 5% above the EU-25 average. Starting from 2006 the regulator brought down the prices by merging some consumer categories and reducing prices for captive consumers, those not allowed to access the electricity exchange. By this move, electricity prices for all types of consumers have fallen below the EU average.

Still, the electricity price puts a strong restructuring pressure on energy-intensive industries in Romania. The high price level has only been effective since the beginning of 2004. Compared with one year earlier, prices for small consumers doubled, for large consumers they increased by 45%, with inflation meanwhile coming down to one-digit figures.



Compared to 2001 (the initial year of price liberalization and adjustment), energy prices rose by more than 300% in nominal terms (domestic currency), while overall industrial production prices increased by less than 100% as of mid-2006. Thus the share of electrical energy inputs in costs has increased, especially in the case of energy-intensive industries.

The price hikes encourage energy-saving measures and energy imports. The MEC energy policy for 2006-2009 does not foresee any relief for consumers (rightly so), albeit through modernization and efficiency increases in energy generation. Large energy consumers have started to show an interest in investing in power stations to ensure cheaper own supply. Another way to escape the high prices would be imports, but according to expert opinion, the trans-border interconnection capacities of the country do not allow for a substantial increase in imports. The long-term solution is modernization of electricity generation, closing down high-cost generators and building new plants that generate lower-priced electricity. This is included in the government's power plant rehabilitation programme. In this context, a capacity increase at the Cernavoda nuclear power station has been decided. Financing is available for the second block, to be put into commercial operation in the second half of 2007. An opportunity for very large consumers is to have direct contracts of supply at advantageous prices. The aluminium smelter ALRO has such a contract with the supplier of atomic energy.

### **3.3.2 Natural gas**

Romania has the biggest domestic gas market in Central Europe, with a long tradition in the production and industry utilization of natural gas. In 2005, out of a total of 17.6 billion m<sup>3</sup> domestic consumption, 12.4 billion m<sup>3</sup> were ensured from internal production (70%), while the rest of 30% was imported from the Russian Federation. These proportions are shifting towards imports over time. Natural gas is not only one of the main sources of electricity, but also a direct input for the chemical industry. Basic chemicals and fertilizer producers have been affected by the recent price changes, being users of gas both as a raw material and for a source of energy.

A major advantage enjoyed by Romanian industrial consumers consists in the fact that the cost-covering price for domestically produced gas is much lower than the current import price, which allows suppliers to offer gas at a low price by international standards. The delivery of natural gas to consumers is regulated by the National Gas Authority, ANRGN, while gas transport is a state monopoly. The regulator sets the price of domestically produced gas, establishes the mix between domestic production and imports, and determines the price for some consumers not eligible to deal on the liberalized gas market. As of mid-2006, 75% of the industrial gas consumption was liberalized, i.e. freely traded between supplier and industrial consumer. The rest of the exchange is governed by ANRGN. The complete liberalization of the natural gas market for industrial consumers has

been announced for July 2007 when all industrial consumers will be declared eligible to freely negotiate the prices with any provider on the Romanian market.

For 25% of industrial consumption (non-eligible, captive consumers), ANRGN applies differentiation in terms of quotas and prices. It decides who receives how much natural gas and in which ratio between imports and internal production. The latter ratio is decisive for the price a company pays for its gas supply. There is an approved list of domestic industrial consumers that benefit from advantageous quotas of high domestic shares, thus lower average prices. This list contains many of the chemical industry companies which use gas as a raw material. The price advantage will expire with the liberalization of the gas market in mid-2007.

Table 3.3

**Natural gas prices for industrial consumers in Romania  
compared with other EU member and accession countries**

EUR/Gigajoules, second half of 2005

	Small consumer without tax	Small consumer with tax	Medium-sized consumer without tax	Medium-sized consumer with tax
Romania	5.01	5.96	4.68	5.57
Austria	7.62	11.71	6.48	10.27
Bulgaria	3.99	4.78	3.68	4.42
Czech Republic	5.67	6.75	5.28	6.28
Germany	9.64	12.47	8.50	11.15
Hungary	5.89	7.04	6.39	7.61
Italy	7.59	9.51	6.44	7.70
Poland	6.38	7.78	5.55	6.77
EU-25	8.11	10.23	6.42	7.99

*Remarks:* Small consumer, annual consumption: 418.6 GJ; no load factor; medium-sized consumer annual consumption: 41,860 GJ; load factor: 200 days, 1600 hours.

*Source :* Eurostat.

The 2007 market liberalization will not affect the price gap between domestic and foreign gas, thus the average price can be kept relatively low. Still, since the beginning of price liberalization, prices for industrial consumers have increased from USD 35 per 1000 m<sup>3</sup> to USD 110 per 1000 m<sup>3</sup> until mid-2006. In the second half of 2005, the internal price for natural gas delivered to industrial consumers was half the price in Austria and one of the lowest in Europe (Table 3.3). In 2006 prices in Romania decreased by 8% for small consumers and 2% for medium-sized consumers, while increases of 21% and 26% respectively took place in the EU-25 (prices without taxes, source: Eurostat). Thus the Romanian average price is only 47% of the EU average for a medium-sized industrial consumer. This recent development shows that the gas regulator, just as the electricity regulator, has powerful means to reduce prices even if the share and price of imported gas

increases. Such a relief for consumers is, on the one hand, relative because historical prices were still significantly lower and, on the other hand, temporary because prices for the domestically produced gas will have to be raised.

The existing programme foresees to complete price liberalization along with the unification of domestic and imported gas prices by the end of 2008. This implies that the present indirect subsidy and competitive advantage enjoyed by industrial consumers will come to an end. A major question of industrial policy is, at what speed will prices be raised? The government is yet undecided.

In our opinion, only a clear track of price adjustment can have the necessary disciplining effect on companies. The problem therefore is the credibility of the government if it sets a gradual price adjustment strategy. This could be feasible, if the timetable of the price adjustment is agreed with the EU Commission and anchored in the post-accession monitoring process.

### **3.4 Privatization and state assets management**

In the transition economies, privatization has been one of, if not the most important industrial policy tool. The way and terms of privatization have decisively influenced the restructuring of companies and set the circumstances for their recovery from decline. The privatization policies pursued in the CEECs in the past have differed considerably, but recently most of them have applied direct sales. Hungary opted for a complete sell-out to foreign multinationals in order to speed up capital and know-how transfer. Slovenia maintained national ownership and built on existing international networking and domestic competence. While structural change and industrial modernization has been fast in Hungary, also Slovenia has lost little of its competitiveness. The Czech Republic first tried the Slovenian way, but in the wake of an economic crisis in the late 1990s it changed its strategy and opted for more FDI. This change of strategy can be observed also in the case of Romania, where foreign penetration has grown fast in recent years.

While the building of national champions was not possible in most CEECs due to the lack of competence and finances at the early stage of transformation, this may be more realistic when the market economy is firmly established. The successful internationalization of some Hungarian companies which had not been sold to strategic owners but were privatized through initial public offering (MOL, OTP) has proved beneficial. Once a competitive business environment is firmly established in Romania, privatization may not necessarily focus on direct sale. Unfortunately, the remaining state-owned companies are in bad shape, thus no recovery from the inside seems feasible.

The Romanian privatization policy went through several inefficient periods when a huge amount of effort and money was spent on rescuing the inefficient companies inherited from

the socialist era, before the present policy, aimed at final and full privatization, was introduced. As in other CEECs, the most efficient way of privatization has been the direct sale of companies to foreign investors active in the same branch. It seems that selling most of the metallurgy to Mittal Steel has brought about effective restructuring, increased competitiveness and ensured the access to foreign markets (see details in Part 2). Manager and employee buy-outs were favoured in the mid-1990s. This way of privatization affected lots of SMEs, with the result that the former management became the majority owner. Many of these companies did not have access to capital in order to modernize and are either in bad shape such as in the glass industry, or have become subject to foreign takeovers which ensured their survival, such as in ceramics production (see details in Part 2).

The Authority for State Assets Recovery (AVAS) is a specialized body of the Romanian government created by merging the Banking Assets Resolution Agency (AVAB) with the Authority for Privatization and Management of State Ownership (APAPS). Thus AVAS is in charge of implementing privatization and also of carrying out post-privatization tasks. The latter include monitoring the fulfilment of privatization contracts and care for outstanding receivables of the state. AVAS has to sell the last 120 state-owned companies during 2006 and 2007. By doing so, privatization will be finalized while the other activities of the present authority will continue.

AVAS is not the only government body in charge of privatization. Companies of the defence industry, mining and the energy sector are subordinated to the MEC and offered for sale by its subordinated 'Office of State Ownership and Privatization in Industry' (OPSPI). There is a process of restructuring going on in the three mentioned sectors, belatedly as compared to other industries. In addition, there are also five other industrial companies in the OPSPI portfolio, two of which are in the energy-intensive sectors. One of them is S.C. MELANA Savinesti, producing acrylic fibres, a company which stopped production in 2005. Another is the huge chemical company Oltchim in Ramnicu Valcea which exports 65% of its products and was still 95% state-owned in 2005. The strategy of the government concerning these companies is unclear. In fact it is difficult to find good reasons for maintaining a second privatization and assets management agency, thus we recommend that AVAS takes over the tasks of OPSPI.<sup>23</sup>

In 50 of the companies to be privatized by AVAS the state has majority, in the rest minority ownership. Most of the companies with majority state ownership are in bad shape, some of them are to be privatized a second time. Former governments stuck to the method of selling integral companies, which repeatedly failed when the existing framework was not considered viable by investors. The present government allows AVAS to sell companies by assets, a practice that made privatization in Hungary a success ten years ago. In this way companies can be liquidated and assets sold to potential investors. Thus finally Romania

---

<sup>23</sup> In December 2006 OPSPI was merged into AVAS.

has embarked on a privatization way that may really lead to the completion of that process as far as the companies in the portfolio of AVAS are concerned.

Only a few of the remaining 120 companies listed for privatization belong to the group of energy-intensive industries that are under investigation in this study. Six are registered in the basic chemical products sector (NACE 241), but five of those belong to the same Nitramonia Fagaras group. These are now on the priority list of AVAS due to major social and environment problems which make privatization particularly complicated. Another two priority list companies are in the NACE 271-273 sector of metallurgy. Laminorul Braila is a company that reduced its number of employees by a factor of ten in the past 15 years and accumulated debts of more than EUR 3.5 million. TEPRO Iasi is yet another unsuccessful privatization story also implicated in corruption charges.

AVAS still monitors around 7000 sale-purchase contracts, on a post-privatization basis, concluded for almost 5000 companies. AVAS is at court with a large number of litigation processes involving buyers failing to fulfil the provisions of the privatization contract. These contracts prescribe post-privatization employment and investment levels which may not be feasible under changing market circumstances. Tight monitoring of contract fulfilment may not be the best solution as it reduces the new owners' freedom to adapt to changes. It also prolongs the responsibility of the state authorities related to problems for which the new owner should have full responsibility. Court procedures may be long and unproductive. In addition, post-privatization monitoring allows any new government to question the privatization decisions of the former one and thus causes insecurity of ownership rights. In view of these problems, it would be useful to terminate all post-privatization litigations and withdraw from the monitoring of past contracts upon the termination of the privatization process. Only in this way would the withdrawal of the state from ownership rights in the privatized companies be complete.

The experience with active post-privatization monitoring is not good across the CEECs. The Czech government failed to press Volkswagen in the early 1990s to increase investments to the level agreed in the privatization contract at a time when the European car market was down. But huge investments took place later at the time of market recovery. In Hungary, conditionalities in the privatization process were very soon abandoned, as these could be attained only in exchange for lower sales prices and new owners could circumvent the contracts claiming that market circumstances had changed.

### **3.5 Horizontal policies**

#### **3.5.1 Regional policy**

Based on the Accession Treaty, regional policy and fiscal aid provided to backward regions in Romania have been adjusted to EU regulation. The difference between past Romanian

policy and the EU norms is that the Romanian government had given tax exemptions to companies in underdeveloped regions defined at the NUTS3 or community level. The main aim of the Romanian government's providing tax exemptions for companies settling in these regions had been to support the restructuring of the local economy and establish new workplaces after the ailing companies had been closed down. Many of these regions are areas of former heavy industries suffering from problems relating to lacking competitiveness and environmental protection. According to the derogation Romania received, companies in the deprived areas may retain their benefits, in some of the regions until 2008, in others until 2009 or even 2010. While keeping this fiscal aid for two to four years after accession, the government will have to calculate the net grant equivalent of all subsidies which may not surpass the rate of 50%, in the motor vehicle sector 30% of the eligible investment cost, thus complying with the general eligible subsidy levels applied for backward regions. This derogation helps keep existing contracts running, but does not provide any new facility to support restructuring of the energy-intensive industries. Another, similar exemption refers to the aid granted to companies in free trade areas. These are more recent facilities stimulating greenfield investments, which have usually not attracted energy-intensive industries.

Regional policy is offering tools for supporting programmes aimed at the economic recovery of areas affected by closures of major enterprises in mono-industrial regions. It has been applied following the closure of chemical and non-ferrous metallurgy plants in Copsa Mica and Zlatna. Such interference may become necessary if the currently pending privatization cases fail in the city of Braila caused by the bankruptcy of Laminorul and in the city of Fagaras related to the closure of Nitramonia.

Nevertheless, past programmes of regional rehabilitation were not particularly efficient. The special programmes for disfavoured zones, which aimed at the development of the business environment in the West Region, and the support for investment in post-closure mono-industrial areas (Jiu Valley, Baia Mare, Apuseni, Motru) did not produce significant improvements in the respective regions. They were followed by a series of smaller, more successful aid projects, using Phare funds, which ended up in producing a total of 7000 new jobs in the West Region in only a couple of years (ARD-West, 2001).

In the recently approved Regional Operational Programme (MIE, 2006), there is no specific regulatory framework destined for centres of potentially problematic energy-intensive industries or for disfavoured areas as such. Nonetheless, within the Priority Axis 2, 'Strengthening the regional and local business environment', significant importance is given to the rehabilitation of industrial sites, and specific opportunities of financing investments and local initiative are mentioned.

Even if regional restructuring in problem areas were to be successful, the labour demand may still remain low. In formerly densely populated industrial regions outmigration, both domestic and international, should be supported.

### **3.5.2 Energy efficiency**

In 2003, MEC launched the Strategy for Improving Energy Efficiency (MEC, 2003). There is a special part dedicated to the analysis of energy-intensive sectors, and the investments planned for the period up to 2010. However, the government in office since the end of 2004 had not announced by 2006 whether it intends to keep the same structure of public investments or to continue started projects during the years to come. The entire strategy departs from the finding that the primary energy intensity in the Romanian economy was 10 times higher than in the EU in 1990 and 6 times higher by 2000. It envisaged bringing this ratio to a level of 3-4 by 2010, by reducing primarily the energy consumption in metallurgy and the chemical industry (the main industry consumers).

A large part of high energy consumption is structural, due to the high share of energy-intensive sectors in Romania. Their share in industrial production is declining, thus decreasing the overall energy intensity of the economy. Another part of the currently high energy intensity is technology-based in specific industries. According to the Strategy, the intensity is supposed to decrease by 20% in ferrous metallurgy and by 15% in non-ferrous metallurgy (mainly aluminium). The investment plans for the future were generously set in the Strategy when taking into account the decreasing number of state-owned firms in these sectors. The investment plans were surpassing the total amount of investments of the 1990-2000 period in the case of non-ferrous metallurgy and keeping that level in basic chemical products (first of all the investment in Olchim).

While the 2003 government strategy targets mainly the financing of investments in state-owned companies, one could also think of supporting energy-saving investments in privately owned firms. Such projects may be linked with environmental programmes.

### **3.5.3 Policy programmes applied by the MEC to increase competitiveness**

For the period 2000-2004 the government applied the 'RELANSIN' programme, which financed projects linking industry and R&D facilities to solve issues related to restructuring, compliance with EU norms in technology and the environment.

A project in line with EU initiatives is the Centre for Industrial Productivity and Competitiveness, CIPC Romania, at the MEC. It is involved in productivity promotion, productivity measurement and database, training and consulting. These services are available to companies, also in the energy-intensive sectors.

In 2002 the MEC launched a project (modified in 2005, Decree no. 719/14.12.2005) to increase the competitiveness of production by financing company projects for quality management, environmental management, safety at work, quality control and product testing.

These and other such projects should be evaluated on a regular basis to find out how effective they are.

#### **3.5.4 Environmental policy**

Romania features alongside the EU-15, some of the current NMS-10 and Bulgaria in having committed to a reduction of its total greenhouse gas emissions of 8% with respect to its baseline year level (measured as a CO<sub>2</sub> equivalent) to be achieved as the average emissions level of the 2008-2012 period. The transition countries were characterized by excessively energy-intensive structures and high CO<sub>2</sub> emission levels up to their baseline year. But as their real GDP levels finally reach or surpass their baseline year levels after the transitional recession of the 1990s, they are doing so with leaner, cleaner and more modern technologies and production structures. In 2004, the greenhouse gas emissions level of the EU-15 was at the level of 1990, that of the Czech Republic and Slovakia at 75% of the level in the baseline year 1989, and that of Romania at only 52%. While the EU-15 will need to make some stronger efforts if it wants to meet its emissions target for 2008-2012, Romania will comfortably meet its Kyoto commitments.

The main mechanism introduced so far at the European Union level to help meet Kyoto targets is the European Union's Emissions Trading Scheme (EU ETS). It functions as follows: each EU member state must submit a National Allocation Plan (NAP) which states, for the emitting facilities (power plants, factories etc.) that are selected, the total (national) GHG (CO<sub>2</sub> equivalent) allocation over the trading period as well as the allocation for each facility that is selected. So far three trading periods have been pre-defined: 2005-2007, 2008-2012 and 2013-2017. The EU ETS, it should be noted, is designed to deal with the emissions of industry and of the energy sector. It does not deal with emissions by the two other main sectors, namely transport and households. Once the NAPs are officially submitted, the Commission assesses them and takes a decision for each member state. That decision constitutes the final word: each member state must comply with it, regardless of what was submitted in the NAP.

What has happened so far during the first trading period? It appeared during 2006 that the Commission decisions based on the first period NAPs had been a little too generous. The core principle of a scheme such as the EU ETS is that it should create scarcity, thus pushing companies to make a trade-off between cutting down on emissions or having to pay for the right to make them. What happened instead was that many member states reported being on track towards emitting less than their total allocations. As more detailed



data became available in late April 2006, the spot price of EU CO<sub>2</sub> allowances (one allowance representing the right to emit one tonne of CO<sub>2</sub>) crashed from a high of around EUR 30 down to around EUR 11. This was followed first by a partial recovery, with the spot price fluctuating around EUR 16 over the summer, and then by a slow descent to around EUR 6.50 by mid-December 2006. Of course there were a number of rather sharp criticisms against the handling of the NAPs in light of the events of April 2006, though misallocations should be expected when one first launches such schemes. However, as the independently assessed 2005 emissions data mentioned above became available in the course of 2006, the Commission found itself in a much stronger position to correctly assess future NAPs, and this is indeed what is happening at present.

DG Environment was gathering and assessing the second round NAPs from member states in 2006. They should have all come in by 30 June 2006 but some countries were late. In light of this the Commission initiated infringement procedures on 12 October 2006 against Austria, the Czech Republic, Denmark, Hungary, Italy and Spain. Other current member states that had submitted their NAPs at earlier dates have already been assessed and decisions have been made by the Commission with respect to their validity. These countries are Belgium, Germany, Greece, Ireland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Slovakia, Slovenia, Sweden and the UK. Decisions are pending for the remaining countries. Concerning the 13 countries already assessed (as on 9 February 2007), the Commission has imposed cuts on all of them except the UK and Slovenia, i.e. on 11 out of 13 of them. Furthermore the cuts are in some cases quite substantial, and also concern certain new member states that are on track towards meeting their Kyoto targets. These developments indicate that the Commission has now adopted a strict attitude and is seriously committed to forcing member states to hold down their emissions. In the case of the new member states it also reveals that the Commission is unwilling to let those countries that still have some margin with respect to their Kyoto targets increase their emissions by much more than may be expected given current emissions levels and given achievable capping of emissions with current technologies. In light of these recent developments, we expect that the Commission will likewise adopt a strict attitude towards Romania. As things stood on 9 February 2007, Romania had submitted its NAP to the Commission, though the Commission has yet to make its assessment. For reasons discussed in Christie (2007), we expect that Romania will also face cuts to its requested emissions cap.

Concerning other (non-greenhouse gas) air pollutants, Romania has emissions that are quite high by European standards if one measures emissions per euro of real GDP (measured at constant purchasing power standards). On the other hand, if one chooses to measure emissions on a per capita basis, one finds Romania to be better ranked than the EU-15 average. Focusing just on the most striking examples, one can say that Romania fares quite badly in terms of emissions of sulphur oxides (SO<sub>x</sub>, contributors to acid rain)

where it ranks sixth out of 27 for emissions per capita and third out of 27 for emissions per euro. By contrast, Romania has low emissions per capita for the other main type of contributor to acid rain, nitrogen oxides (NO<sub>x</sub>), ranking 25th out of 27. As Romania's economy grows one would expect emissions per euro to decrease due to a structural effect, notably as the share in GDP of the services sectors is expanding, but one will also need to see certain specific improvements (i.e. new technologies) in order to reduce emissions of pollutants, in particular sulphur oxides. In this respect the energy sector needs to continue its modernization, particularly as concerns the modernization or indeed replacement of certain thermal plants. Also, incentives need to be put in place to encourage the use of higher-quality types of fuels by both the energy sector and households, as discussed in EIA (2003).

Finally one may mention a number of transitional arrangements that were negotiated between the EU and Romania at the end of 2004 as part of the country's accession treaty. This is not exceptional: all of the NMS-10 that joined on 1 May 2004 had likewise negotiated a number of transitional arrangements. In this respect Romania does not look much worse a case than, for example, Poland or Latvia three years ago. Focusing just on the longest transitional periods, one may mention the treatment of waste landfills (deadline of July 2017 instead of 2009), the treatment of urban waste water (until 2018), some aspects of air pollution from large combustion plants (until 2016-17), the quality of drinking water (until 2015) and the Integrated Pollution Prevention and Control (IPPC) system (until 2015).<sup>24</sup>

### **3.5.5 Labour market policy**

The energy-intensive industries have been shedding workforce since the outset of transformation in 1990. This trend continued also after the year 2000, with the exception of the ceramics industry where employment stayed constant (see Part 2). Large one-time layoffs have usually been carried out in the course of large-scale restructuring programmes connected with privatization. These organized actions have been backed by active labour market policies which supported retraining and early retirement. The decrease of employment in Romania has generally not been accompanied by a proportional increase in unemployment, as many of the laid-off left the official labour force, went into the informal sector or took jobs abroad.

The 2003 labour code, partially amended in 2005, introduced some widely criticized rigidities for laying off workers. The labour code hinders layoffs for efficiency reasons. In addition, industry-wide collective agreements and wage bargaining results are mandatory (Daianu et al., 2006). Conditions and salaries negotiated at the industry level may be too

---

<sup>24</sup> For a more detailed discussion of CO<sub>2</sub> emissions and other environmental challenges see Christie (2007).

generous in the case of small businesses. More flexibility would thus be beneficial to keep SMEs competitive and preserve employment.

### **3.6 Conclusions and recommendations**

#### *Basic conditions relevant to industrial policy related to the energy-intensive industries*

- Romania has a relatively fast growing economy, a growth based on services rather than on industry. Manufacturing sector growth has been carried by just a few large FDI companies in the automotive sector, and the steel industry. But energy-intensive industries in general have a high share in production and exports, calling for special monitoring of their fate in times of rapid input-price adjustments.
- An energy price shock hit the Romanian industry in 2004-2005 independently of the world market prices for oil. The shock was related to an important step in the transition process, the termination of state aid which included artificially low electricity prices. Gas price adjustments will take place until the end of 2008.
- The state aid norms of the EU have not been set to tackle transition-related shocks. Thus either the energy price reform came belatedly in Romania or EU accession is premature. Now the policy tools for supporting adjustments are more limited than would have been the case outside the EU.
- The industrial policy framework of Romania has been adjusted to EU standards. Derogations apply in two broad areas: they help the steel industry to stretch out the adjustment process, and several industries can postpone the adherence to environmental norms. In addition, low prices for industrial consumers of domestic natural gas can be maintained until the end of 2008. There is no derogation in Romania's Accession Treaty for the energy-intensive industries to adjust to increased electricity and rising gas prices.
- Most of the companies in the energy-intensive manufacturing industries have been privatized and the larger ones are predominantly in the ownership of foreign investors. This means that companies must come up with the necessary means and strategies for survival being aware of the future price liberalization programmes. But many SMEs and companies in the course of privatization need support from carefully implemented horizontal policies.

#### *Recommendations to improve industrial policy related to the energy-intensive industries*

- A detailed but comprehensive analysis of the competitive position of individual industries would be beneficial because each of them face a rapidly changing business environment due to rising electricity and gas prices as well as to EU accession. Industrial policy has to decide whether it intends to smoothen the transformation and restructuring process going on in these industries, or to leave it completely to the

market forces. We are not in a position to recommend one or the other way, but encourage a better founded decision-making. Based on the publicly available documents of the Ministry of Industry and Trade, the foreign trade strategy could be taken as a starting point for an improved industrial policy strategy.

- Industrial policy lacks the instruments to protect the energy-intensive producers against the adverse effects of high energy prices. What it may do to mitigate the impact is to foster restructuring both in the energy-intensive industries and in the power generation sector. In these efforts, the environment-related strategies can be combined with the innovation-oriented state aid programmes. Investments in energy generation are necessary to replace inefficient power plants with new ones in order to lower energy prices for industrial consumers in the future. Also, the international connection of the energy-grid has to be improved to allow for more imports at lower prices.
- As private owners are in charge of caring for the future of their companies, the privatization process should be finalized soon. It seems that AVAS is on the right track to do so. But the involvement of the Ministry of Industry and Commerce is less transparent. In fact it is difficult to find good reasons for maintaining a second privatization and assets management agency, thus we recommend that AVAS takes over the tasks of OPSPI.<sup>25</sup> Another important recommendation is that, when privatization has been completed, also post-privatization monitoring should come to an end. The state should finally give up its involvement in the business sector and concentrate on improving the business environment. A third problem related to privatization concerns the future development of SMEs privatized through management-employee-buyout and lacking access to capital for modernization. They need venture capital, management consulting, etc. that could be the subject of industrial policy programmes.
- Restructuring in the energy-intensive industries may lead to further lay-offs. The government has adequate experience with active labour market policies, retraining and severance payments which can be applied if necessary. Fortunately, layoffs in energy-intensive industries occur at a time when the Romanian economy is booming, which is supportive to finding new jobs. However, new jobs are rarely created in the same area of manufacturing and skilled labour from these industries may find it difficult to switch to services or skill-intensive manufacturing industries. The regional policy tools available under EU regulation could be concentrated in geographic areas most severely hit. But such a policy should be flexible, taking into account that past employment levels cannot be restored in restructuring areas, thus the regional mobility of the workforce should also be encouraged. The problem of restructuring regions should be integrated in the Regional Operational Programme. Also the labour code

---

<sup>25</sup> This recommendation was valid at the time of writing but meanwhile OPSPI has been merged into AVAS (as of December 2006).

should allow more flexibility of employment. Employment conditions and salaries negotiated at the industry level may not be mandatory especially for SMEs.

- The overall modernization programme which is included in the government's industrial policy and export strategy should be adapted to the specific needs of the energy-intensive sectors. Application of ITC and R&D results should be part of the modernization investments which can decrease energy intensity in manufacturing, but these measures are far from sufficient because these industries usually rely on standard international technologies. Clustering, promotion of market access, etc. can reduce the cost of market entry and help maintain competitiveness on international markets. These policies should be applied not only centrally but also regionally in the country to allow for better access of companies, in particular SMEs, to existing facilities. The priority list of industries in the National Export Strategy is a good addition to horizontal policies. It would be necessary however to specify how the horizontal policy tools can be used to help these industries in particular. For the internationally more competitive Romanian companies it is time to go international, not only with products but also with production abroad.
- Delaying the full liberalization of natural gas prices for industrial consumers should be applied only if accompanied by specific programmes of modernization. Companies – most of them privately owned – are already increasing their investments. Specific co-financing schemes, based on EU funds and state aid destined for environmental protection, may represent a solution for increasing their competitiveness within the EU single market beyond 2008. The timetable of the price adjustments should be agreed with the EU Commission and anchored in the post-accession monitoring process.
- Investments into environment-related technology and R&D can be stimulated by using EU funds. The technological upgrading necessary for improving emission standards and for increasing energy efficiency are, in general, similar. To start with, companies should be supported to work out restructuring and environmental upgrading projects eligible for EU funding.

## References

- ADR-Vest (National Agency for Regional Development – West Region) (2001), Annual Report [http://www.adr5vest.ro/attach\\_files/2\\_zone\\_defavorizate\\_1141217078\\_1143465142.pdf](http://www.adr5vest.ro/attach_files/2_zone_defavorizate_1141217078_1143465142.pdf).
- Christie, E. (2006), 'Energy intensity and industry composition: a comparison between selected old and new member states', *wiiw Monthly Report*, No. 1, The Vienna Institute for International Economic Studies (wiiw), January.
- Christie, E. (2007), 'Romania: EU entry and related environmental challenges', *wiiw Monthly Report*, No. 1, The Vienna Institute for International Economic Studies (wiiw), January.
- Daianu, D. et al. (2005), 'Romania and the Lisbon agenda, sustaining growth and fostering jobs in an emerging economy, 3<sup>rd</sup> report', GEA, Group of Applied Economics, Bucharest, October.
- EIA (2003), 'Romania: Environmental Issues', EIA Country Analysis Brief, Energy Information Administration, Washington DC, October.
- EU Commission (2002), Industrial policy for an enlarged Europe, COM(2002) 714, Brussels, December.
- EU Commission (2003), Restructuring of the steel industry in the new Member States, candidate and third countries, [http://ec.europa.eu/enterprise/steel/framework\\_policy\\_enlargement.htm](http://ec.europa.eu/enterprise/steel/framework_policy_enlargement.htm).
- EU Commission (2005a), Negotiations on Accession by Bulgaria and Romania to the European Union, Treaty of Accession, Brussels, 31 March.
- EU Commission (2005b), Implementing the Community Lisbon Programme: A policy framework to strengthen EU manufacturing – towards a more integrated approach for industrial policy, COM(2005) 474, Brussels, October.
- EU Commission (2005c), European industry: a sectoral overview, SEC(2005) 1216, Brussels, October.
- EU Commission (2005d), A new industry policy: Making the EU a more attractive place for industry, MEMO/05/352, Brussels, October.
- EU Commission (2006), Romania May 2006 Monitoring Report, Brussels.
- Government of Romania (2004), National energy efficiency strategy (HOTĂRÂRE nr. 163 din 12 februarie 2004 privind aprobarea Strategiei naționale în domeniul eficienței energetice).
- Gratiasová, L. (2006), Progress report on the implementation of the 'Czech Steel Sector Restructuring Programme' for the European Commission, Ministry of Industry and Trade of the Czech Republic, Prague, April.
- Hunya, G. (2004), 'Manufacturing FDI in New EU Member States – Foreign Penetration and Location Shifts between 1998 and 2002', *wiiw Research Reports*, No. 311, The Vienna Institute for International Economic Studies (wiiw), November.
- Hunya, G. (2007), 'Privatization Disputes in Romania – the Petrom Case', *wiiw Research Reports*, No. 337, The Vienna Institute for International Economic Studies (wiiw), March.
- MEC – Ministry of Economy and Commerce (2003), Road map for energy sector of Romania, Bucharest, July.
- MEC – Ministry of Economy and Commerce (2004), Restructuring strategy for the steel industry in Romania for the period 2004-2010. [http://www.minind.ro/domenii\\_sectoare/strategie\\_aprilie.html](http://www.minind.ro/domenii_sectoare/strategie_aprilie.html) Bucharest, April.
- MEC – Ministry of Economy and Commerce (2005a), Industrial Policy of Romania 2005-2008 (HOTĂRÂRE nr. 1172 din 29 septembrie 2005 privind aprobarea Politicii industriale a României pentru perioada 2005-2008 și a Planului de acțiune pentru implementarea politicii industriale a României în perioada 2005-2006).
- MEC – Ministry of Economy and Commerce (2005b), Romania: National Export Strategy 2005-2009, Bucharest, September, [http://www.dce.gov.ro/SNE/National\\_exp\\_strategy.html](http://www.dce.gov.ro/SNE/National_exp_strategy.html).

MEC – Ministry of Economy and Commerce (2006a), Energy policy of Romania 2006-2009 (Politica energetica a Romaniei in perioada 2006-2009), Bucharest, May,  
[http://www.minind.ro/foaie/PEN\\_Document\\_de\\_discutie\\_3\\_mai\\_2006.pdf](http://www.minind.ro/foaie/PEN_Document_de_discutie_3_mai_2006.pdf).

MEC – Ministry of Economy and Commerce (2006b), Romanian Industry, June.

MIE – Ministry of European Integration (2006), Romania: Regional Operational Programme 2007-2013, Bucharest, April, <http://www.mie.ro/documente/POR/ROP.pdf>.

ANRGN – National Regulatory Authority for Natural Gas Sector (2006), [www.anrgn.ro](http://www.anrgn.ro).

Trusca, V. (2005), 'Implementation of Flexible Mechanisms and EU ETS in Romania', Presentation given at the 22nd Session of the Subsidiary Bodies (SB 22), Bonn, May.

# Appendix 1

Table A1

## Romania: Selected economic indicators

	2001	2002	2003	2004	2005 <sup>1)</sup>	2005 1st quarter	2006	2006 forecast	2007
Population, th pers., mid-year <sup>2)</sup>	22408.4	21794.8	21733.6	21673.3	21623.8	.	.	.	.
Gross domestic product, RON mn, nom.	116768.7	151475.1	197564.8	246371.7	287186.3	50984.7	61034.7	331700	378900
annual change in % (real)	5.7	5.1	5.2	8.4	4.1	6.0	6.9	5.0	4.8
GDP/capita (EUR at exchange rate)	2002	2224	2420	2805	3665	.	.	.	.
GDP/capita (EUR at PPP - wiiw)	5460	6060	6520	7290	8140	.	.	.	.
Gross industrial production									
annual change in % (real)	8.3	4.3	3.1	5.3	2.0	5.7	4.5	4	4
Gross agricultural production									
annual change in % (real)	22.7	-3.5	7.5	24.1	.	.	.	.	.
Construction output total									
annual change in % (real)	9.0	10.0	9.8	9.2	8.2	3.2	20.7	.	.
Actual final consump.of househ., RON mn, nom.	91718.6	116940.4	149259.0	189538.4	223331.3	42970.4	52173.4	.	.
annual change in % (real)	6.8	4.8	8.2	12.9	9.1	12.5	10.9	.	.
Gross fixed capital formation, RON mn, nom.	24115.4	32283.6	42293.0	53291.8	66356.8	7903.3	9547.8	.	.
annual change in % (real)	10.2	8.2	8.5	10.8	13.1	5.2	11.4	10	8
LFS - employed persons, th, avg. <sup>2(3)</sup>	10696.9	9234.3	9222.5	9157.6	9146.6	8948.1	.	.	.
annual change in %	-0.6	.	-0.1	-0.7	-0.1	1.5	.	.	.
Reg. employees in industry, th pers., avg.	1901.0	1891.0	1848.0	1741.0	1704.0	.	.	.	.
annual change in %	1.5	-0.5	-2.3	-5.8	-2.1	-0.2	-4.0	.	.
LFS - unemployed, th pers., average <sup>2(3)</sup>	750.0	845.3	691.8	799.5	704.5	831.6	.	.	.
LFS - unemployment rate in %, average <sup>2(3)</sup>	6.6	8.4	7.0	8.0	7.2	8.5	.	7	7
Reg. unemployment rate in %, end of period	8.8	8.4	7.4	6.3	5.9	6.0	6.2	5.8	5.7
Average gross monthly wages, RON	422.0	532.1	663.8	818.3	957.5	915.6	1072.7	.	.
annual change in % (real, net)	5.1	2.4	10.8	10.6	13.5	13.1	5.9	.	.
Consumer prices, % p.a.	34.5	22.5	15.3	11.9	9.0	8.8	8.6	8.5	8.0
Producer prices in industry, % p.a.	38.1	23.0	19.5	19.1	10.5	13.3	10.9	.	.
General governm.budget, nat.def., % GDP									
Revenues	30.1	29.6	28.7	28.7	29.1	.	.	.	.
Expenditures	33.3	32.2	30.9	29.9	29.9	.	.	.	.
Deficit (-) / surplus (+)	-3.2	-2.6	-2.2	-1.2	-0.8	.	.	-1	-3
Public debt, EU-def., % of GDP <sup>4)</sup>	23.2	23.8	20.7	18.0	15.2	.	.	.	.
Discount rate, % p.a., end of period <sup>5)</sup>	35.0	20.4	20.4	18.0	7.5	10.8	8.5	.	.
Current account, EUR mn	-2488	-1623	-3060	-5099	-6891	-980	-1564	-9000	-10000
Current account in % of GDP	-5.5	-3.3	-5.8	-8.4	-8.7	-7.1	-9.1	-9.5	-9.5
Gross reserves of NB excl. gold, EUR mn	4445.3	5876.8	6373.6	10848.2	16795.6	12561.5	18146.1	.	.
Gross external debt, EUR mn <sup>6)</sup>	14685.5	16199.8	17835.3	21894.8	30653.9	.	32360.6	.	.
FDI inflow, EUR mn	1294	1212	1946	5183	5197	754	1720	8000	5000
FDI outflow, EUR mn	-18	18	36	56	-11	8	29	.	.
Exports of goods, BOP, EUR mn	12722	14675	15614	18935	22255	5095	6213	26700	29300
annual growth rate in %	12.9	15.4	6.4	21.3	17.5	17.4	21.9	20	10
Imports of goods, BOP, EUR mn	16045	17427	19569	24258	30061	6156	7907	37600	42100
annual growth rate in %	22.1	8.6	12.3	24.0	23.9	21.1	28.4	25	12
Exports of services, BOP, EUR mn	2273	2468	2671	2903	3931	790	1141	5500	7150
annual growth rate in %	19.0	8.6	8.2	8.7	35.4	25.9	44.4	40	30
Imports of services, BOP, EUR mn	2402	2463	2609	3116	4365	909	1130	5670	7300
annual growth rate in %	10.7	2.5	5.9	19.4	40.1	48.5	24.3	30	29
Average exchange rate RON/USD	2.9061	3.3055	3.3200	3.2637	2.9137	2.8297	2.9624	.	.
Average exchange rate RON/EUR (ECU)	2.6027	3.1255	3.7556	4.0532	3.6234	3.7094	3.5641	3.5	3.6
Purchasing power parity RON/USD	0.8324	0.9893	1.1894	1.3312	1.3563	.	.	.	.
Purchasing power parity RON/EUR	0.9547	1.1475	1.3946	1.5586	1.6311	.	.	.	.

\*) On 1 July 2005 the new Romanian leu was introduced (1 RON = 10000 ROL). Data in this table are presented in new leu (RON).

Notes: 1) Preliminary. - 2) From 2002 according to census March 2002. - 3) From 2002 break in methodology. - 4) According to ESA'95, excessive deficit procedure. - 5) From February 2002 reference rate of NB. - 6) From 2004 including short-term deposits and foreign direct investment intercompany lending.

Source: wiiw Database incorporating national statistics; European Commission (Spring 2006); wiiw forecasts.



Table A2

### Production shares of individual industries in total manufacturing

(at current prices), 2005, in %

NACE		2004	2003	Hungary	Poland	2004	2003
		Romania	Czech Republic			Slovak Republic	Bulgaria
D	Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0
15	Food products and beverages	17.2	13.0 <sup>1)</sup>	12.1	19.7	9.0	17.3
16	Manufacture of tobacco products	1.9	.	0.2	0.6	0.1	4.8
17	Textiles	2.9	2.4	0.8	1.7	1.1	3.7
18	Wearing apparel; dressing and dyeing of fur	5.0	0.8	1.1	1.4	1.0	6.0
19	Tanning and dressing of leather; manuf. of related art.	2.2	0.3	0.4	0.5	1.4	1.2
20	Wood and products of wood and cork	3.7	3.1	1.0	3.7	1.3	1.9
<b>21</b>	<b>Paper and paper products</b>	<b>1.3</b>	<b>2.1</b>	<b>1.5</b>	<b>2.5</b>	<b>3.4</b>	<b>2.2</b>
22	Publishing, printing and reproduction of recorded media	1.8	2.6	2.1	3.5	1.1	2.4
23	Coke and refined petroleum products	11.7	2.5	6.6	6.1	8.1	.
<b>24</b>	<b>Chemicals and chemical products</b>	<b>7.4</b>	<b>5.3</b>	<b>7.5</b>	<b>7.1</b>	<b>3.9</b>	<b>7.1</b>
25	Rubber and plastic products	3.1	6.0	3.6	5.7	4.3	2.8
<b>26</b>	<b>Other non-metallic mineral products</b>	<b>4.3</b>	<b>5.5</b>	<b>2.8</b>	<b>4.7</b>	<b>4.0</b>	<b>4.5</b>
<b>27</b>	<b>Basic metals</b>	<b>12.6</b>	<b>6.6</b>	<b>4.2</b>	<b>4.9</b>	<b>12.0</b>	<b>9.6</b>
28	Fabricated metal products, exc. mach. & equip.	4.1	7.9	4.0	7.3	3.6	3.6
29	Machinery and equipment	4.1	8.2	5.2	6.1	7.3	7.0
30	Office, accounting and computing machinery	0.3	3.4	4.0	0.1	2.7	0.3
31	Electrical machinery and apparatus	2.7	5.9	7.5	3.7	5.3	2.7
32	Radio, TV & communication equip. & apparatus	0.7	3.4	18.1	2.2	2.1	1.4
33	Medical, precision & optical instr., watches & clocks	0.7	1.5	0.9	1.2	0.8	0.7
34	Motor vehicles, trailers and semi-trailers	4.6	14.2	14.8	10.1	23.3	0.2
35	Other transport equipment	2.5	1.3	0.6	2.0	1.2	1.3
36	Furniture; manufacturing n.e.c.	3.5	3.2	1.0	4.7	3.1	.
37	Recycling	1.7	0.5	0.1	0.5	0.1	.
<b>21+24+26+27</b>	<b>Energy-intensive industries</b>	<b>25.6</b>	<b>19.5</b>	<b>16.0</b>	<b>19.2</b>	<b>23.3</b>	<b>23.3</b>

Note: 1) NACE 15+16.

Source: Eurostat, wiw Industrial Database.

Table A3

### Employment shares of individual industries in total manufacturing

2005, in %

NACE		2003		2004		2003	
		Romania	Czech Republic	Hungary	Poland	Slovak Republic	Bulgaria
D	Manufacturing total	100.0	100.0	100.0	100.0	100.0	100.0
15	Food products and beverages	11.9	11.4 <sup>1)</sup>	16.2	18.4	10.4	15.8
,16	Manufacture of tobacco products	0.2	.	0.2	0.3	0.1	1.7
17	Textiles	4.7	4.6	3.2	3.4	4.2	5.7
18	Wearing apparel; dressing and dyeing of fur	18.7	3.2	5.5	6.4	6.9	23.2
19	Tanning and dressing of leather; manuf. of related art.	6.5	1.0	1.8	1.4	4.0	3.4
20	Wood and products of wood and cork	4.6	3.8	2.7	5.2	2.5	2.7
<b>21</b>	<b>Paper and paper products</b>	<b>0.9</b>	<b>1.6</b>	<b>2.6</b>	<b>1.8</b>	<b>2.1</b>	<b>2.0</b>
22	Publishing, printing and reproduction of recorded media	1.6	2.8	3.4	3.4	2.1	2.1
23	Coke and refined petroleum products	0.9	0.3	1.0	0.7	1.1	.
<b>24</b>	<b>Chemicals and chemical products</b>	<b>3.4</b>	<b>3.6</b>	<b>4.5</b>	<b>4.4</b>	<b>3.4</b>	<b>4.3</b>
25	Rubber and plastic products	2.6	5.6	5.4	5.7	4.3	3.1
<b>26</b>	<b>Other non-metallic mineral products</b>	<b>4.3</b>	<b>6.2</b>	<b>3.6</b>	<b>5.6</b>	<b>5.7</b>	<b>3.6</b>
<b>27</b>	<b>Basic metals</b>	<b>4.1</b>	<b>5.0</b>	<b>2.6</b>	<b>2.9</b>	<b>7.6</b>	<b>3.8</b>
28	Fabricated metal products, exc. mach. & equip.	5.8	10.7	7.8	9.4	6.8	5.2
29	Machinery and equipment	7.5	12.1	8.7	7.9	11.2	11.0
30	Office, accounting and computing machinery	0.2	0.7	1.1	0.2	0.7	0.3
31	Electrical machinery and apparatus	5.3	7.8	9.6	4.0	10.6	2.9
32	Radio, TV & communication equip. & apparatus	0.6	2.4	7.3	1.2	2.5	0.9
33	Medical, precision & optical instr., watches & clocks	0.9	2.3	2.1	1.7	1.6	0.9
34	Motor vehicles, trailers and semi-trailers	4.2	7.4	6.0	4.6	6.2	.
35	Other transport equipment	4.1	1.8	1.3	3.0	2.2	1.5
36	Furniture; manufacturing n.e.c.	6.5	5.3	3.5	8.0	3.7	4.1
37	Recycling	0.6	0.4	0.2	0.4	0.2	0.1
<b>21+24+26+27</b>	<b>Energy-intensive industries</b>	<b>12.7</b>	<b>16.4</b>	<b>13.2</b>	<b>14.7</b>	<b>18.8</b>	<b>13.8</b>

Note: 1) NACE 15+16.

Source: Eurostat, iwiw Industrial Database.

Table A4

## Production growth in energy-intensive industries in Romania and other CEECs, 2000-2005

### Pulp, paper and paper products (NACE 21)

Production growth (at constant prices 1999)

	annual changes in %					av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
	2001	2002	2003	2004	2005	2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>10.9</b>	<b>10.2</b>	<b>-0.2</b>	<b>-2.9</b>	<b>4.9</b>	<b>4.5</b>	<b>7.9</b>	<b>-3.4</b>
Czech Republic	6.2	3.8	2.0	6.4	.	4.6 <sup>2)</sup>	5.9 <sup>2)</sup>	-1.3
Hungary	1.8	5.8	3.2	-3.1	2.2	1.9	6.2	-4.3
Poland	9.0	3.1	11.2	12.6	6.7	8.5	6.2	2.3
Slovak Republic	9.9	-8.4	-1.7	18.3	10.3	5.2	7.2	-2.0
Bulgaria	-8.1	9.6	15.5	5.0	8.9	5.9	10.3	-4.4

### Chemicals (NACE 24)

Production growth (at constant prices 1999)

	annual changes in %					av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
	2001	2002	2003	2004	2005	2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>-8.8</b>	<b>2.6</b>	<b>5.8</b>	<b>34.3</b>	<b>3.1</b>	<b>6.5</b>	<b>7.9</b>	<b>-1.4</b>
Czech Republic	0.0	-2.6	0.7	11.4	5.7	2.9	6.2	-3.3
Hungary	-3.8	1.8	7.5	4.5	6.3	3.2	6.2	-3.0
Poland	1.7	7.4	12.0	10.3	3.3	6.9	6.2	0.7
Slovak Republic	2.6	4.5	-5.4	-1.9	3.2	0.5	7.2	-6.7
Bulgaria	-2.9	-1.5	10.8	3.0	18.1	5.2	10.3	-5.1

### Manufacture of other non-metallic mineral products (NACE 26)

Production growth (at constant prices 1999)

	annual changes in %					av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
	2001	2002	2003	2004	2005	2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>1.8</b>	<b>3.5</b>	<b>-0.4</b>	<b>16.8</b>	<b>-2.4</b>	<b>3.7</b>	<b>7.9</b>	<b>-4.2</b>
Czech Republic	-0.8	0.3	5.5	7.8	3.0	3.1	6.2	-3.1
Hungary	4.0	2.8	1.7	-3.3	17.4	4.3	6.2	-1.9
Poland	-5.5	4.2	6.4	11.9	4.0	4.0	6.2	-2.2
Slovak Republic	10.2	1.3	4.2	2.5	5.1	4.6	7.2	-2.6
Bulgaria	5.2	11.9	14.7	28.0	15.8	14.9	10.3	4.6

### Manufacture of basic metals (NACE 27)

Production growth (at constant prices 1999)

	annual changes in %					av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
	2001	2002	2003	2004	2005	2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>13.1</b>	<b>21.8</b>	<b>-19.1</b>	<b>13.5</b>	<b>2.0</b>	<b>5.2</b>	<b>7.9</b>	<b>-2.7</b>
Czech Republic	6.1	-5.1	13.3	10.5	.	6.0 <sup>2)</sup>	5.9 <sup>2)</sup>	0.1
Hungary	-3.3	4.3	8.2	6.5	-3.3	2.4	6.2	-3.8
Poland	-16.9	-3.0	2.9	22.1	-6.7	-1.1	6.2	-7.3
Slovak Republic	3.8	10.2	5.6	-3.0	-1.7	2.9	7.2	-4.3
Bulgaria	-7.6	5.7	32.3	61.1	0.4	15.9	10.3	5.6

Notes: 1) Growth rate pulp, paper and paper products - growth rate total manufacturing. 2) 2000-04.

Source: Eurostat SBS, wiiw Industrial Database.

Table A5

**Employment in energy-intensive industries in Romania and other CEECs, 2000-2005****Pulp, paper and paper products (NACE 21)**

Number of employees, thousand persons

	2000	2001	2002	2003	2004	2005	av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
							2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>17.0</b>	<b>16.0</b>	<b>17.0</b>	<b>16.0</b>	<b>15.0</b>	<b>13.1</b>	<b>-5.1</b>	<b>-1.3</b>	<b>-3.8</b>
Czech Republic	19.1	19.9	20.1	19.5	18.9	.	-0.1 <sup>2)</sup>	-1.0 <sup>2)</sup>	0.9
Hungary <sup>3)</sup>	1.5	1.3	1.5	1.5	1.4	1.4	-1.7	-2.0	0.3
Poland	39.6	37.4	35.9	36.3	39.1	40.8	0.6	-1.5	2.1
Slovak Republic	10.2	9.8	8.9	8.5	7.6	.	-7.3 <sup>2)</sup>	-1.1 <sup>2)</sup>	-6.2
Bulgaria	12.1	10.4	12.4	12.2	12.3	12.6	0.9	1.9	-1.0

**Chemicals (NACE 24)**

Number of employees, thousand persons

	2000	2001	2002	2003	2004	2005	av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
							2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>73.0</b>	<b>69.0</b>	<b>64.0</b>	<b>58.0</b>	<b>51.0</b>	<b>50.4</b>	<b>-7.2</b>	<b>-1.3</b>	<b>-5.9</b>
Czech Republic	40.0	39.0	38.0	39.0	37.0	38.0	-1.0	-0.6	-0.4
Hungary	35.4	34.2	33.0	32.7	32.2	31.0	-2.8	-2.0	-0.8
Poland	112.3	105.5	100.0	98.6	99.9	100.8	-2.1	-1.5	-0.6
Slovak Republic	19.0	19.0	17.4	15.1	12.3	11.8	-9.0	-0.3	-8.7
Bulgaria	32.7	31.8	27.9	25.6	23.9	24.3	-5.7	1.9	-7.7

**Manufacture of other non-metallic mineral products (NACE 26)**

Number of employees, thousand persons

	2000	2001	2002	2003	2004	2005	av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
							2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>85.0</b>	<b>84.0</b>	<b>77.0</b>	<b>72.0</b>	<b>63.0</b>	<b>62.6</b>	<b>-5.9</b>	<b>-1.3</b>	<b>-4.6</b>
Czech Republic	71.0	74.0	72.0	67.0	65.0	65.0	-1.8	-0.6	-1.2
Hungary	30.5	29.1	27.8	27.4	26.5	24.7	-4.2	-2.0	-2.2
Poland	156.6	146.0	134.8	125.6	127.5	128.5	-3.9	-1.5	-2.4
Slovak Republic	22.7	22.4	22.4	21.5	20.7	21.2	-1.3	-0.3	-1.0
Bulgaria	24.5	22.7	21.8	22.0	22.9	25.9	1.1	1.9	-0.8

**Manufacture of basic metals (NACE 27)**

Number of employees, thousand persons

	2000	2001	2002	2003	2004	2005	av. annual changes		Growth differential <sup>1)</sup> in ppt 2000-05
							2000-05	Total manufacturing 2000-05	
<b>Romania</b>	<b>95.0</b>	<b>95.0</b>	<b>85.0</b>	<b>76.0</b>	<b>63.0</b>	<b>60.3</b>	<b>-8.7</b>	<b>-1.3</b>	<b>-7.4</b>
Czech Republic	73.7	72.8	65.2	60.5	60.0	.	-5.0 <sup>2)</sup>	-1.0 <sup>2)</sup>	-4.0
Hungary	20.8	20.3	19.9	20.0	18.7	18.2	-2.8	-2.0	-0.8
Poland	98.1	83.0	74.6	68.5	66.5	66.8	-7.4	-1.5	-5.9
Slovak Republic	29.2	30.7	31.6	29.2	27.8	.	-1.2 <sup>2)</sup>	-1.1 <sup>2)</sup>	-0.1
Bulgaria	31.5	27.7	23.7	23.2	23.3	23.9	-5.4	1.9	-7.3

Notes: 1) Growth rate pulp, paper and paper products - growth rate total manufacturing. 2) 2000-04. - 3) NACE 211.

Source: Eurostat, wiiw Industrial Database.

Table A6

**Productivity, in national currency, at constant prices 1999, 2000-2005 <sup>1)</sup>****Pulp, paper and paper products (NACE 21)**

	2000	2001	2002	2003	2004	2005	in % of total manuf. 2004	av. annual change in % Total manuf. 2001-05	growth differential <sup>2)</sup> in ppts 2001-05	
<b>Romania, RON</b>	<b>25486</b>	<b>30030</b>	<b>31144</b>	<b>33036</b>	<b>34228</b>	<b>41176</b>	<b>123.4</b>	<b>10.1</b>	<b>9.3</b>	<b>0.8</b>
Czech Rep., CZK	2076060	2110727	2173896	2279535	2498279	.	139.5	4.7 <sup>3)</sup>	6.9 <sup>3)</sup>	-2.2
Hungary, HUF <sup>4)</sup>	29133807	31857109	29531930	30228856	29316136	28466970	169.5	-0.3	8.4	-8.7
Poland, PLN	228362	263556	283080	311316	325439	332775	147.1	7.8	7.8	0.0
Slovak Rep., SKK	2534184	2918979	2937647	3023292	4018717	.	193.8	12.2 <sup>3)</sup>	9.2 <sup>3)</sup>	3.0
Bulgaria, BGN	19445	20730	19067	22340	23319	24744	69.5	4.9	8.3	-3.3

**Chemicals (NACE 24)**

	2000	2001	2002	2003	2004	2005	in % of total manuf. 2004	av. annual change in % total manuf. 2001-05	growth differential <sup>2)</sup> in ppts 2001-05	
<b>Romania, RON</b>	<b>38161</b>	<b>36820</b>	<b>40741</b>	<b>47550</b>	<b>72647</b>	<b>75810</b>	<b>261.9</b>	<b>14.7</b>	<b>9.3</b>	<b>5.4</b>
Czech Rep., CZK	2327824	2387511	2386632	2341714	2749679	2829926	153.5	4.0	6.8	-2.8
Hungary, HUF	17398909	17311158	18281486	19828145	21016004	23279686	121.5	6.1	8.4	-2.3
Poland, PLN	232137	251300	284740	323437	352109	360481	159.1	9.2	7.8	1.4
Slovak Rep., SKK	1961963	2005784	2298502	2496636	3003841	3225768	144.9	10.5	7.5	3.0
Bulgaria, BGN	41108	41056	46105	55507	63426	73701	189.1	11.6	8.3	3.4

**Manufacture of other non-metallic mineral products (NACE 26)**

	2000	2001	2002	2003	2004	2005	in % of total manuf. 2004	av. annual change in % total manuf. 2001-05	growth differential <sup>2)</sup> in ppts 2001-05	
<b>Romania, RON</b>	<b>16171</b>	<b>16658</b>	<b>18816</b>	<b>20046</b>	<b>26750</b>	<b>26282</b>	<b>96.4</b>	<b>10.2</b>	<b>9.3</b>	<b>0.9</b>
Czech Rep., CZK	1402751	1335115	1376318	1560375	1733841	1785856	96.8	4.9	6.8	-1.9
Hungary, HUF	8368151	9113844	9819710	10111214	10114430	12763339	58.5	8.8	8.4	0.4
Poland, PLN	137877	139753	157722	180108	198538	204873	89.7	8.2	7.8	0.4
Slovak Rep., SKK	1035439	1156098	1171494	1272108	1350079	1388389	65.1	6.0	7.5	-1.5
Bulgaria, BGN	25371	28794	33561	38238	44171	45059	131.7	13.6	8.3	5.3

**Manufacture of basic metals (NACE 27)**

	2000	2001	2002	2003	2004	2005	in % of total manuf. 2004	av. annual change in % total manuf. 2001-05	growth differential <sup>2)</sup> in ppts 2001-05	
<b>Romania, RON</b>	<b>47286</b>	<b>53481</b>	<b>72774</b>	<b>65846</b>	<b>90130</b>	<b>96067</b>	<b>325.0</b>	<b>15.2</b>	<b>9.3</b>	<b>5.9</b>
Czech Rep., CZK	1660868	1782756	1890144	2306098	2571698	.	143.6	11.6 <sup>3)</sup>	6.9 <sup>3)</sup>	4.7
Hungary, HUF	18332815	18165977	19280972	20819718	23677275	23519512	136.9	5.3	8.4	-3.1
Poland, PLN	223370	219390	236771	265333	333715	309958	150.8	6.8	7.8	-1.0
Slovak Rep., SKK	2403899	2376065	2543944	2900769	2959723	.	142.8	5.3 <sup>3)</sup>	9.2 <sup>3)</sup>	-3.9
Bulgaria, BGN	53078	55891	68756	93198	149266	146016	445.1	22.4	8.3	14.2

Notes: 1) Production at constant prices 1999 / number of employees.- 2) Growth rate textile and textile products - growth rate total manufacturing.- 3) 2000-04. - 4) NACE 211.

Source: wiiw Industrial Database.

Table A7

**Comparison of labour productivity, conversion at exchange rates and in PPS CAP 2004<sup>1)</sup>****Pulp, paper and paper products (NACE 21)**

	Productivity in EUR	Romanian Productivity in % of productivity in	Productivity at PPS CAP	Romanian Productivity in % of productivity in
Romania	30629		57510	
Czech Republic	81674	37.5	126712	45.4
Hungary	48777	62.8	66179	86.9
Poland	80878	37.9	140081	41.1
Slovak Republic	107953	28.4	147168	39.1
Bulgaria	21808	140.4	39523	145.5
EU-25 <sup>2)</sup>	197599	15.5	197599	29.1

**Chemicals (NACE 24)**

	Productivity in EUR	Romanian Productivity in % of productivity in	Productivity at PPS CAP	Romanian Productivity in % of productivity in
Romania	53167		99829	
Czech Republic	108045	49.2	167625	59.6
Hungary	120093	44.3	162939	61.3
Poland	90494	58.8	156737	63.7
Slovak Republic	75665	70.3	103151	96.8
Bulgaria	33283	159.7	60319	165.5
EU-25 <sup>2)</sup>	291492	18.2	291492	34.2

**Non-metallic mineral products (NACE 26)**

	Productivity in EUR	Romanian Productivity in % of productivity in	Productivity at PPS CAP	Romanian Productivity in % of productivity in
Romania	24967		46879	
Czech Republic	54885	45.5	85151	55.1
Hungary	53205	46.9	72188	64.9
Poland	47867	52.2	82905	56.5
Slovak Republic	45578	54.8	62136	75.4
Bulgaria	27787	89.9	50358	93.1
EU-25 <sup>2)</sup>	131457	19.0	131457	35.7

**Manufacture of basic metals (NACE 27)**

	Productivity in EUR	Romanian Productivity in % of productivity in	Productivity at PPS CAP	Romanian Productivity in % of productivity in
Romania	73290		137613	
Czech Republic	105026	69.8	162940	84.5
Hungary	130758	56.1	177409	77.6
Poland	108225	67.7	187446	73.4
Slovak Republic	102614	71.4	139891	98.4
Bulgaria	51001	143.7	92429	148.9
EU-25 <sup>2)</sup>	216345	33.9	216345	63.6

Notes: 1) Purchasing power standards (PPS) for fixed capital formation (CAP). - 2) 2003, ex MT, CY, SE.

Source: Eurostat, wiiw Industrial Database.

Table A8

### EU-25 share in total trade of Romania and other CEECs, 1997-2005

EU-25 shares in exports to the world									
Paper and paper products (NACE 21)	1997	1998	1999	2000	2001	2002	2003	2004	2005
Bulgaria	48	43	48	42	38	43	28	40	
Czech Republic		82	85	86	83	81	80	79	
Hungary	61	62	67	70	70	67	68	63	
Poland	65	68	75	72	71	72	73	69	
Slovakia	83	84	86	83	84	84	86	87	
Romania	34	42	45	43	49	48	53	47	45
<b>Chemicals (NACE24)</b>									
Bulgaria	37	38	36	37	39	35	33	34	
Czech Republic		82	82	81	81	78	78	79	
Hungary	58	64	64	61	58	58	57	58	
Poland	59	68	73	73	73	73	73	66	
Slovakia	86	87	86	86	86	86	86	86	
Romania	42	52	45	45	41	41	40	37	32
<b>Non-metallic mineral products (NACE 26)</b>									
Bulgaria	38	61	58	53	57	59	56	53	
Czech Republic		75	74	73	70	68	70	67	
Hungary	67	67	68	64	64	65	69	68	
Poland	71	73	77	71	74	73	74	69	
Slovakia	80	82	84	82	83	79	81	79	
Romania	53	58	58	62	70	64	68	68	68
<b>Basic metals (NACE 27)</b>									
Bulgaria	54	71	74	74	72	66	65	64	
Czech Republic		81	86	84	82	81	81	82	
Hungary	84	85	86	85	82	79	80	83	
Poland	68	78	80	79	81	79	79	75	
Slovakia	80	88	84	87	90	83	82	86	
Romania	51	54	50	49	48	39	37	43	34
<b>Total manufacturing (NACE D)</b>									
Bulgaria	54	64	66	66	67	67	67	68	
Czech Republic	82	85	86	85	85	84	86	85	
Hungary	83	83	84	83	83	83	83	80	
Poland	74	79	83	80	82	81	82	79	
Slovakia	83	87	88	88	89	87	83	84	
Romania	68	75	79	78	80	77	80	79	75
EU-25 shares in imports from the world									
Paper and paper products (NACE 21)	1997	1998	1999	2000	2001	2002	2003	2004	2005
Bulgaria	77	74	75	75	74	76	73	74	
Czech Republic	92	91	91	90	91	91	91	91	
Hungary	87	87	86	86	88	88	86	89	
Poland	92	92	93	89	92	92	93	92	
Slovakia	90	92	90	87	89	93	93	90	
Romania	87	89	92	92	91	88	88	89	89
<b>Chemicals (NACE24)</b>									
Bulgaria	64	71	74	73	71	71	72	70	
Czech Republic	85	83	82	82	81	82	81	81	
Hungary	74	70	72	76	76	78	77	81	
Poland	79	79	82	81	81	80	81	80	
Slovakia	80	81	83	82	81	81	82	78	
Romania	69	76	78	77	77	79	78	75	74
<b>Non-metallic mineral products (NACE 26)</b>									
Bulgaria	64	73	75	71	71	69	68	63	
Czech Republic	93	91	90	89	88	91	91	89	
Hungary	86	86	84	82	84	83	81	83	
Poland	90	90	92	89	89	85	86	83	
Slovakia	94	94	93	93	91	92	90	82	
Romania	82	84	86	83	85	82	79	77	75
<b>Basic metals (NACE 27)</b>									
Bulgaria	45	45	51	43	38	42	42	37	
Czech Republic	93	85	84	83	82	82	83	83	
Hungary	68	72	73	70	69	71	73	73	
Poland	87	85	84	81	83	81	83	81	
Slovakia	85	83	81	78	77	77	80	75	
Romania	49	53	60	51	53	59	62	58	60
<b>Total manufacturing (NACE D)</b>									
Bulgaria	71	72	75	74	76	74	72	70	
Czech Republic	82	82	81	80	79	77	75	75	
Hungary	78	76	76	71	70	68	67	76	
Poland	78	78	79	76	78	76	77	75	
Slovakia	82	82	84	84	84	82	82	76	
Romania	74	78	80	77	79	78	78	76	74

Source: UN Comtrade database.

Table A9

**Gross investment in tangible goods in Romania and other CEECs, 1995-2004, EUR mn****Manufacture of pulp, paper and paper products (NACE 21)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Czech Rep.	101.5	149.6	97.7	155.1	94.6		86.1	145.6	87.8	105.9
Hungary	:	:	:	:	57.9	46.8	100.7	56.1	60.3	90.3
Poland	:	206.4	230.7	314.4	:	206.2	:	234.1	236.3	217.3
Slovakia	50.1	53.9	106.1	145.6	100.8	43.4	54.9	74.9	172.5	133.0
Bulgaria	:	2.4	2.2	9.5	41.2	23.5	11.0	54.4	27.8	20.9
Romania	:	:	:	43.8	53.2	57.8	49.8	62.1	56.3	47.9

**Manufacture of chemicals and chemical products (NACE 24)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Czech Rep.	215.5	313.1	287.0	332.0	249.4		324.0	332.0	366.6	298.8
Hungary	:	:	:	:	380.5	310.4	362.9	388.4	556.6	649.6
Poland	:	494.8	667.2	736.8	570.0	677.5	:	:	558.1	634.9
Slovakia	76.7	77.4	74.2	92.5	100.3	66.2	74.3	82.6	46.0	55.1
Bulgaria	:	48.0	26.2	49.1	33.8	50.9	60.4	105.5	68.8	67.3
Romania	:	:	:	432.5	219.8	197.8	278.3	173.3	252.2	308.1

**Manufacture of other non-metallic mineral products (NACE 26)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Czech Rep.	340.9	367.0	349.1	365.3	333.5		334.5	289.0	333.6	285.8
Hungary	:	:	:	:	110.4	98.0	129.1	142.3	159.8	244.0
Poland	:	379.1	456.8	706.7	646.2	:	611.3	:	408.0	609.0
Slovakia	56.1	77.2	71.7	59.0	83.9	65.4	115.4	78.6	95.8	210.3
Bulgaria	:	9.1	15.6	57.7	76.5	70.6	61.0	54.1	69.4	109.2
Romania	:	:	:	226.5	347.8	167.0	240.7	153.2	186.3	319.0

**Manufacture of basic metals (NACE 27)**

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Czech Rep.	194.0	310.3	432.4	215.6	493.5		477.2	144.3	148.1	176.7
Hungary	:	:	:	:	67.9	83.2	85.5	83.4	:	98.3
Poland	:	574.1	396.9	387.8	354.9	215.7	169.2	116.0	117.9	183.6
Slovakia	69.6	71.3	50.0	121.0	51.4	126.9	114.0	169.2	161.0	196.7
Bulgaria	:	31.0	46.5	73.8	51.9	73.9	139.3	146.6	121.4	83.6
Romania	:	:	:	469.0	608.8	191.3	275.4	215.3	252.9	435.8

Source: Eurostat, Structural business statistics (SBS).



Table A10

**Inward FDI stock of individual countries in the manufacturing industry**

as of December 2004, EUR million

	RO	CZ	HU	PL	SK
<b>D Manufacturing industry total</b>	<b>6876.0</b>	<b>16849.5</b>	<b>17836.4</b>	<b>23750.1</b>	<b>4102.9</b>
DE Pulp, paper & paper products, publishing & printing		1060.0	601.0		145.17
DG Chemicals, prod. and man-made fibres	322.9	1106.2	2317.9	2455	295.16
DI Other non-metallic mineral products	603.0	1668.4	669.6	.	177.1
DJ Basic metals and fabricated metal products	1981.0	2248.7	1188.5	2014.2	1158.5

*Remarks:* Romania (RO): equity capital, reinvested earnings, loans.  
 Czech Republic (CZ): equity capital, reinvested earnings, loans.  
 Hungary (HU): equity capital and reinvested earnings.  
 Poland (PL): equity capital, reinvested earnings, loans.  
 Slovakia (SK): equity capital and reinvested earnings.

*Source:* Respective National Banks according to international investment position (IIP).

Table A11

**Number of employees in individual energy-intensive sub-branches in Romania, 2000-2004**

	2000	2001	2002	2003	2004 <sup>1)</sup>
<b>Pulp and paper</b>	9868	9017	8142	7262	6395
<b>Basic chemicals</b>	39234	37619	35563	33239	29600
<b>Glass and glass products</b>	25945	24670	23736	23217	19235
<b>Ceramics</b>	18726	18352	19451	18657	15841
<b>Cement</b>	10105	10068	7135	6476	7499
<b>Iron and steel industry</b>	77095	77791	68798	58466	
<b>Non-ferrous metals</b>	14275	14006	12777	12108	11190
<b>Manufacturing</b>	1734259	1753787	1734963	1710785	1690102

*Note:* Number of persons employed (including self-employed), preliminary.

*Source:* Eurostat, SBS.

Table A12

### Romania's foreign trade in energy-intensive sub-branches, 2000-2005

Exports to the world	in mn EUR						av. annual growth rates 2000-05 in %
	2000	2001	2002	2003	2004	2005	
Total manufacturing (NACE D)	10890.0	12280.0	14205.0	15135.0	18432.0	21618.6	14.7
Pulp and paper (NACE 211)	68.5	77.5	94.4	95.2	97.1	63.6	-1.5
Basic chemicals (NACE 241)	579.5	578.5	569.8	619.4	859.1	1073.0	13.1
Glass and glass products (NACE 261)	97.2	104.4	132.9	110.3	102.2	88.8	-1.8
Ceramics (NACE 262)	67.3	74.2	80.9	84.4	89.6	91.2	6.3
Cement (NACE 265)	45.5	42.8	40.4	29.4	28.9	28.5	-8.9
Iron and steel industry (NACE 271-273)	1106.8	1052.5	1265.6	1430.9	2147.0	2307.7	15.8
Non-ferrous metals (NACE 274)	617.8	512.1	413.5	387.1	500.2	614.1	-0.1
shares in total manufacturing exports in %							
Pulp and paper (NACE 211)	0.6	0.6	0.7	0.6	0.5	0.3	
Basic chemicals (NACE 241)	5.3	4.7	4.0	4.1	4.7	5.0	
Glass and glass products (NACE 261)	0.9	0.9	0.9	0.7	0.6	0.4	
Ceramics (NACE 262)	0.6	0.6	0.6	0.6	0.5	0.4	
Cement (NACE 265)	0.4	0.3	0.3	0.2	0.2	0.1	
Iron and steel industry (NACE 271-273)	10.2	8.6	8.9	9.5	11.6	10.7	
Non-ferrous metals (NACE 274)	5.7	4.2	2.9	2.6	2.7	2.8	
<i>Sum of energy-intensive branches</i>	23.7	19.9	18.3	18.2	20.7	19.7	
av. annual growth rates 2000-05 in %							
Imports from the world	in mn EUR						av. annual growth rates 2000-05 in %
	2000	2001	2002	2003	2004	2005	
Total manufacturing (NACE D)	11700.0	14340.0	16447.0	18408.0	22788.0	27477.8	18.6
Pulp and paper (NACE 211)	131.8	145.6	193.4	222.6	247.9	284.8	16.7
Basic chemicals (NACE 241)	465.5	504.9	572.3	659.4	807.5	1005.1	16.6
Glass and glass products (NACE 261)	63.8	83.0	100.2	117.9	145.2	194.6	25.0
Ceramics (NACE 262)	38.1	42.1	55.8	62.4	76.8	109.1	23.4
Cement (NACE 265)	3.5	3.2	4.7	9.1	13.3	14.6	33.1
Iron and steel industry (NACE 271-273)	463.2	591.6	627.9	705.8	1005.6	1301.0	22.9
Non-ferrous metals (NACE 274)	215.5	247.9	203.2	238.6	318.4	363.6	11.0
shares in total manufacturing imports in %							
Pulp and paper (NACE 211)	1.1	1.0	1.2	1.2	1.1	1.0	
Basic chemicals (NACE 241)	4.0	3.5	3.5	3.6	3.5	3.7	
Glass and glass products (NACE 261)	0.5	0.6	0.6	0.6	0.6	0.7	
Ceramics (NACE 262)	0.3	0.3	0.3	0.3	0.3	0.4	
Cement (NACE 265)	0.0	0.0	0.0	0.0	0.1	0.1	
Iron and steel industry (NACE 271-273)	4.0	4.1	3.8	3.8	4.4	4.7	
Non-ferrous metals (NACE 274)	1.8	1.7	1.2	1.3	1.4	1.3	
<i>Sum of energy-intensive branches</i>	11.8	11.3	10.7	11.0	11.5	11.9	
Trade balance							
Trade balance	in mn EUR						
	2000	2001	2002	2003	2004	2005	
Total manufacturing (NACE D)	-810	-2060	-2242	-3273	-4356	-5859	
Pulp and paper (NACE 211)	-63	-68	-99	-127	-151	-221	
Basic chemicals (NACE 241)	114	74	-3	-40	52	68	
Glass and glass products (NACE 261)	33	21	33	-8	-43	-106	
Ceramics (NACE 262)	29	32	25	22	13	-18	
Cement (NACE 265)	42	40	36	20	16	14	
Iron and steel industry (NACE 271-273)	644	461	638	725	1141	1007	
Non-ferrous metals (NACE 274)	402	264	210	149	182	251	
<i>Sum of energy-intensive branches</i>	1201	824	840	741	1209	994	
	-148.3	-40.0	-37.5	-22.6	-27.8	-17.0	
Avg. exchange rate USD/EUR	0.924	0.896	0.945	1.131	1.243	1.245	

Source: UN Comtrade database, converted from USD to EUR by wiiw.



## Appendix 2

### Questionnaire for the basic chemical industry (NACE 241)

The purpose of this questionnaire is to investigate the position of the basic chemical products sector in Romania, in order to assess its preparedness before the moment of EU integration.

We would like to have your personal opinion on the situation of your sub-sector in Romania, but would also highly appreciate if you could share some of your company's experience related to energy consumption and energy policy.

The sub-sector covered here is (in NACE classification):

#### 24.1 Basic chemical products

Basic information on your company:

Name of company

Name of mother company (if applicable):

Location:

Name and position of person interviewed:

Main products / activities of the company

Number of employees:

#### 1. Size and ownership structure

What is the approximate size structure in your industry in percentage shares?

Small (0-20 employees)    medium (20-250 employees)    large (> 250 employees)

What is the approximate ownership structure in your industry in percentage shares?

Private (foreign)    private (domestic)    state owned    social ownership

What is the ownership structure in your company?

#### 2. Modernization / Technology

How far has restructuring / modernization proceeded in your industry up to now?

How far has restructuring / modernization proceeded in your company?

Far                      medium                      little

How old are the plants / units of production/technologies in your company?

Is your company making use of information technology?

Much                      some                      little

Have companies in your industry achieved international certification (e.g. ISO 9001/9002)?

Many                      some                      few

Has your company achieved international certification (e.g. ISO 9001/9002)?

Many                      some                      few

### 3. Inputs

Are there any specific advantages / problems with inputs for your industry, e.g. with raw materials and intermediate inputs, with utilities (energy, water, telecommunication), labour (labour costs, skills), **other** ..... or none?

Please specify! What about your company?

Is there any research activity in your industry? Is there any cooperation in R&D between different companies within the sector?

### 4. Output and employment

Over the next five years, compared to manufacturing as a whole, will the output in your industry probably grow at a pace

Above average                      average                      below average ?

Over the next five years, compared to manufacturing as a whole, will the output in your company grow at a pace

Above average                      average                      below average ?

Will the number of persons employed in your industry most probably

Increase                      stay constant                      decline ?

Will the number of persons employed in your company most probably

Increase                      stay constant                      decline ?

### 5. Investment

Was the extent of investment activity to adjust to modern requirements, in the sector and in your company, over the last five years:

Sector:                      Sufficient                      moderately sufficient                      insufficient ?

Company:                      Sufficient                      moderately sufficient                      insufficient ?

Is the importance of FDI in the modernization of your industry

High                      medium                      low ?

Are the EU environmental norms and regulations (adopted already or in process of implementation by Romania before integration) affecting a lot your production process? Have you been forced to invest massively in environment-friendly technologies? If yes, please specify in detail.

**6. Customer relation**

Is there a considerable user-supplier relation in your industry, yes / no ?  
 If yes, please elaborate! (in which regions in Romania, countries, with companies from other sectors)

**7. Support programmes**

Are there any government or international support programmes relevant for your industry (e.g. subsidies, preferential energy prices, investment incentives, research & development programmes, regional development plans, special support for small and medium-sized enterprises, **other**.....) or none? Please specify!

**8. Overall assessment**

Please, evaluate by ticking the appropriate!

a) What, do you think, are the strengths of your industry in Romania?

	big	medium	small	none
Local inputs (raw materials, semi-finished products)				
Relatively low energy costs				
Skilled and cheap labour				
Longstanding tradition and experience				
Established customer networks				
Research and development				
Other.....				

b) Which, do you think, are the weaknesses of this sector in Romania?

	big	medium	small	none
Lack of investment				
Insufficient foreign direct investment				
Low labour productivity				
Shortage (high cost) of managerial skills				
Insufficient quality of local inputs				
Weak professional training				
Inefficient transport facilities				
Fragmented home market				
Property structure				
Other.....				

c) Which, do you think, are the opportunities of this sector in Romania?

	big	medium	small	none
Modernization by means of domestic investment				
Increased inflow of FDI				
Industrial co-operations				
Improving customer relations				
Specialization (field/area?)				
Employment creation				
R&D				
Fast growth of the domestic market				
Economic recovery of the Balkan region				
EU integration				
Other.....				

d) Which, do you think, are the threats for this sector in Romania?

	big	medium	small	none
Competition from other low-cost suppliers				
Energy prices rising faster				
World-wide overcapacities, low profitability				
Closing down of parts of the industry				
Loss of employment by closures and / or rationalization				
Widening technology gap				
Lack of domestic funds for investment				
Lack of foreign direct investment				
Other.....				

**9. Policy measures to improve the sector's situation in Romania**

	very important	important	not important
Promotion of FDI			
Fiscal (or other) stimulation of own investment			
Taxation policies			
Privatization			
Special support of SMEs			
Support of enterprise start-ups			
Training facilities for general managerial skills			
Favourable energy pricing policy			
Improvement of infra-structure			
Promotion of a unified market			
Support of R&D and of professional training			
Enhanced regional cooperation			
Promotion of a 'chemistry' cluster in Romania			
Targeted support of by international agents			
Other.....			

**10. International competitiveness**

What, do you think, is the competitive position of companies in your sub-sector on the international market? Please evaluate by ticking the appropriate.

	Now			In the future		
	very competitive	competitive	not competitive	very competitive	competitive	not competitive
241						





## Short list of the most recent wiiw publications

(as of April 2007)

For current updates and summaries see also wiiw's website at [www.wiiw.ac.at](http://www.wiiw.ac.at)

### **Restructuring of Energy-intensive Industrial Branches in Romania and Proposals for Industrial Policy Measures**

by Gábor Hunya, Waltraut Urban et al.

*wiiw Research Reports*, No. 339, April 2007

98 pages including 34 Tables and 16 Figures

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **The Vienna Institute Monthly Report 4/07**

edited by Leon Podkaminer

- Baltic states: perils of a boom-bust scenario
- What drives the Chinese stock market?
- Russia and WTO accession
- Selected monthly data on the economic situation in ten transition countries, 2005-2007
- Guide to wiiw statistical services on Central, East and Southeast Europe, Russia and Ukraine

wiiw, April 2007

36 pages including 14 Tables and 2 Figures

(exclusively for subscribers to the wiiw Service Package)

### **On the Dynamics of Profit- and Wage-led Growth**

by Amit Bhaduri

*wiiw Working Papers*, No. 42, March 2007

19 pages including 6 Figures

hardcopy: EUR 8.00 (PDF: free download from wiiw's website)

### **The Impact of EU Enlargement on Economic Restructuring in Russia and Future Relations between Russia and the European Union**

by Svetlana Glinkina and Natalia Kulikova

*wiiw Research Reports*, No. 338, March 2007

42 pages including 3 Tables and 4 Figures

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **Privatization Disputes in Romania – the Petrom Case**

by Gábor Hunya

*wiiw Research Reports*, No. 337, March 2007

36 pages including 9 Tables and 2 Figures

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **The Vienna Institute Monthly Report 3/07**

edited by Leon Podkaminer

- Net outward investment position of the new member states
- Sources of growth in the CIS
- The troubling economics and politics of the US trade deficit
- Selected monthly data on the economic situation in ten transition countries, 2005-2007
- Guide to wiiw statistical services on Central, East and Southeast Europe, Russia and Ukraine

wiiw, March 2007

36 pages including 17 Tables and 2 Figures

(exclusively for subscribers to the wiiw Service Package)

### **Rapid Growth in the CIS: Is It Sustainable?**

by Garbis Iradian

*wiiw Research Reports*, No. 336, February 2007

81 pages including 24 Tables and 11 Figures

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **Private Consumption and Flourishing Exports Keep the Region on High Growth Track**

by Vladimir Gligorov, Leon Podkaminer et al.

*wiiw Research Reports*, No. 335, February 2007

(special issue on economic prospects for Central, East and Southeast Europe; covering Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Hungary, Macedonia, Montenegro, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, Ukraine, Turkey, and China)

134 pages including 49 Tables and 19 Figures

hardcopy: EUR 70.00 (PDF: EUR 65.00)

### **The Vienna Institute Monthly Report 2/07**

edited by Leon Podkaminer

- Regional convergence in the NMS
- EU membership – support and challenge to the competitiveness of the Polish and Romania economies
- The flawed logic of capital account liberalization
- Selected monthly data on the economic situation in ten transition countries, 2005-2006
- Guide to wiiw statistical services on Central, East and Southeast Europe, Russia and Ukraine

*wiiw*, February 2007

36 pages including 21 Tables

(exclusively for subscribers to the wiiw Service Package)

### **The Consequences of WTO Accession for Belarus**

by Kiryl Kurilionak, Stanislav Vassilevsky and Vitaly Medvedev

*wiiw Research Reports*, No. 334, January 2007

28 pages including 8 Tables

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **The Vienna Institute Monthly Report 1/07**

edited by Leon Podkaminer

- Romania: EU entry and related environmental challenges
- China and India: a comparison of recent economic growth trajectories
- Poland's experience with capital account convertibility
- Selected monthly data on the economic situation in ten transition countries, 2005-2006
- Guide to wiiw statistical services on Central, East and Southeast Europe, Russia and Ukraine

*wiiw*, January 2007

32 pages including 15 Tables and 2 Figures

(exclusively for subscribers to the wiiw Service Package)

### **The Vienna Institute Monthly Report 12/06**

edited by Leon Podkaminer

- Updated wiiw forecasts for 2006 and 2007
- Albania 1 euro
- Bosnia and Herzegovina: economy improving despite politics
- Kosovo: an emerging state
- Montenegro: the first year of independence
- Turkey: back on course (economically)
- Selected monthly data on the economic situation in ten transition countries, 2005-2006
- Guide to wiiw statistical services on Central, East and Southeast Europe, Russia and Ukraine

*wiiw*, December 2006

28 pages including 15 Tables

(exclusively for subscribers to the wiiw Service Package)

### **Economic Growth, Regional Disparities and Employment in the EU-27**

by Michael Landesmann and Roman Römisch

*wiiw Research Reports*, No. 333, December 2006

74 pages including 7 Tables, 47 Figures and 5 Maps

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **Employment Developments in Central and Eastern Europe: Trends and Explanations**

by Michael Landesmann and Hermine Vidovic

*wiiw Research Reports*, No. 332, November 2006

75 pages including 23 Tables and 27 Figures

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### ***wiiw Handbook of Statistics 2006: Central, East and Southeast Europe***

covers key economic data on Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Russia, Serbia, the Slovak Republic, Slovenia and Ukraine, 1990 to September 2006

wiiw, Vienna, November 2006, ISBN-13 978-3-85209-011-5 (ISBN-10 3-85209-011-3)

591 pages including 336 Tables and 105 Figures

hardcopy: EUR 92.00

CD-ROM (PDF): EUR 92.00; CD-ROM (MS Excel Tables + PDF) + hardcopy: EUR 230.00

Individual chapters (MS Excel Tables, on CD-ROM or via E-mail): EUR 37.00 per chapter

### **The Vienna Institute Monthly Report 11/06**

edited by Leon Podkaminer

- Russian Federation: growing economy, deteriorating politics
- Ukraine: the time of big business returns
- Croatia: record FDI inflow
- Serbia: still in search of stability
- Macedonia: speed-up of growth still elusive
- INDEUNIS: joint research project on transition, integration and restructuring in the New EU Member States and the Newly Independent States
- Selected monthly data on the economic situation in ten transition countries, 2005-2006
- Guide to wiiw statistical services on Central, East and Southeast Europe, Russia and Ukraine

wiiw, November 2006

34 pages including 15 Tables

(exclusively for subscribers to the wiiw Service Package)

### **Ukraine: Current Economic Situation and Future Prospects**

by Vasily Astrov

*wiiw Research Reports*, No. 331, October 2006

51 pages including 16 Tables and 7 Figures

hardcopy: EUR 22.00 (PDF: EUR 20.00)

### **Hungary, Slovakia and the Czech Republic: Longer-term Growth Prospects**

by Leon Podkaminer and Robert Stehrer

*wiiw Research Reports*, No. 330, October 2006

(reprinted from: *New Regional Economics in Central European Economies: The Future of CENTROPE*, Proceedings of OeNB Workshops, No. 9, Oesterreichische Nationalbank – OeNB, Vienna, March 2006, pp. 120-145)

26 pages including 21 Tables and 2 Figures

hardcopy: EUR 8.00 (PDF: free download from wiiw's website)

## **wiiw Service Package**

The Vienna Institute offers to firms and institutions interested in unbiased and up-to-date information on Central, East and Southeast European markets a package of exclusive services and preferential access to its publications and research findings, on the basis of a subscription at an annual fee of EUR 2,000.

This subscription fee entitles to the following package of **Special Services**:

- A free invitation to the Vienna Institute's **Spring Seminar**, a whole-day event at the end of March, devoted to compelling topics in the economic transformation of the Central and East European region (for subscribers to the wiiw Service Package only).
- Copies of, or online access to, **The Vienna Institute Monthly Report**, a periodical consisting of timely articles summarizing and interpreting the latest economic developments in Central and Eastern Europe and the former Soviet Union. The statistical annex to each *Monthly Report* contains tables of the latest monthly country data. This periodical is not for sale, it can only be obtained in the framework of the wiiw Service Package.
- Free copies of the Institute's **Research Reports** (including **Reprints**), **Current Analyses and Country Profiles** and **Statistical Reports**.
- A free copy of the **wiiw Handbook of Statistics** (published in October/November each year and containing more than 400 tables and graphs on the economies of Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Poland, Romania, Russia, Serbia and Montenegro, the Slovak Republic, Slovenia and Ukraine)
- Free online access to the **wiiw Monthly Database**, containing more than 1200 leading indicators monitoring the latest key economic developments in ten Central and East European countries.
- **Consulting**. The Vienna Institute is pleased to advise subscribers on questions concerning the East European economies or East-West economic relations if the required background research has already been undertaken by the Institute. We regret we have to charge extra for *ad hoc* research.
- Free access to the Institute's specialized economics library and documentation facilities.

Subscribers who wish to purchase wiiw data sets **on CD-ROM** or special publications not included in the wiiw Service Package are granted considerable **price reductions**.

**For detailed information about the wiiw Service Package  
please visit wiiw's website at [www.wiiw.ac.at](http://www.wiiw.ac.at)**

To  
The Vienna Institute  
for International Economic Studies  
Oppolzergasse 6  
A-1010 Vienna

- Please forward more detailed information about the Vienna Institute's Service Package
- Please forward a complete list of the Vienna Institute's publications to the following address

Please enter me for

- 1 yearly subscription of *Research Reports* (including *Reprints*)  
at a price of EUR 225.00 (within Austria), EUR 250.00 (Europe) and EUR 265.00 (overseas) respectively

Please forward

- the following issue of *Research Reports* .....
- the following issue of *Current Analyses and Country Profiles* .....
- the following issue of *Working Papers* .....
- the following issue of *Statistical Reports* .....
- the following issue of *Research Papers in German language* .....
- the following issue of *Industry Studies* .....
- the following issue of *Structural Reports* .....
- the following issue of *wiiw Database on Foreign Direct Investment* .....
- the following issue of *wiiw Handbook of Statistics* .....

.....  
Name

.....  
Address

.....  
Telephone

Fax

E-mail

.....  
Date

.....  
Signature

---

Herausgeber, Verleger, Eigentümer und Hersteller:

Verein „Wiener Institut für Internationale Wirtschaftsvergleiche“ (wiiw),  
Wien 1, Oppolzergasse 6

Postanschrift: A-1010 Wien, Oppolzergasse 6, Tel: [+431] 533 66 10, Telefax: [+431] 533 66 10 50

Internet Homepage: [www.wiiw.ac.at](http://www.wiiw.ac.at)

Nachdruck nur auszugsweise und mit genauer Quellenangabe gestattet.

P.b.b. Verlagspostamt 1010 Wien