The "resurrection" of industrial policy in the European Union and its impact on industrial policy in the New Member Countries

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Contribution to the Project

The object of this milestone paper is first to discuss the most important theoretical aspects, elements and tools of a new industrial policy for catch-up economies. This paper deals with the solution of simple and more complex industrial policy cases. Secondly the paper will give adequate solutions for practical cases. Thirdly the paper will focus on the relationships in industry competitive analyses by using case studies from different sectors of industry. Special attention will be given to some forms of competition, export competitiveness and the variety of industrial policies in the Central and Eastern European Countries (CEECs).

Our research contributes to the first central question and closely related to task 306.5 (A new industrial policy for more inclusive and sustainable growth).

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Abstract

The aim of this study is to consider the main factors affecting the industrial policy in Central and Eastern European Countries (CEECs) by elucidating the issues such as; the connection between competitiveness and industrial policy, innovation, manufacturing, green growth and environment. The objective is to inspire thought in the reader and to highlight the necessity for a new industrial policy, which considers regional differences and specializations in the catching up economies of the CEECs.

The ultimate question is what kind of industrial policy development is required in the CEECs in the future that could enable an even more successful catching up, or convergence, with the Western economies. This study includes an analysis of the countries that have been more successful in transition. A measurement was made of the export market shares as well as the industrial structure (primarily in manufacturing). The first step towards accomplishing this task was to examine the export competitiveness of CEECs, the concept of export competitiveness, and the role of exports in competitiveness-oriented growth strategies during the financial crisis. The question was how the effectiveness of policies that enhance export competitiveness could be improved in these countries. The second step was to examine and differentiate the variety of industrial politics in the CEECs, with special emphasis on tools used in order to promote incoming foreign direct investment and technological development. The third step was an assessment of CEECs innovation and R&D policies, and their linkages with competitiveness, for a better understanding of future options in the CEECs.

It is outside the scope of this study to formulate a new industrial policy for certain countries since there is a wide variation in the level of development, workforce structure and industrial specialization of the countries examined in this study. Making predictions that are generally applicable to all member countries of the European Union (EU) is not possible in the international economic environment of June 2013. This study highlights that there is a need for a country specific industrial policy for each member country. During the development of industrial policy, the decision makers of each country must make complex decisions which consider all past and current economic factors. It is the intention of this study to inspire deeper, new ways of thinking about industrial policies in the CEECs [1].

Keywords industrial policy, clusters, green growth, innovation, manufacturing, competitiveness, Central and Eastern Europe

JEL Classification O14, O25, L16, L50, L52

[1] We would like to thank the reviewers for their valuable insights, recommendations and suggestions.

1. Changing focus in industrial policy - stages of industrial policy from 1957 in a nutshell

In 1957, in Rome six governments (Belgium, France, Germany, Italy, Luxembourg and the Netherlands) signed the Treaties, which established the European Economic Community and the European Atomic Energy Community. In these Treaties, frameworks for sectoral policies were created and industrial policy was left to the discretion of the member countries. In 1970 a memorandum to the Council described the principles of industrial policy, the situation of industry and the strategic options for industrial restructuring (Colonna Report).

The first kind of a more or less explicit industrial policy toolkit in the EU was introduced by the Maastricht Treaty in 1992. Industrial policy (albeit not under this very denomination yet) was dedicated as a factor of competitiveness and it was partly and implicitly included in competition regulation and policy (Jacquemin, 1994, Rosenthal, Nicolaides, 1997).

It is necessary to consider the relationship of industrial policy with other policies, e.g. trade policy, science and technology policies or regional policy, particularly in the aspect of coordination of instruments involved in these policies (Markowski, 1992). Instruments of industrial policy may include tax incentives to promote investments or exports, direct or indirect subsidies, special financing arrangements, protection against foreign competition, worker training programs, regional development programs, and assistance for research development (Hinkelman, Putzi, 2005).

Due in part to the recent enlargements in 2004 and in 2007, the EU had to reevaluate the idea of community-wide industrial policy[2], and ultimately decided to make it explicit. In the CEECs, the instruments of industrial policy have become important in improving competitiveness. The post-1990 development of industrial policies in the countries examined – Bulgaria, the Czech Republic, Poland, Hungary, Romania, Slovakia, Slovenia, Estonia, Latvia and Lithuania – may be described as a shift from crisis management to horizontal industrial policy until the mid-2000s (Török, 2007).

Is it believable that industrial policy will once again regain its past importance? Does new industrial policy help to accelerate growth in the EU countries, especially in the new member countries? In the case of industrial policy, the real question is not whether one should apply them, but how to apply them. Industrial policy is a way of thinking rather than a set of certain policy actions.

[2] In 2004 the Commission published its Communication about "Fostering Structural Change: an industrial policy for an enlarged Europe" and in 2005 the "Implementing the Community Lisbon Programme: A policy framework to strengthen EU manufacturing – towards a more integrated approach for industrial policy".

2. Industrial Policy concept based on job creation, resources protection and new technology development

The concept of competitiveness has evolved from the industry and macro perspective, as it has changed focus from a cost basis to productivity, and also includes an assessment of structure, technology, quality and ability (Aiginger, Bärenthaler-Sieber, Vogel, 2013). This new approach is based on new observations that were made after the financial crisis. An important contribution of the paper to industrial policy literature is defining competitiveness from new perspectives.

In the past competitiveness was measured by the levels of "living standards and employment", as exemplified in a report by Aiginger and Sieber (2006), where he states that competitiveness is the ability to create welfare. A definition for competitiveness was suggested by Delgado, Ketels, Porter, Stern (2012) as the overall quality of a country as a place to do business.

A new concept of competitiveness is needed that is adequate for the new challenges that exist today, one that can be used to equally gauge industrialized high-income regions as well as regions that are catching up[3]. The new concept needs to be applied to Europe to assess the competitiveness of EU member countries and to learn which pillars their competitiveness is based on, and also which policy actions might be able to improve upon it.

The transition, shifting to a new path of growth and development, is happening in an environment in which even the industrialized countries are facing the challenges of tense public budgets, globalization, and costly welfare systems due to the aging of the population. There is a persistent state of financial instability across countries, with high-income differences and environmental issues such as global warming (Aiginger, Bärenthaler-Sieber, Vogel, 2013). The authors define competitiveness as the ability of a country (region, location) to deliver beyond GDP goals for its citizens both today and in the future.

The renewed interest in industrial policy originated first from the inability of EU to close the productivity gap relative to the United States and because of the increasing pressure from emerging economies in the globalising world. An empirical study shows that countries with a smaller industrial base and with deficits in trade, as well as deficit in current account, had experienced stronger crises (Aiginger, 2012). The goal of the European summit in January 2012 was to attempt to shift back the emphasis towards growth and employment. It has become vital to have an analytical base in the development of new strategies.

Future oriented industrial policy has to be based on research and education also, and industrial policy needs to be merged with innovation policy. Industrial policy should make use of those forces, which promote change, and foster higher incomes, such as competition and

[3] The definition of „catching-up" will be given later.

globalisation. Thus, a "Systemic Industrial and Innovation Policy" (SIIP) is pulled by the vision of a new growth path of social development and higher emphasis on sustainability. SIIP is further promoted by internal and external competition, openness as well as new technologies and capabilities. EU should try to become more dynamic by cutting costs, social benefits and taxes, thus taking the low road of competitiveness. Another way for Europe is the high road by striving for the best education and innovation, thus trying to become the leader in new technologies, sustainability and the most sophisticated quality segments (Aiginger, 2012).

A well-qualified and skilled workforce, and also an adequate amount of capital, could lead to high labour productivity, which in turn has been the key transmission mechanism for growth throughout industrialised countries. Increasing the quality of human resources and the skill levels of the workforce may lead to an increased labour productivity and the continued success of European industry (EC, 2010).

The tools used by the Member Countries vary significantly, including policies such as improving recruitment strategies, development, training, communication, leadership and motivation of employees. However, the tools have in common a shifting focus from simply administering public personnel towards a people-centred approach. The degree of implementation of different human resources management tools by Member Countries is described by the post-bureaucracy index, developed by Demmke and Moilanen (2010) in a study on Civil Services in the EU of 27 commissioned for EUPAN (EC, 2012a). Government staffs are experiencing a tendency towards more private law based employment contracts without guaranteed lifetime employment, flexible working patterns and pay, and a weakening of collectivist cultures. The currently available human resources tools in the CEECs have to be evaluated in light of the local context, and the notion that public personnel are a key resource is an issue of primary importance in public sector modernization.

A number of studies have shown the positive link between environmental performance and job creation (Ecologic study, 2004, Ecorys, 2009) European companies are performing well on the global market in ecology, in particular in photovoltaics, air pollution control and waste disposal where the EU seems to have a comparative advantage. However, many environmental goods and services included in the study, which are sold on local or national markets and not traded extensively (Ecorys, 2012.) However, shares in national exports of these sectors are not very relevant[4].

In 2011, the export share of products from eco-industries (percentage of total exports) was under 1 per cent in Estonia, Latvia, Lithuania, Poland Romania, Bulgaria and Slovakia. In the Czech Republic, the export of products from eco-industries was 1.44 per cent of total exports, 1.19 per cent in Hungary, 1.37 per cent in Slovenia (EC, 2012a).

[4] The exports of products from eco-industries (per cent in total exports): 0.08 per cent in Estonia, 0.05 per cent in Latvia, 0.14 per cent in Lithuania, 0.10 per cent in Slovakia, 0.27 per cent in Romania, 0.25 per cent in Poland, 0.18 per cent in Bulgaria. Source: Exports of products from eco-industries (2011) http://database.eco-innovation.eu/indicators/view/289/1 (2013.04.29).

As shown in Table 1, high-technology industries displayed a positive annual average growth rate between 2005 and 2011. The average growth of industrial production of the high-technology sector was 3.3 per cent in the EU-27 and 3.8 per cent in the Euro area. The industrial production of the medium-high-technology sector fell (per cent) in seven EU countries, specifically in Greece, Spain, France, Italy, Portugal, Sweden and in the United Kingdom.

Table 1: Industrial production according to level of technology, annual average growth rates (%), (2005-2011), Working day adjusted

Country	Technology level			
	High[5]	Medium-high[6]	Medium-low[7]	Low[8]
EU27	3.3	1.0	-0.4	-0.7
EU17	3.8	0.7	-0.8	-0.1
Hungary	4.6	4.0	1.0	-1.1
Poland	14.5	8.4	6.9	3.0
Czech Republic	5.4	7.3	1.5	-1.4
Estonia	35.1	6.8	-0.1	-1.4
Latvia	0.8	9.9	1.0	3.5
Lithuania	5.2	7.2	1.3	-0.1
Romania	1.7	12.7	3.5	1.7
Bulgaria	1.9	3.8	-0.1	-1.4

Source: Jaegers, Lipp-Lingua, Amil, 2013[9].

Data for industrial manufacturing are grouped into four levels of technological sophistication: high technology, medium-high-technology, medium-low-technology, and low technology. As the table shows almost half of the EU countries recorded a reduction of production in the timeperiod 2005-2011. Poland recorded a growth of 6.9 per cent in the production of medium-low technology industries since 2005 to 2011. In the low technology manufacturing sector, Latvia, Poland, Romania and Belgium achieved a positive rate of growth. Romania, Lithuania, Latvia, the Czech Republic, Poland and Hungary recorded a growth in the medium-low technology area. The production of high-, and medium-high technology goods increased in each country. On the average, production in the low-and medium-low technology sectors declined (per cent) in the EU27 and EU17 countries.

[5] High-technology industries: Aircraft and spacecraft, Pharmaceudicals, Office, accounting and computing machinery, Radio, TV and communications equipment and Medical, precision and optical instruments.
[6] Medium-high technology industries: Electrical machinery and apparatus, Motor vehicles, trailers and semi-trailers, Chemicals excluding pharmaceuticals, Railroad equipment and transport equipment, Machinery equipment, others.
[7] Medium-low technology industries: Building and repairing of ships and boats, Rubber and plastics products, Coke, refined petroleum products and nuclear fuel, Other non-metallic mineral products and Basic metals and fabricated metal products.
[8] Low-technology industries: Manufacturing, others; Recycling, Wood, pulp, paper products, printing and publishing, Food products, beverages and tobacco, Textiles, textile products leather and footwear.
[9] Note: No data on Slovakia and Slovenia.

3. Countries in Focus

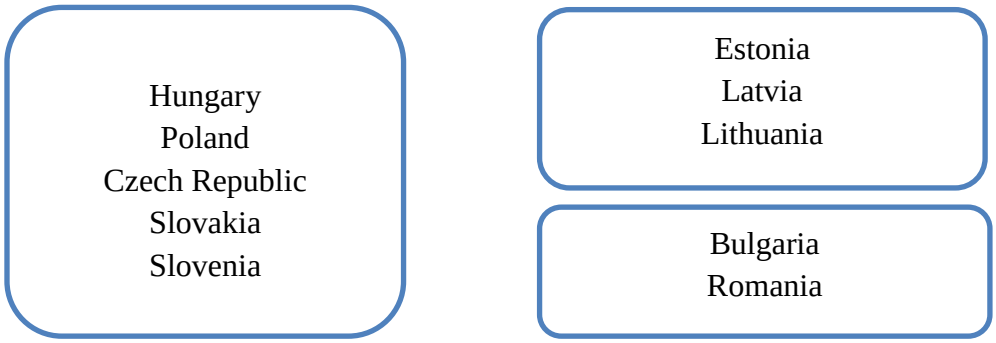
The term "catching-up Member Countries of the EU" covers not only the ten transition member countries[10] (Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Hungary, Slovenia, Romania and Bulgaria) but also the four former cohesion countries (Greece, Portugal, Spain and Ireland) as well (Veugelers, Mrak, 2009). In our research, we will only consider the first group; the ten transition member countries (Figure 1.).

Figure 1: The Countries Examined

The countries are divided into three groups in our study. The first group includes the CEECs with trade specialization in technologically progressive sectors and with close connections with German, Austrian and partly North Italian industry ("*high-tech subcontracting countries*"): the Czech Republic, Hungary, Poland, Slovak Republic, and Slovenia. The second group is the Baltic countries, Estonia, Latvia and Lithuania. These countries have economies with *marked potentials of catching up*, boasting quite strong service sectors but having, for the time being, weaker patterns of manufacturing specialization. The third group includes Bulgaria and Romania. These are the *emerging countries of the region* with still quite considerable capacities in agriculture, and a relatively strong role of low-value added industries in manufacturing. In our analysis, the first group was compared to the second and third group.

[10] The word transitional suggests that changes in the political, ideological and economic system took place in these countries starting from 1990. There was a transition process from socialism to capitalism.

Figure 2: Groups of Countries



For the ten countries that we are considering in our research, the term "catching up" or "convergence" implies the objective of attaining the average of the EU27 in the socio-economic sense. The Catch Up Index serves as the indicator that measures the convergence or divergence based on the following four criteria: the performance of the economy, quality of life, level of democracy and governance, in comparison to the "old Western European" member countries, as illustrated in Appendix (thecatchupindex.eu).

The ultimate question is what kind of industrial policy could be designed in the CEECs for successful catching up. Each of the transition economies examined had suffered from centralised and inefficient industrial policies prior to 1990. "Transitional recession" called for completely new approaches to economic policy in general and industrial policy in particular (Török, 2007). Most CEECs have made a significant policy effort to put their industrial policies on new paths based on more or less new concepts of industrial development. Details of such policy efforts follow below.

4. New industrial policy and competitiveness

4.1. The role of industrial policy in employment policy and crisis management

An "Integrated Industrial Policy for the Globalisation Era" was adopted by the European Council in October 2010, in the context of the Europe 2020 strategy (EC, 2010). Total industrial production of the EU at the end of June 2012 was still 10 per cent lower than pre-crisis. Since the onset of the crisis, over three million industrial jobs have been lost, approximately 10 per cent of the sector's employment in the EU. Total investment in the EU economy has fallen from 21.25 per cent of GDP before the crisis (2007) to 18.6 per cent (2011) [11].

[11] Industrial Policy Communication Update (2012). Source: http://europa.eu/newsroom/calendar/event/395099/industrial-policy-communication-update

The prior goal would be to re-industrialize the EU and also deliver sustainable growth, create high-value jobs and solve the societal challenges. To achieve this, a comprehensive vision is needed, focusing on investment and innovation, but also mobilising all the levers available at EU level, notably the single market, trade policy, Small and Medium Sized Enterprises (SME) policy, competition policy, environmental and research policy supporting European companies' competitiveness. A "Stronger European Industry for Growth and Economic Recovery" emphasises the crucial importance of strengthening industrial competitiveness to underpin growth and jobs and to facilitate the transition to a low emission and resource-efficient economy, in order to contribute to the Europe 2020 strategy (EC, 2012a, b).

4.2. Green growth and the environment

Resource efficiency is one of those main strategic challenges for the EU the importance of which was recognized only recently. Sustainable competitiveness refers to the promotion of economic growth and development while at the same time improving resource efficiency, minimising waste and enhancing energy security. The Annual Growth Survey, published by the Commission, emphasized the importance of unleashing the potential of green growth through structural reforms to create a new policy mix of regulatory, market and measures to promote investment in greening the European economy (EC, 2011b). As part of the Europe 2020 Strategy, the Commission has launched the Industry Policy and Resource Efficiency as the primary targets under the sustainable growth priority. The Commission also launched a Resource Efficiency Roadmap in 2011. The recent Eurobarometer survey highlights a number of trends in resource efficiency (Eurobarometer, 2012)[12].

A 2009 study by Ecorys suggested that European companies should taking action to increase their resource efficiency. The most prominent actions were first order measures, that is, incremental changes in production through investments, for example, recycling of materials, use of green and intelligent information technology, and the use of green business models. Second-order measures, that is, fundamental changes to business operations involving longer-term investments, were present to a lesser extent. In both of these cases, the lack of access to finance and lack of knowledge were identified as major barriers (EC, 2012b).

Between 2004 and 2008, the total amount of waste generated by industry in the EU fell by 8.6 per cent, whereas for the whole EU economy this decline was 8.1 per cent, thus indicating that industry reduced its waste somewhat faster than the wider economy (Sustainable Industry, 2011). Country-specific data for 2008 indicate that enterprises generate the highest amount of waste (in tonnes per capita) in Bulgaria, Luxembourg, Finland and Estonia, while enterprises in Latvia, Hungary and Cyprus produce the lowest amounts. When looking at resource

[12] For example, a third of European SMEs are striving to improve their resource efficiency, around a fifth say that they are taking these measures because of financial or tax incentives or other forms of public support. Over a third indicates that measures to improve resource efficiency have reduced their production costs while about a quarter report that their production costs have increased.

efficiency in the context of waste disposal, waste from production processes is no longer seen as just a burden, but is recognised as an important re-usable resource for industries.

Eco-industry refers to the production of goods and services to measure, prevent, limit, minimise, or correct environmental damage to water, air and soil and problems related to waste, noise and ecosystems. The global market for environmental goods and services represents an opportunity for European firms. The global market for eco-industries is estimated nearly EUR 1.15 trillion per year (Ecorys, 2012), and the EU captured approximately one third of it. In the future, the global market could almost double, with the average estimate for 2020 being around EUR 2 trillion a year.

On 20 March 1970, the Commission submitted the first document about the principles of industrial policy for the Community to the Council, which has also included recommendations about protection of the natural environment (Colonna Report). Because of the wide variety of linkages between the economy and the environment, evidence demonstrates that environment related activity provides opportunities in a wide range of regions and sub-regions. Evidence and examples suggest that environmental activity has a particularly strong role to play in cohesion/regional policy (Raymenta, Pirgmaierb, De Ceusterc, Hinterbergerb, Kuikd, Leveson Gowera, Polzinb, Varma [2009]).

Protecting environmental assets (clean air, water, biodiversity) call for innovation and the large-scale adoption of green technologies. Otherwise, it will be very difficult and very costly to sustain growth trajectories of the past decades while not depleting humanity's "green capital". EU's emerging economies view R&D activities and incentives for the diffusion and adoption of green technologies as a priority.

The Hungarian green economic development is one of the seven focus areas of the New Széchenyi Plan. Hungary's National Sustainable Development Strategy (2007) encourages R&D in future energy sources. Other green initiatives include the Hungarian National Renewable Energy Action Plan (2010-2020), the National Environmental Technology Innovation Strategy (2011-2020), and the National Energy Strategy (2030).

Poland has embraced green growth in its National Reform Programme. The National Programme for Low-Emission Economy Development will be central for delivering green growth objectives. To minimise the environmental impact of government operations, the Public Procurement Office of Poland considers sustainability aspects in its tendering processes. The GreenEvo project supports the introduction of Polish green technologies on foreign markets.

Eco-innovations are part of the Slovakia's Innovation Strategy and Innovation Policy of 2013. Support for eco-innovation is mainly provided through grants from EU structural funds to increase energy efficiency in production and consumption, upgrade public lighting promote green innovation activities in enterprises and technology transfer. The Slovak government approved the National Action Plan for Green Public Procurement in 2012 to improve the

implementation of green procurement in central and local governments through training, information, diffusion of tender models and monitoring.

The Ministry of Environment of the Czech Republic updated the Programme of Support of Environmental Technologies approved by the government in July 2009. The update aims to increase energy efficiency and stresses the importance of renewables and eco-innovation. The Slovenian action plan for the implementation of cradle-to-cradle principles is based on the concepts of eco-effectiveness, ecoefficiency and closed-loop economy[13] (OECD, 2012).

The energy intensity of Lithuania's industry is twice the EU average. To comply with the EU Climate Change regulation, Lithuania is required to restrict the rise in carbon dioxide (CO2) emissions to 15 per cent between 2005 and 2020. Lithuania has made limited progress with respect to improving the energy efficiency of buildings. The government introduced a new version of the Multi-Apartment Building Modernisation Programme in December 2011 but this version is less ambitious than the previous one and is not likely to bring about significant efficiency gains (A Resource-efficient Europe, 2011).

The main funding instrument for environmental policy in Romania is the *OP Environment*. Funding for the development of eco-efficient production, for increasing energy efficiency and for promoting renewable energy sources is also provided through the *OP Increase of Economic Competitiveness*. The *2011 - 2013 National Energy Efficiency Action Programme* was adopted in May 2012 (The Government of Romania, 2012). Since it is one of the most energy-intensive economies in Europe, improving energy efficiency and developing complementary actions in energy efficiency and renewable energy should be a key priority in Romania. Moreover, complying with environmental standards, which is essential for industrial competitiveness, will require significant financial efforts to support the adoption of standards, upgrade productive processes, and implement environmentally friendly, eco-efficient technologies.

In October 2011, the Council of Ministers of Bulgaria adopted a national plan for green public procurement. The plan sets binding objectives for the central administration on green procurement of 6 product groups (for example, Information Technology (IT) equipment, air-conditioning, and lighting). A System for Certification of Green Jobs is operational since January 2011 and 786 new green jobs were created under this programme (A Resource-efficient Europe, 2011).

In an effort to tackle the challenges posed by environmental constraints and to ensure sustainable production, Member Countries are using a variety of demand-side and supply-side policies. The effects of these policies have not always been fully favourable. However, demand-side policies and support, such as green public procurement and labeling, taxation and subsidies seem to have solidly taken root. Supply-side policies, such as better access to

[13] The closed loop model is a biomimetic (life-imitating) approach, a school of thought that takes nature as an example and considers that our systems should work like organisms, processing nutrients that can be fed back into the cycle, hence the terms "closed loop" or "regenerative" usually associated with it.

finance for environmentally viable solutions, education and information services directed at enterprises, have been identified as bottlenecks (EU Industrial Performance Scoreboard 2012).

The national green policies are tightly related to the EU OP financing. It would be interesting to examine the following questions in a subsequent study: Are national green policies, as part of the supranational political prescriptions, harmonious with the improvement of national competitiveness? Are these not crowding out alternative domestic policies that would better fit the local requirements? However, addressing these questions would be out of the scope of the current study.

4.3. Clusters as supporters of IP efforts

Clusters can bring together firms, higher education and research institutions, and other public and private entities to facilitate collaboration on complementary economic activities. “Smart specialisation” is a policy framework to help entrepreneurs and firms strengthen scientific, technological and industrial specialisation patterns while identifying and encouraging the emergence of new domains of economic and technological activity (OECD, 2012).

National cluster policy in Hungary was formulated in 2007. It has a horizontal character and its main focus is to increase innovation, competitiveness and employment levels in the country. Given the small size of the country, elements of cluster policy only exist at the national level, although the regional implementation of these policies may show some special characteristics. An accreditation system for clusters has been introduced in the country as a means of implementing the policy and supporting the emergence of competitive clusters. The system is similar to the German cluster benchmarking system, and the purpose is to allocate special emphasis on the champions, thus promoting innovation, and also further support companies in their innovation activities, which is part of the economic development plan of the country (The Government of the Republic of Hungary, 2007). Benefits of the accreditation include certification of their activities, and extra points for accredited clusters in national competitions (Barsoumian, Severin, Spek, 2011).

Cluster policy initiatives are a key pillar of regional policy in Hungary (Rechnitzer, Smahó, 2011). The Pole Programme supports clusters of firms with export potential in the main urban concentrations. The Economic Development Operational Programme (EDOP) and the Central Hungary Operational Programme (CHOP) also support cluster activity. Several clusters provide useful frameworks to the activities of companies engaged in technology parks. In Hungary, such parks often include at least one multinational company and its suppliers (OECD, 2012).

Cluster policy in Poland is part of the National Reform Programme 2020, issued by the Ministry of Economy in 2011. Cluster references were first made at the policy level in the

country in the „Strategy for Increasing the Innovativeness of the Economy, 2007-2013" in 2006, with goals of supporting joint networking activities in order to build-up and strengthen the innovation infrastructure in the country. Measures and policy tools supporting clusters were thus included in the national as well as Regional Operational Programmes starting from 2007. There is a recent interest in the government to link cluster policy with "Special Economic Zones" development policy. At the national level, cluster policies have a rather implicit character with some instruments (mainly funding instruments) applied by the national government which promote the establishment of clusters in all Polish regions. Such instruments are in place to establish cooperative networks, and organizations are invited to apply for funding for the establishment and running of clusters.

The Co-operation Programme (2007-13) promotes clusters, poles of excellence and co-operative projects in the Czech Republic. In 2010, USD 42 million was invested in cluster collaboration platforms. The Ministry of Industry and Trade (MIT) and CzechInvest oversee 30 science and technology parks, which help to accomplish the goals of regional innovation strategies (OECD, 2012).

There is no explicit cluster policy in Slovakia. There are references to cluster formation in other types of policies. Clusters are mentioned as important policy instruments to increase competitiveness and innovation of enterprises in the Slovak economy (Innovation Strategy for the Slovak Republic for years 2007-2013). However, the support at the policy level, as well as at the implementation level for clusters is low in Slovakia. No programmes for cluster support are reported (Barsoumian, Severin, Spek, 2011).

Table 2: Cluster policies in new member countries

National policies	Latvia, Lithuania, Czech Republic, Poland, Romania and Bulgaria
National frameworks for regional policies	Hungary
Elements of cluster policy in various policies and initiatives	Estonia, Slovakia and Slovenia

Source: Barsoumian, Severin, Spek (2011)

"Slovenia Clusters" was considered as one of the tools of the Entrepreneurship and Competitiveness Policy that the Slovenian Ministry of Economy was implementing during 1999-2004. Slovenia has begun with its national cluster policy in 2001. Industrial clusters have been a prevalent element of Slovenian competitiveness policy until 2004. More than thirty cluster initiatives were born in Slovenia in that period (Palčič, Vadnjal, Lalič, 2010). After that period and starting from 2005 support to the cluster development programme stopped. From 2008 on the government does not support clusters as defined by the EC, but is still supporting networking among enterprises, research institutions, academia through other

organizational forms such as Centres of Excellence, Centres of Competence and Development Centres (The Government of the Republic of Slovenia).

The Slovenian Industrial Policy (SIP) sets the priorities for the development of industry and the economy for the period of the next financial perspective 2014-2020 (The Govenment of Slovenia, 2013). Slovenia has set up national platforms serving specific cluster categories. In some ways, these platforms are natural extensions of traditional industry- or sector-oriented programmes in research and innovation policy (Barsoumian, Severin, Spek, 2011).The platforms, largely financed by the government, provide companies with information on how to access project funding from other parts of government.

The importance of cluster development is mentioned in the Latvian National Development Plan 2007-2013. Until 2009, when the Government of Latvia started to provide financial support for cluster development, the only Latvian clusters were the IT cluster and the Latvian Forest Industries cluster (Boronenko, Zeibote, 2011).

Cluster policy in Lithuania is integrated into innovation policy and industrial policy. Efforts have increased significantly since 2008, in order to establish a more active cluster policy in the country. Currently, the government views cluster policy as one of the key components in the policy mix, which are expected to make the economy competitive. In recent years, the government has invested efforts and resources in conducting "Cluster development study" and mapping exercises [14].

Cluster policy in the country is highly sectoral, with the sectors of focus identified in the assessment done over the past two years. Funding for cluster projects comes from national budgets as well as the Structural and Cohesion Funds. Lithuania has set up the Clusters of Excellence Network (KCT), which is a public body aiming to coordinate networking actions and support the promotion of cluster organisations and activities (MITA, 2011).

[14] Source: Mini Country Report, Lithuania, 2011
http://ec.europa.eu/enterprise/policies/innovation/files/countryreports/lithuania_en.pdf

Table 3: National cluster policies by sectors

Countries / Sectors	HU	SL	LV	LT	EST	RO	BG
agriculture							x
agro-food						x	
automotive	x	x					
biotechnology and materials				x	x		
chemicals		x		x			x
construction		x					
energy	x	x					
engineering and machinery			x				
environmental industry	x						
food and beverages				x			x
forestry			x				
furniture						x	
Information and Communication Technologies (ICT)	x	x	x	x	x	x	
laser and component				x			
logistics and wood processing		x					
machinery and equipment				x			
manufacturing		x		x			x
pharmaceuticals and science research			x				x
renewable energies						x	
textiles and clothing		x		x		x	
tourism and maritime						x	
wood processing and furniture				x			

Source: this table has been compiled based on information from Barsoumian, Severin, Spek 2011.[15]

Romanian cluster policy is integrated within industrial policy. The integration of the cluster approach within policy planning began in 2009. As a result, the first cluster organisation in the country was established in 2010. The fundamental aim within cluster policy in Romania is to develop specific regional clusters while simultaneously establishing a national network of clusters (Barsoumian, Severin, Spek, 2011).

[15] Note: Poland: no specific sectors can be identified. Czech Republic: there are no priority sectors identified. Slovak Republic: not applicable, since there are no national cluster policies. Cluster policy is integrated into R&D and innovation policy in Estonia. It has been in place since 2006, before the current programming period started with the use of the Structural and Cohesion Funds. The programming period with cluster references is in place is from 2007 until 2013, and an impact assessment of the policy is expected to take place in 2012. The most relevant policy to cluster policy is the Innovation strategy „Knowledge-based Estonia" 2007-2013, with the aims of supporting innovation, enterpreneurship, competitiveness through research and development, and an overall favourable innovation environment. (Barsoumian, Severin, Spek, 2011)

There is no well defined cluster policy in Bulgaria. Cluster policy is part of the Operational programme for competitiveness 2007-2013 (Government of Republic of Bulgaria, 2007). There are clear references to cluster policy and cluster formation and what the objectives are: "Policy objectives for 2007-2013. It is recognised that cluster policy can have an impact in three distinct areas: cluster formation, protecting or enhancing cluster development and encouraging embryonic clusters. All clustering initiatives in the country can be regarded as clusters in early stages. Thus, priority should be given to speeding up the cluster development processes. Support measures will have to focus on: the establishing of new and strengthening the existing clusters to help firms specialise and innovate; the cooperation among cluster members and between the clusters and other stakeholders national/regional/local authorities, universities, intermediaries, and to strengthen the governance of the clusters; the "maintenance" of the human capital." Currently, the Ministry of the Economy has undertaken a comprehensive study of all the Bulgarian Clusters and is developing both regional and national strategies for supporting these clusters in an attempt to increase the overall competitiveness of the economy (Barsoumian, Severin, Spek, 2011). Even though, clusterization is a priority form of organization of businesses for the EU, there are very few active clusters in Bulgaria. Furthermore, systemized information on clusters in Bulgaria is not well developed (Bankova, Yalamov, 2009). The development of clusters could potentially improve competitiveness, and therefore could be important tools to achieve the national industrial policy objectives.

5. Industrial policy and innovation

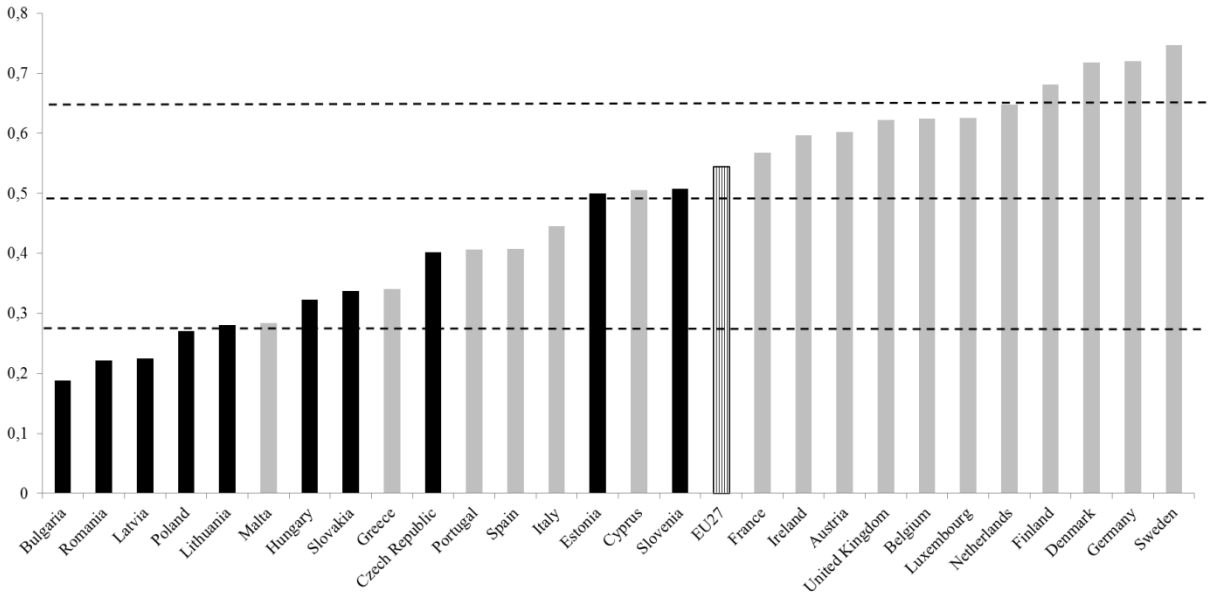
Quite a range of industrial policies can be distinguished in the Central and Eastern European region, with slightly interventionist policies along with very liberal ones. Some common features of these very diverse approaches to industrial policy have included, for example, a focus on incentives to foreign direct investment (FDI) and a more or less strong emphasis on R&D and innovation (Török, 2007). Due to the shift in the content of industrial policies that has taken place since 2007 in most CEECs, we will focus on CEECs innovation policies, going beyond an understanding of current R&D and innovation and their linkages with competitiveness, to a better understanding of future for innovation policy in the CEECs.

The role of innovation and R&D in industrial policy is still rather controversial in the region under scrutiny. In 2012, Poland became a modest innovator and Lithuania advanced to the moderate performance group level of innovators. The change in performance group was due to marginal changes of the innovation performance in both countries (Innovation Union Scoreboard, 2013). All innovation leaders and innovation followers improved their innovation performance except the UK[16].

[16] In the UK the change in innovation performance between 2010 and 2012 was -0.2 per cent (Innovation Union Scoreboard, 2013)

As Figure 3 shows, the performance of modest innovators (Bulgaria, Latvia, Poland, Romania), is below the EU27 average. Among the "economies with marked potentials of catching up", every country is a moderate innovator or a modest innovator, except two innovation follower countries, Slovenia and Estonia, which have innovation performances close to the EU27 average.

Figure 3: EU Member Countries's Summary Innovation Index (SII), 2012



Source: Innovation Union Scoreboard, 2013.

The EU's current innovation policy line is presented in the Innovation Union, Europe 2020 flagship initiative. The Innovation Union aims to make Europe into an excellent science performer, remove obstacles to innovation and revolutionize the way public and private sectors work together, notably through Innovation Partnerships between the European institutions, national and regional authorities and business. The Innovation Union flagship in particular is about creating a vibrant, innovation-based economy fuelled by ideas and creativity, capable of linking into global value chains, seizing opportunities, capturing new markets and creating high-quality jobs. "Innovation policy is about helping companies to perform better and contributing to wider social objectives such as growth, jobs and sustainability" (EC Enterprise and Industry, 2013). However, even though the EU has a specific framework for innovation policy implementation, some issues could arise from different sectors. The framework conditions for the specific sector and the identified trends could be the key factors for the improvement of competitiveness in the European industry.

5.1. Green innovation

Innovation plays an important role in helping to decouple growth from environmental pressures and it is essential to have a framework conducive to innovation, including competitive markets and openness to trade and investment. Green innovation is strongly influenced by the environmental policy framework.

Box 1: Case of Slovenia

From June 2012, the Slovenian Development and Export Bank (SID) has earmarked EUR 44 million for SMEs to finance green technology solutions.
Germany has an initiative on 'electro-mobility', which aims to establish it as a leading market for electric vehicles. In addition, Germany is working on a programme aimed at developing hydrogen and fuel cell technologies.
The Electric Vehicles Systems (EVE) programme has been launched in Finland, in order to increase the amount of business related to electric vehicles and machinery (EC, 2010).

Among the countries we analyzed, Poland has launched a green technologies accelerator scheme aimed at fostering the development and international transfer of Polish innovative environmental technologies. Many Member Countries have enacted measures to promote business sector research, in particular tax incentives, grants and tax credits[17]. Several Member Countries have revised their tax systems to make them more suitable for SMEs. For instance, the Czech Republic has redesigned its previous tax incentive for in-house research so that smaller companies, which outsource research to external institutes or enterprises can also benefit from it[18].

According to the European Commission, in order to enhance growth based on research and innovation, Member Countries should increase the availability of venture capital. The Hungarian total venture capital investment scaled by GDP was 400 € in 2011[19], which is in the fourth place among the Member Countries of the EU. There are initiatives in the Netherlands, Poland and France to set up new venture capital schemes. These developments focus on fund-of-fund schemes, investing public funds in venture capital funds. The main objective of these initiatives is to attract private institutional investors. Estonia has set up further competence centers to bridge the gap between firms and academic research, in order to

[17] For example: France is providing a Research Tax Credit that reduces the cost of R&D expenditure for businesses, focusing on technological innovation. Finland has also recently introduced R&D tax incentives. The Netherlands has cut subsidies and transformed them into generic tax deductions; especially for R&D wages and R&D-based profits, with the goal of making it easier to apply for these instruments. Belgium allows similar tax deductions to be combined with a generic allowance for corporate equity and R&D grants. Greece has recently shifted its R&D support from grants to loans, guarantees and tax incentives (EU Industrial Performance Scoreboard (2012).

[18] Measures in Portugal follow a similar line. Austria has turned its tax allowance into a tax credit that will better suit SMEs, which may make few profits; and France has a scheme targeting young innovative firms with tax advantages. The United Kingdom is slightly adapting its R&D tax credit scheme based on a recent evaluation (EC, 2010).

[19] The total venture capital investment was the highest in Sweden with 640 €; Second: Denmark with 520 €; Third: The United Kingdom and Finland with 450 €. Source: EC, 2013b.

encourage closer cooperation between academia and enterprises. In Slovenia, one selection criterion for public research grants is whether the researcher cooperates with businesses. Innovation vouchers for enterprises to buy services from R&D providers remain a popular policy measure. For example, Estonia, Latvia and Lithuania all have such schemes and Slovakia is considering a similar system.

In May 2011, the Slovenian government approved the Resolution on the Research and Innovation Strategy of Slovenia 2011-2020 (RISS) (National Assembly of the Republic of Slovenia, 2011). The main objective of the strategy is to advance the whole research and innovation system in Slovenia. RISS is aimed at establishing a common governance system for R&D in Slovenia, strengthening human resources, fostering technological and non-technological innovations. Increasing a number of PhDs and young researchers in companies and increasing the number of interdisciplinary research departments in the business sector. It ensures effective inter-institutional mobility of researchers, to support the employment of researchers or developers in the economy. The funding available for the call amounts to €20 million. More than 60 companies and more than 500 researchers (100 PhD students among them) will be financed until mid-2014.

The Czech Accelerator 2011-2014 Programme is supported by the Operational Programme Enterprise and Innovation. The Programme aims to enhance the managerial skills and capacities needed to successfully commercialise products, implement business plans and gain easier access to venture capital. Thanks to the Programme the innovative Czech firms will be able to seek new opportunities for doing business in ICT, clean technologies biotechnology, life sciences, new materials or nanotechnology, a stay in the US (Silicon Valley, Boston), Israel, Singapore or Switzerland [20]. In addition to an office in one of the business incubators, consulting services, coaching and training are offered to the participants. Companies also participate in various networking events, which make their search for a strategic partner or investor easier. Innovation Union flagship initiative, together with the Digital Agenda, Industrial Policy and Resource Efficient Europe flagships, and the Single Market Act, aim to create the best conditions for Europe's researchers and entrepreneurs to innovate.

Since 2008, the EU has improved its innovation performance and closed almost half of the innovation gap with the US and Japan. The global innovation leaders US, Japan and South Korea are particularly dominating the EU27 in indicators capturing business activity as measured by R&D expenditures in the business sector, Public-private co-publications and PCT patents but also in educational attainment as measured by the Share of population having completed tertiary education (Innovation Union Scoreboard, 2013).

The EU is also keeping its strong innovation lead over Brazil, India, Russia and China, although the latter is most markedly catching up. Furthermore, while public R&D spending in the EU grew throughout the crisis governments strived to keep up their R&D investments (EU Industrial Performance Scoreboard, 2012).

[20] Source: EU Industrial Performance Scoreboard (2012)

In 2011, for the very first time since the beginning of the crisis, the total public R&D budget of the 27 EU Member Countries decreased slightly. Since 2011, through its 7th Framework Programme (FP7), the EU has supported about 30 million € worth of research projects on social innovation and it is funding two networks of incubators to nurture and scale up successful social innovation. The pilot European Public Sector Innovation Scoreboard is the first EU-wide attempt to better understand and analyse innovation in the public sector. The analysis clearly shows that improved public services make it much more likely that companies will innovate, experience and increase in sales. In addition, countries that perform well on the quality of public services tend to perform better on innovation (EC, 2013a). Highy effective public administrations could improve Europe's innovation performance.

5.2. "High-tech subcontracting countries"

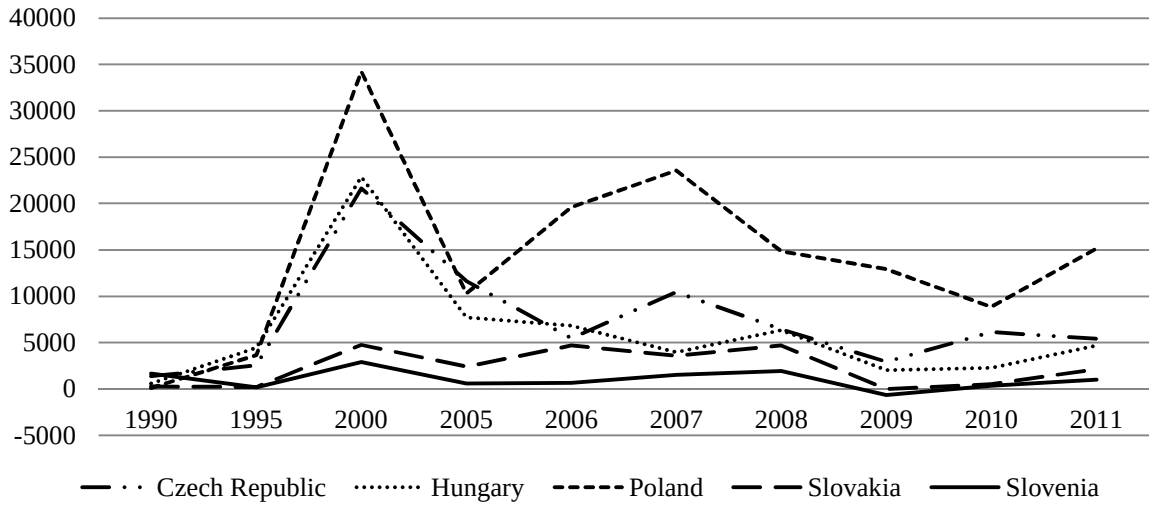
Research, development, and innovation are key sources of economic and productivity growth in the medium term. EU has confirmed its objective of spending 3 per cent of its GDP on R&D by 2020. Successful investment in research and innovation can boost productivity and the competitiveness of European business. However, improved innovation performance facilitates structural changes in the economies of Member Countries towards high value added economic activities (EC, 2012a).

The catching-up group as we see it consists of Bulgaria, Romania, the Czech Republic, Poland, Hungary, Slovakia, Latvia and Lithuania. These countries face significant challenges, as they move towards more knowledge- and skills oriented industries, even if it is hampered by weaknesses in innovation capacity and knowledge transfer. Resource efficiency is still low, in particular in the case of Bulgaria and Romania. There are clear signs that the catch-up process in these countries has been fairly brisk on many competitiveness criteria, enabling them to further narrow down their gap with the most advanced economies (EC, 2012a). Polish firms seem to have relatively better access to finance.

The Hungarian industrial policy of the 1990s was relatively successful in introducing a number of tools for promoting innovation, supporting small and medium-sized enterprise development and attracting FDI, but a marked industrial policy profile was missing most of the time. A spectacular turn towards active industrial policy was taken in 2000 under the code name of "Széchenyi Plan". The focus of Hungarian industrial policy has been increasingly on innovation, at least as far as new elements of industrial policy are concerned. The government's technology policy agency introduced a series of innovative tools of innovation promotion increasing BERD and also with quite significant network-building effects. Activation of Hungarian industrial policy after 1998 included a shift towards such a horizontal approach, which involved less direct expenditure by the government but made life considerably easier for SMEs. (Török, 2007) According to Doing Business, Hungary is in 54th

place (compared to 184 other economies) in Starting a business rank[21]. The European Commission advised Hungary to gear reforms to removing obstacles o the growth of innovative companies. In the new Hungarian innovation strategy, specific well-targeted incentive schemes are provided to support innovative SMEs.

Figure 4: FDI inflows in Hungary, Poland, the Czech Republic, Slovakia and Slovenia, millions of US dollars (1990-2011)

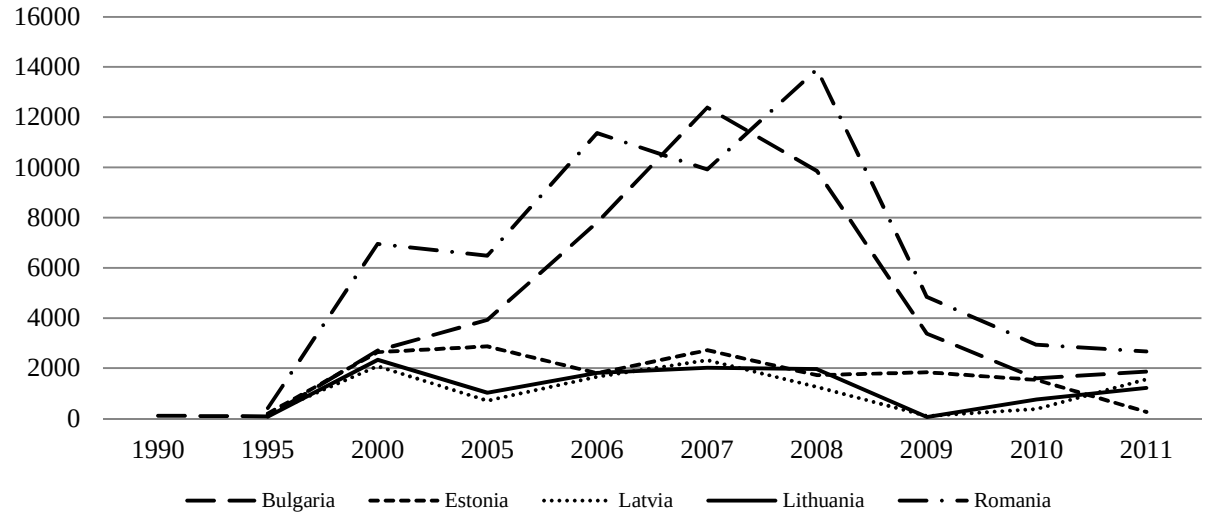


Source: World Investment Report (1990-2011)

In the transition process, the countries examined opened their markets for foreign direct investment (FDI) in the late 1980s. The Czech Republic, Hungary and Poland were the most attractive investment destinations during the transition process. In 2000, these three countries received 76.36 per cent of the total FDI that went to the region[22], while in 2011 this was 70.21 per cent.

[21] Source: http://www.doingbusiness.org/rankings (2013. 05.03)
[22] 10 new member states.

Figure 5: FDI inflows to Estonia, Latvia, Lithuania, Romania and Bulgaria, millions of dollars (1990-2011)



Source: World Investment Report (1990-2011)

In the period between 1995 and 2008, there was continued increase in FDI to Romania and Bulgaria. At the same time, FDI flows to Estonia, Latvia and Lithuania were low in comparison. After 2009, the flow of FDI into all of these countries was extremely low.

The strategic document of Poland, the competitiveness chapter of the National Development Plan 2007-2013 contributed to enterprise competitiveness in general, job creation in the New Economy and R&D and the promotion of FDI inflow. Poland had an industrial culture that had slowly led it to more competitive industry but "free market thinking" was destroyed under collectivist economic policies based on central planning. The "leader countries of transition" did not formulate any kind of industrial policy. They strived to obtain foreign investment in selected "crisis" sectors.

In November 1991 Poland made an agreement of Associate Membership with the EU, which helped to increase its exports to the EU to $16 billion (1995) from $6.4 billion (1990). At the end of 2002 the stock of FDI in Poland expanded to $45.2 billion, from $4 billion in 1996. (Manek, Kirpalani, Nowak, 2003). Rachwal analysed the changes in industry of Poland, with respect to changes in other EU member countries. His research covered the period of industrial restructuring in Poland (1995-2007). Changes in the branch structure of Polish industry are helping to create a sector similar to that of highly developed EU countries such as France and the UK. This could be regarded as very good news in terms of the realization of restructuring goals in Poland. Structure of the Polish export sectors changes could be considered as positive, given Poland's shift towards increasing exports of machinery and transport equipment. The high-tech products had a low share of Polish exports. According to Rachwal's study this is related to the country's unfavourable R&D climate in terms of job creation and new investments compared to other EU countries (Rachwal, 2011).

The Czech Republic adopted in 2011 the International Competitiveness Strategy for 2012-2020 and the National Innovation Strategy (NIS). For instance, there was an increase in expenditure on R&D in 2010. Public R&D expenditure remained similar to the level reached in 2009, that is, 0.58 per cent of GDP in 2010. In the Czech Republic, business expenditure on R&D (BERD) was 0.97 per cent of GDP in 2010. The majority of companies performing R&D are foreign owned characterized by strong presence in manufacturing sector with innovative industrial specialisation. By the suggestion of the European Commission (EC, 2012a) the Czech Republic has to solve some difficulties in the R&D sector, in order to increase the competitiveness in research and innovation. There is a lack of co-operation between the research and the business sector in the Czech Republic. One reason for this could be that a large part of the new technologies stem from abroad. There is a low demand for contracted research from companies because the latter usually keep their research results for themselves. Further difficulties in the Czech Republic are the lack of policy instruments for long-term collaborations between Universities and businesses and lack of coordination and fragmentation of responsibilities on innovation policy at the government level. There is a low horizontal mobility between the research organisations and companies, and a low level of readiness of research organisations to collaborate with the corporate sector (EC, 2012a).

The main policy tool to foster R&D spending is the structural funds. Owing to the Czech tax reform (adopted in January 2012), the tax credits for R&D services purchased by companies from universities or research organisations (previous practice: tax credits were available only for in-house R&D). In May 2012, the government amended the Act (ACT No 72/2000 Coll.) on investment incentives, which makes the Czech Republic more attractive for domestic and foreign firms and supporting the creation of new SMEs and the development of innovative and technologically oriented companies is welcomed (EC, 2012a).

The EU Commission recommended for the Czech Republic to improve the output of the science base to foster business R&D investment (EC, 2013a). However, this initiative is only one part of the suite of industrial policy tools, thus significant improvement could not be expected from this effort. The EU Commission (EC, 2013a) recommended for the Czech Republic to improve the output of the science base to foster business R&D investment. At the same time, it is necessary to note that such indicators are based on mostly quantitative and less qualitative factors, which raises the question of the reliability of several indicators of R&D – business relationships (Godin, 2002).

The industrialization of Slovakia was perhaps the main goal of the post-war economic policy of Czechoslovakia – a strategy approved in 1949 by the ninth congress of the Communist Party of Czechoslovakia (Pavlínek, 1995). The economic transformation in Czechoslovakia after the collapse of state socialism resulted in re-emergence of industrialization in Slovakia. Automotive industry played a key role in the Slovak industrial policy program launched in 1998. The automotive industry provided 32 per cent of total exports as already in 2003 (Lukáčik, 2007). According to Lukáčik, in order to provide support to private sector development and, in particular, to SMEs, it would be necessary to make further efforts to

facilitate access to risk capital, to improve the possibility of participation in vocational retraining programs, and to minimise the administrative burdens. By means of cluster development, competitive SMEs would be connected to firms with worldwide export potential. Between 1970 and 2001, services as a percentage of GDP increased from 52 per cent to 71 per cent in the EU, in the same period the share of processing industry decreased from 30 per cent to 18 per cent (Lukáčik, 2007).

According to the Innovation Union Scoreboard, Slovakia is a moderate innovator. The total R&D expenditure in Slovakia is one of the lowest in the EU, (in 2010, 0.63 per cent of GDP). The total R&D expenditure between 1999 and 2009 remained low[23] as was the share of private R&D expenditure. The generation of intellectual assets and patent revenues stayed at low levels, while a significant increase of community trademarks was observed. Furthermore, there are low numbers of frequently quoted Slovakian scientific publications (EC, 2012a).

However, it is important to note that the various scientific disciplines have less publication opportunities and diffenent publication conditions. A wide range of literature deals with the interpretation of citation indexes (Coupé, 2003, 2004; Simonovits, 2005). It should be taken into consideration that the numbers of frequently quoted scientific publications might not be an accurate indicator of either R&D or a measure of innovation.

In recent years, Slovakia has increased its relative value added share[24] in high innovation sectors and decreased its specialisation in labour-intensive low-skill industries. Innovations in the production system and productivity gains have mainly been driven by technology imports. The technology imports contributed to the declining inflows of FDIs increased Slovakia's relative value added share in high innovation sectors and decreased specialisation in labour-intensive low-skill industries. The Innovation Strategy for 2007-2013 sets the general framework for innovation policy intervention in the Slovak Republic. The document Innovation Policy 2011-2013 specifies actions in three areas. Infrastructure is the first area, which aims to provide support to industrial clusters for which first calls are planned by the end of 2012. The second area is the quality of human resources, and the last area is support for innovation. Two strategy documents (FENIX, MINERVA 2.0) were adopted in 2011, which aimed at science, technology, and a knowledge-based economy (EC, 2012a).

According to the World Intellectual Property Organization (WIPO, 2011) Slovenia is the best performer within its reference group (CZ, IT, HU, SI, SK) for "patent applications per GDP", "share of the employment in knowledge-intensive activities" and "contribution of medium and high-tech product exports to the trade balance". Slovenia's export share of high-tech products is not necessarily associated with indigenous technological capabilities (Srholec, 2005). Srholec shows in his study that in developing countries the specialization in high-tech exports typically does not appear in line with indigenous technological capabilities.

[23]Total R&D expenditure in Slovakia: in 2010 0.63 % of GDP. In 1999: 0.66% , In 2009: 0.48%, (EC, 2012a)

[24] This indicator shows the share of nominal value added by industry in the total economy. (OECD, http://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=STANINDICATORS&Coords=[VAR].[VSHT]&ShowOnWeb=true&Lang=en).

Particularly in developing countries, despite the large amounts of high-tech product exports, there are very limited technological capabilities and are specialized in low-tech and low-skill fragments of the particular value chain.

In Slovenia, there are weak links between public and private sector; some structural aspects of the business environment hinder foreign direct investment, according to the European Commission. It needs to have a new industrial policy including a strategy for attracting foreign capital, notably linked to R&D, towards a knowledge-intensive economy. The country has weaknesses in the share of knowledge intensive services in the total exports of services and sales of new to market and new to firm innovation as a percentage of the turnover of firms (EC, 2013a).

5.3. Emerging CEEs: Romania and Bulgaria

Romania's economy is characterized by the prevalence of low-and-medium-technology sectors, with a weak demand for knowledge and an underdeveloped innovation culture, and a poor innovation level. The Global Competitiveness Report 2011 classifies the country as efficiency-driven (together with Bulgaria), all the rest of the EU economies being either in transition to, or already in the innovation-driven stage. R&D intensity of Romania increased from 0.37 per cent in 2000 to 0.58 per cent in 2008, unfortunately only to drop back to 0.48 per cent in 2011 (World Economic Forum GCI, 2011). The Romanian R&I system is primarily public-based, with only 38.3 per cent of research performed by the business sector (the EU average is 61.5 per cent) (EC, 2013a).

Bulgaria lacks regional level planning and implementation and still does not have a public policy agenda. This might lead to serious problems with the next planning phase through 2020 (Yalamov, T., Bougiouklis, K., 2011). According to EC recommendations Bulgaria needs to seize the economic growth potential of innovation-policy coordination and strategic planning, and also improve the access to finance for start-ups and SMEs, in particular those involved in activities in order to increase their research and innovation performance. Romania faces the challenge of improving the policy coordination of R&D (EC, 2013a).

5.4. Economies with marked potentials of catching up: Baltic countries

The three Baltic countries were incorporated into the Soviet Union (USSR) in 1940 and regained their independence in 1990 (Latvia, Lithuania) and 1991 (Estonia). In the Soviet period, heavy industrialization took place in these countries (Misiunas, Taagepera, 1983). In Latvia, factories such as the Riga Electrical Machine Plant and the Riga Diesel Plant were built for the manufacturing of machines and for metalworking. Lithuania, which is the largest of the Baltic countries, has an economy that is dominated primarly by agriculture. In addition to that, the development of the light industries for food processing, textiles and wood products

and machine tools and computer technology (especially in Estonia) enjoyed priority in the Soviet period. In 1960, the Cybernetics Institute was founded in Tallin. In addition, the machinery, electricity production, metalworking industries and the extraction and processing of shale oil were preferred sectors[25].

Table 4: Growth in innovation performance 2008-2012

Country	Innovation performance	Growth rate 2008-2012 (per cent)
Bulgaria	Modest innovator	0.6
Romania	Modest innovator	1.2
Latvia	Modest innovator	4.4
Poland	Modest innovator	0.4
Hungary	Moderate innovator	1.4
Czech Republic	Moderate innovator	2.6
Slovakia	Moderate innovator	3.3
Lithuania	Moderate innovator	5.0
Slovenia	Innovation follower	4.1
Estonia	Innovation follower	7.1
EU27	**Innovation follower**	**1.6**

Source: Innovation Union Scoreboard, 2013

According to the Innovation Union Scoreboard (2013), Latvia is a modest innovator, Lithuania is a moderate innovator and Estonia belongs to the group of innovation followers. The Baltics (Estonia, Lithuania and Latvia) are at the top of the scale within their own respective innovation performance groups. As Table 4 shows, Estonia experienced the highest growth rate (7.1 per cent) in innovation performance of all Member Countries, between 2008 and 2012. Lithuania was the growth leader (5.0 per cent) among the moderate innovators. Among the modest innovators Latvia was the growth leader (4.4 per cent).

Estonia had been more successful in transition than the other Baltic countries. Between 1995 and 2011 GDP per capita was higher, central government debt (in percentage of GDP) and unemployment rate (per cent of total labor force) were lower (data.wordbank.org). Estonia has deposits of shale oil, but the country has to minimize the environmental impacts. Its key industries are energy, environment, food and agriculture (EC, 2013a). R&D intensity increased in Estonia from 2000 to 2011 by 13.31 per cent. [26]

[25] These counties signed the Baltic Free Trade Agreement in 1993 (the agreement existed until 2004) which established the principle of free trade of industial products (OECD, 2000).
[26] The R&D intensity in Estonia was 0.60 per cent in 2000 and 1.42 per cent is 2009. (EC, 2011c)

In Latvia the key industries are manufacturing, health, nano-sciences, environment and energy (EC, 2013a). Latvian R&D intensity has increased by 4.15 per cent from 2000 to 2011. One aim of the new industrial policy is to promote innovation and to stimulate the collaboration between scientists and entrepreneurs (Latvijas Nacionālās industriālās politikas vadlīnijas, 2012). In Lithuania, the hot spots in key technologies are for example the construction technologies and energy. R&D intensity increased in Lithuania by 4.13 percentage points from 2000 to 2011 (EC, 2013a).

Another interesting area of research would be to examine how the selected CEECs in this study were able to implement improvements to the quality of innovation within their country. Specifically, how their efforts contribute to the innovation of improvements in technology. However, it is difficult to give a quantitative rating to this. The other measurement problem is that it is difficult to compare the performance ranking of individual countries on the basis of a single indicator because it may not reflect actual performance.

6. Manufacturing

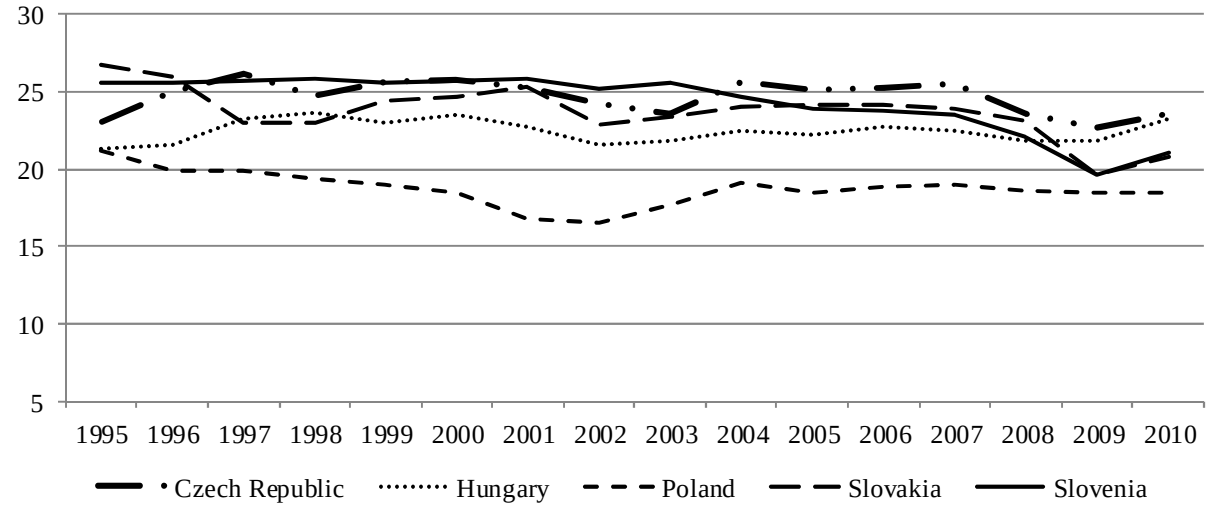
The manufacturing[27] sector remains competitive if an economy is open to imports and inward FDI so that it can make use of division of labour along the value chain (Aiginger, 2012). Total industrial production dropped by almost 20 percentage points in the first months of the financial and economic crisis between the first quarter of 2008 and the second quarter of 2009. The fall in production during the crisis in high-technology manufacturing was only half as large as in the total industry (Jaegers, Lipp-Lingua, Amil, 2013). In 1997, the manufacturing share in GDP was 20 per cent, which was reduced to 15 per cent by 2009.[28]

According to the European Commission Europe must increase the share of manufacturing to 20 per cent of GDP by 2020, because a stronger manufacturing sector will enable "growth and economic recovery". Industrial policy of the EU aimed at boosting the competitiveness and output of its manufacturing sector.

Industrial policy focuses on six areas in the EU: advanced manufacturing technologies; enabling technologies such as nanotechnologies, advanced materials, industrial biotechnology, nano-electronics, photonics and advanced manufacturing systems; bio-based products; sustainable industrial, construction and raw materials; clean vehicles and smart grids (EC, 2012b). Growth impact of world crisis on industrial performance depends on the business cycles. The impact of the global recession on the growth of each CEEC economy is clearly visible.

[27] The current research deals with manufacturing. It does not cover the energy sector, construction, or mining and quarrying.
[28] EU Industrial Structure (2011): Trends and Performance, pp. 38., Figure II.3. Available at: http://ec.europa.eu/enterprise/newsroom/cf/_getdocument.cfm?doc_id=7066 (2013. 06.10)

Figure 6: Manufacturing value added, per cent of GDP: Hungary, Poland, the Czech Republic, Slovakia and Slovenia (1995-2010)

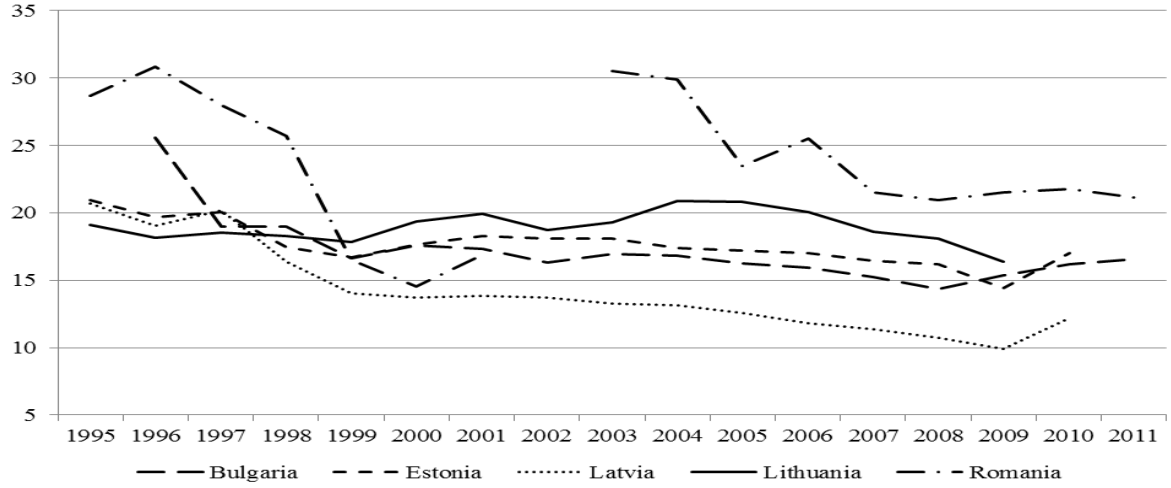


Source: http://data.worldbank.org/indicator/NV.IND.MANF.ZS

For a balaced view of the various industrial policy regimes applied in the CEECs it is necessary to survey the role of industry within GDP along with growth performance. However, an analysis of competitiveness would be advisable in order to obtain a reliable policy assessment. The relative share of manufacturing in GDP was, according to latest available data (2010) 16.67 percent on average in the EU-27.

In the first group, the best performing country was Slovenia, where the GDP per capita (24142USD in 2011) was higher than in other examined countries. The worst performer was Bulgaria, where GDP per capita was USD 7158 in 2011. In the Baltic countries, a very stable performance with an apparent ability of resistance to the crisis was observed.

Figure 7: Manufacturing value added, per cent of GDP: Estonia, Latvia, Lithuania, Romania and Bulgaria (1995-2010)



Source: http://data.worldbank.org/indicator/NV.IND.MANF.ZS

All the Baltic countries have noted growth in GDP after 2010, which shows their success in combating the crisis. The foreign direct investments played the important roles in the business development through the new phases of growth (Mačys, 2012). An incremental increase of FDI can be noticed in all three Baltic countries after they joined the EU. The FDI flows have grown in 2010 due to the EU structural funds and the expanded capital in the biggest commercial banks of the Baltic countries.

6.1. The "high-tech subcontracting countries"

Manufacturing in Hungary is mainly concentrated in low-skill sectors. From 1995, it can be noticed that almost all medium-high-tech and high-tech sectors, especially motor vehicles, electrical machinery and apparatus, and radio, TV and communication equipment have increased their weights in the economy, as well as their R&D intensities. There is a growing trend of specialization in high-tech sectors in Hungary. Business enterprise expenditure on R&D (BERD) in the motor vehicles sector of Hungary accounted for 13.1 per cent of all manufacturing BERD in 2009 (EC, 2013a).

Business R&D intensity in Poland declined between 2000-2011, due to stagnation of the relative research intensity in high technology sectors and the shift of the economic structure towards less research-intensive activities. Only the motor vehicles sector has gained relative importance in total Polish production. The machinery and equipment sector, the chemicals sector, the motor vehicles sector and the radio TV and communication equipment sector decreased in their relative R&D investments over the value of their production. Office equipment, accounting and computing machinery medical, precision and optical instruments, show an increase in their R&D intensities. The medical, precision and optical instruments sector has improved its relative importance in total value added. According to the 2011 EU Industrial R&D Scoreboard, Poland has seven top R&D investors in the fields of telecommunications, banking, computer services and pharmaceuticals (EC, 2013a).

After 1989, the Czech industry had to build capacities able to help to withstand the pressure of economic competition of international markets. They decreased the impact of their activities on the environment; and launched an effort to comply with the EU legislation in general and in the environmental field in particular, and thus gradually embarked on the path to sustainable development (Moldan, 2001). In the 1990s, the Czech Republic reconsidered its FDI approach and introduced targeted investment subsidies. The U-turn in the Czech policy approach to foreign investors identifies domestic actors that have had a major role in organising political support for the competition state.There were good reasons to expect foreign investment to dominate post-communist economic restructuring in the CEE. Strategically, reformers in the CEE were well integrated into a transnational policy network where openness to FDI was the norm.

Among the Visegrad group countries, only the Czech Republic were in the focus of the interest of foreign investors in high-commitment involvement, while managers controlled enterprises and could have transferred them to foreign investors if they wished (Drahokoupil,

2009). Manufacturing Value Added (MVA) decreased significantly after 1990 and after the division of the former Czechoslovakia in 1993. Later it started growing and reached higher levels in 1996 and 1997 compared with 1990. This growth was interrupted in 1998 and 1999 and in spite of the growth in 2000 the gross MVA did not reach the 1990 level in 2000 (Moldan, 2001). The manufacturing sector: 24.3 per cent of value added in 2011.

The sectoral structure of the manufacturing industry in the Czech Republic is gradually approaching the average structure in the EU. The most significant changes took place especially in the iron and steel industry, electrical equipment production, transport, engineering and textile industries. A large array of production capacities were developed based on foreign direct investment. (the EU average was 15.5 per cent) (EC, 2012a). The relative share of inward BERD[29] doubled over the period 1999-2009. Around 80 per cent of this inward BERD is generated by EU-owned firms out of which one-half comes from German-owned firms. With shares of inward BERD in total BERD of more than 85 per cent pharmaceuticals and motor vehicles are the manufacturing sectors that show the highest degree of internationalisation. The dominance of foreign affiliates in high-tech and medium-high-tech sectors are reflected by the absence of Czech firms amongst the EU top 1000 R&D investing firms (EU Industrial R&D scoreboard, 2012).

Inward BERD of the Czech Republic follows incoming FDI. In the manufacturing sector, the share of inward BERD in total BERD (about two thirds) is slightly higher that the share of the value added created by foreign affiliates. Foreign-owned affiliates investing in the Czech Republic also invest in R&D and their R&D intensity is mostly above that of domestic firms (EC, 2013a).

Gross industrial output declined by 19.7 per cent in the Czech Republic in 1991 in comparison to 1990 and by 24.7 per cent in Slovakia (Pavlínek, 1995). A structural change of the Slovak manufacturing sector was observed during the period of 1995-2009. Over the last decade, (2000-2011) the Slovak economy has been diversifying. The share of medium-high and high-tech product exports of GDP is clearly above the average EU27 level. Between 1995 and 2009, measured by R&D investments, several medium- or low-tech sectors (fabricated metal products and food and beverages) have increased their knowledge-intensity. The share of some medium and high-tech sectors in the manufacturing sector has grown (chemicals and chemical products, electrical machinery and apparatus, radio, TV and communication equipment and motor vehicles). Economic growth has been mainly related to radio, TV and communication equipment sector, electrical machinery, motor vehicles sector, and the fabricated metal products. Many of the Slovak manufacturing industries have not increased their knowledge intensity over the period 1995-2009 (EC, 2013a).

[29] Business enterprise expenditure on R&D (BERD) - covers R&D activities carried out in the business -sector by performing firms and institutes, regardless of the origin of funding. While the government and higher education sectors also carry out R&D, industrial R&D is arguably most closely linked to the - creation of new products and production techniques, as well as to a country's innovation efforts. The inward sectoral R&D intensity is defined as inward BERD in sector Y / total BERD in sector (OECD, www.oecd-ilibrary.org).

6.2. Economies with marked potentials of catching up

Latvia has been moving from traditional industrial activities to more knowledge-intensive industries. In 2011, the mechanical engineering and metalworking sector produces about 20 per cent of total manufacturing industry output and value added. The export of this sector accounts for one third of total Latvian exports (Pikšs, 2011). The contribution of manufacturing to Latvia's total gross value added (14.12 per cent in 2011) is lower than the EU average (15.5 per cent in 2011) (EC, 2013a) Latvia's traditional specialization pattern is based on sectors with low and medium-low research intensity such as metal processing and machinery, wood and wood products, and food processing. Latvia's economic structure is highly biased towards small enterprises in traditional sectors such as sawmilling and wood planning as well as fish processing. There are no Latvian companies in the top 1000 EU companies listed by the publication according to the results of the 2011 EU Industrial R&D Investment Scoreboard (EC, 2013a).

Lithuania's manufacturing industry is dominated by low-tech sectors such as food and beverage and the manufacturing of chemicals and chemical products (including pharmaceuticals) in medium-low tech sector. RCA[30] indices of the Lithuanian manufacturing industy sector, between 2004 and 2007, show that manfucture of products of wood, furniture, rubber and plastic products, food, textiles and apparel is comparatively more important that in the rest of the EU. In the long-run the most important elements of the industry development strategy to increase the competitiveness of the Lithunanian manufacturing industy are specialization, high value added products international niches and internal effectiveness (Rybakovas, 2009).

Large parts of the activities of high-tech and medium-high-tech sectors in Lithuania are imports and re-exports. Structural change towards a more research-intensive economy is mainly driven by high-tech and medium-high-tech manufacturing sectors (EC, 2013a). The Innovation Union Scoreboard ranks Lithuania as a modest innovator. However, the Lithuanian companies produced half of all picosecond lasers sold and 80 per cent of the femtosecond parametric light amplifiers sold worldwide. There is significant collaboration in doing laser research between Vilnius University and the Institute of Physics as part of the EU ICT projects. In 2012, 11 science and laser technology research centres carry out fundamental research, 15 laser technology companies employing over 400 highly qualified specialists in Lithuania. 75 per cent of the total laser equipment production is sold in Europe and North America (Kosenko, 2012).

Estonia is one of the countries that are catching up fast in terms of manufacturing: in 2011, manufacturing production represented 17.3 per cent of total value added (compared to the EU average of 15.6 per cent). Estonia focused on labour-intensive industries and specialized in

[30] RCA index: Revealed Comparative Advantage index measures country's comparative advantage in a trade of a particular product or production from certain industry (Rybakovas, 2009).

manufacturing of electronic products, fabricated metal products, motor vehicles, electrical equipment, and machinery and equipment. There has been a structural change in the Estonian manufacturing sector over the period 2005-2009, which shows that the economic expansion has been to a not unimportant extent related to lower-tech sectors or large consumer goods and services, in particular, coke, refined petroleum and nuclear fuel, and electricity, gas and water. Between 2005-2009 there has been an increase in R&I investment in several industrial sectors of the Estonian economy, both in low-tech and traditional sectors such as rubber and plastics, wearing apparel and fur, textiles, and also in the high-tech sectors of office, accounting and computing machinery, medical, precision and optical instruments, and machinery and equipment (EC, 2013a). By means of a well-designed specialization pattern, Estonia has been able to turn its small size into an advantage.

6.3. Emerging countries of the region

In terms of trade and industry specialization Romania together with Bulgaria, Latvia and Lithuania (to a lesser extent Estonia), is part of the group of the emerging countries of the region. Romania has a lower GDP per capita than the EU average and specialization in less technologically advanced sectors. Romania, similarly to Estonia is highly specialized in labour-intensive industries (preparation and spinning of textile fibers, sawmilling, wearing apparel and accessories), in capital-driven industries (cement), and marketing-driven ones (footwear). In Romania between 1996 and 2008, the dynamic structural change caused an increasing value added in technology-driven and innovation sectors (office, accounting and computing machinery and motor vehicles, and to a lesser extent electrical machinery and apparatus). In addition, between 1996 and 2008, the high knowledge intensity fields (medical precision and optical instruments and chemical products) have decreasing shares of value added. However, whereas the quality of the products of labour-intensive industries has improved, this is not yet the case for technology-driven ones (EC, 2013a).

In the process of transition to a market economy and European integration, Bulgaria has not managed to accelerate the much needed structural transformation and technological upgrading of its economy. In 2011, the highest shares in Bulgaria's export of manufactures have the labour intensive and resource based products: 31.1 per cent while the corresponding share in the EU is about 2.5 times lower (12.6 per cent). These are all products that embody unskilled, low-paid labour and have little Bulgarian added value. At the same time, Bulgaria loses its positions in the most perspective group of products with a high level of skill and technology intensity whose share of almost one third in 1995 shrank to 22.6 per cent during the last year, while the average number for the EU countries is as high as 36.4 per cent. A positive change in Bulgaria's exports is the decreasing of the share of low-skill manufacturing to the benefit of those with medium intensity (EC, 2013a).

Overall, Bulgaria still differs substantially in structural and technological aspects from its European partners, and some claim it has fallen in the "low-tech sectors trap" (Zhelev, 2012).

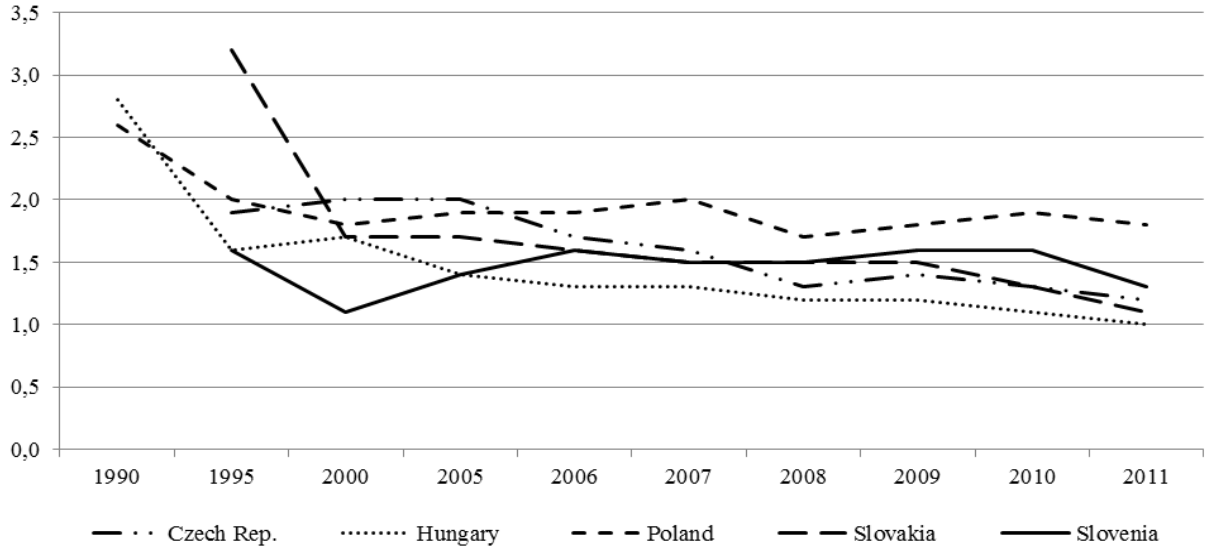
The manufacturing sector plays a slightly bigger role in Bulgaria than in the EU as a whole, owing to its specialization in labour-intensive industries (e.g. textiles and clothing, leather and footwear), and in capital-intensive industries (e.g. cement, refined petroleum and non-metallic mineral products). The primary sector is larger compared to the EU average due to the higher share of agriculture in GDP. In general, the Bulgarian economy is overrepresented by low and medium-low technology intensity sectors. With respect to services, wholesale and retail trade, financial services, tourism, transportation and health-care services are the most important market services in the Bulgarian economy (EC, 2012a). In the period of 1999-2006, the share of value added of textiles, metals and agricultural products in Bulgaria had large relative weight. The electrical and optical equipment sector has increased its significance. Machinery and equipment, and chemicals have seen their shares of value added decrease over time, although BERD intensity increased in the case of machinery and equipment (EC, 2013a).

Overall, there is a positive trend in the evolution of Bulgaria's economic structure. The Composite Indicators on structural change (DG Research and Innovation, 2012) also reflect this by showing steady improvement over time, the largest increase being from 2005 to 2009. There appears to be a general consensus that while improvements are evident and the manufacturing and export sectors are gradually shifting towards higher value-added and a more high-tech mix, this change is not happening fast enough to sustain competitiveness levels in the globalized economy (EC, 2013a).

7. The role of Defence Industry in the CEECs

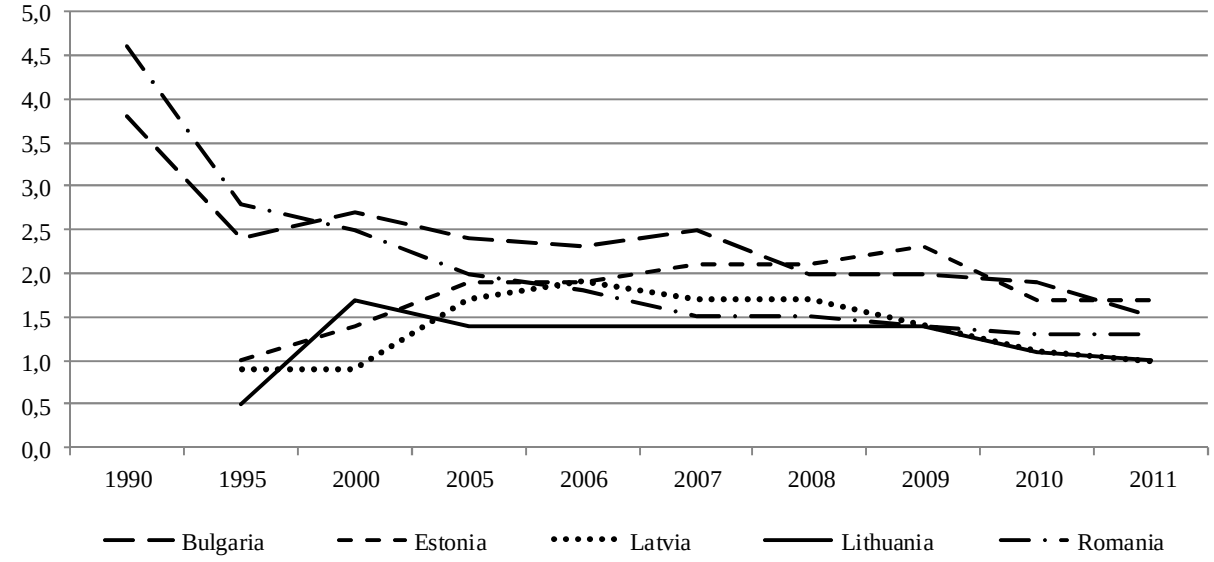
In the former communist countries, heavy industry within the defence sector was developed at the cost of underdevelopment in the field of consumer goods (Berend, 1999). The creation of demand in shortage economies was one of the causes of forced savings, which is often called "inflation overhang". In market economies, on the other hand, the "defence industry is a factor which creates demand in conditions of surplus; in other words, it acts as a tool which improves the state of the economy Bonn International Center for Conversion ((BICC) – International Konversionszentrum Bonn – Brief 8, Conversion in Poland: The Defence Industry and Base Redevelopment, November 1996).

Figure 8: Military expenditure of Hungary, Poland, the Czech Republic, Slovakia and Slovenia, per cent of GDP (1990-2011)



Source: SIPRI

Figure 9: Military expenditure of Estonia, Latvia, Lithuania, Romania and Bulgaria, percentage of GDP (1990-2011)



Source: SIPRI

Military spending was reduced between 1990 and 1995 in Hungary, Poland, Bulgaria and Romania based on available data. The Czech Republic, Hungary and Poland, joined the North Atlantic Treaty Organization (NATO) in 1999, while Slovakia, Slovenia, Bulgaria, Romania and the three Baltic countries joined in 2004. After joining NATO, growth (or at

least stagnation) was observed in military spending. From 2004 through 2008, Polish military spending grew at more than 6 per cent. In contrast, in the same time period, from 2004 through 2008, defence spending in France, Germany, Italy, Sweden, Belgium and Japan shrank (PwC, SIPRI, 2010).

Box 2: Poland military spending and military employment between 1986 and 1995

	The value of total production of defence industry (in thousand zloty)	The value of special production of defence industry (constant prices 1995)	The employment of defence industry
1986	5.390	2.910	175.000
1988	5.760	3.100	180.000
1990	3.380	1.200	145.000
1992	1.310	870	99.000
1995	2.300	580	85.000

Source: Zukrowska-Wieczorek, 1996

Several Polish companies from the military sector are faced with serious difficulties in preparing themselves for the new market conditions (Zukrowska-Wieczorek, 1996). A growing role is ascribed to the level of costs of production, the degree of technical advancement and the ability of quick adjustment to the market requirements. Facing market realities between the late 1980s and early 1990s, those companies lost their privileges for technical and raw material supplies as well as their access to low-interest credits.

Box 3: Hungarian electronics company

A Hungarian electronics company was in a highly influential position because of the following reasons:
- It was the most important employer in a key industrial area (with 20 thousand employees in 1988).
- It was a major industrial player both in the Hungarian-Soviet non-military (commodity) and military trade.
- The company was able to adapt high-tech R&D findings of large international companies and also, this company's own R&D results were significant, but their implementation in the firm's own products was rare because of poor financing (Török, 1992)

Factories always face the same problems when trying to overcome barriers in switching from military to civilian production. As the scale of industrial potential is different however, the scale of the problem varies from country to country, being greater in Poland or Slovakia and less acute in Hungary or the Czech Republic. Reorientation of military R&D resulted "costs" are underemployment of R&D facilities, "brain-drain" and job losses. Among the benefits, on the other hand, one finds the absence of "crowding-out[31]" and the availability for financial

[31] Crowding out is to occur when increased government borrowing, a kind of expansionary fiscal policy, reduces investment spending.

resources and qualified scientists and engineers to tackle global challenges. The problem of high unemployment, accompanied by relatively limited inflation make the conversion more difficult in comparison to the post-war period when unemployment was accompanied by expanding markets and demand, along with high utilization of production capacities (Zukrowska, Wieczorek, 1996).

The period 1990-1999 is characterized by the shrinking size of the national R&D budget in the shape of the GDP of Bulgaria[32]. The whole period shows the drift to the slightly unstable reduction of the defence budget as a part of GDP. Defence R&D Expenditures as a percentage on GDP were 1 per cent in 1990 and 0.19 per cent in 1999. The variations depend on the separate defence policies of the changing governments. In contrast, there was a sharp tendency for reduction of defence R&D in the same period. The resources for R&D in year 2000 are symbolic (Ivanov, 2007).

Box 4: Bulgaria's Defence Industry

In the transitional period (1990-2006) Bulgaria's defence industry was reshaped from 3 holding companies, including about 200 different sized factories with 160 000 employees to 25 companies with 25000 employees.
In Bulgaria, the period from 1990-1999 is characterized by the shrinking size of the national R&D budget in relation to the GDP. In 1991 the R&D expenditures was decreased by half in relation to 1989 and became 1.3 per cent of GDP. R&D spending is symbolic from 2000 in Bulgaria (Ivanov, 2007).

Defence investments require a high degree of funding for R&D and technological projects. In addition, access to critical technologies must be ensured. If critical technologies for development and production were no longer accessible due to restrictions on exports imposed by others, serious problems to achieving European security goals would arise.

According to European Economic and Social Committee (EESC, 2011) public R&D funding at EU level should be agreed among the Member Countries. It can be carried out via the upcoming Framework Programme 8 (FP8) or via a separate fund, preferably via packages of advanced research areas, for example nanotechnology and artificial intelligence.

Many countries develop their "own" naval industry, and build vessels with a great variety of size and complexity from country to country. The LoI nations[33] (main producers) and the Netherlands are leading, also in the area of concept design and complex naval research facilities, which are quite different from developing civil shipbuilding. There is a broad spectrum of subsystem manufacturers and third tier suppliers.

[32] Civilian R&D Expenditures as a percentage of GDP were 1 per cent in 1990 and 0.19 per cent in 1999.
[33] The Letter of Intent (LoI) Framework Agreement Treaty was established to create the necessary measures to facilitate the restructuring of the European defence industry. It was signed on 27 July 2000 by the Defence Ministers of France, Germany, Italy, Spain, Sweden and the UK. The Framework Agreement aimed to create the political and legal framework necessary to facilitate industrial restructuring in order to promote a more competitive and robust European Defence Technological and Industrial Base (EDTIB) in the global defence market. https://www.gov.uk/letter-of-intent-restructuring-the-european-defence-industry

8. Conclusions

The New Member Countries of the EU have adopted very diverse approaches to industrial policy since the beginning of economic transition. By and large, most of them adjusted to the industrial policy stance of the EU (and of its leading countries) which underwent at least two major changes since the eighties. The "hands-off" industrial policy approach dominant between about the mid-1980s and the mid-2000s in Europe was also prevalent in most CEECs. On the other hand, some quite original local clones of this industrial policy line emerged, to name just a few cases, in the Czech Republic, Hungary or Romania.

These local clones or mutations (cf. Török, 2007) reflected, in the first place, the fast growing need for industrial restructuring and crisis management in most CEECs during the first half of the nineties. The apparent inactivity of industrial policy in the CEECs slowly gave way to an increasingly active promotion of FDI, which gradually became the key element of an officially still "market-oriented" (i. e. passive) industrial policy line.

The EU's main think tanks, and not much later the European Commission gave up their reluctance to industrial policy around the mid-2000s, partly owing to the conclusions of the 2004-05 Competitiveness Report. This turn, however, did not mean the re-emergence of old "*dirigiste*" industrial policy thinking. It was characterized by three new elements, including competitiveness orientation, employment creation and a more cautious and future-oriented use of natural resources (including the environment). The global economic crisis starting in the year 2008 gave additional leverage to competitiveness-enhancing industrial policies in Europe, including, of course, the New Member Countries (NMCs).

Most if not all NMCs have followed this change of industrial policy thinking in the EU. This policy adaptation could be identified based on the analysis of a string of relevant policy documents produced by CEEC governments since the late 2000s. Most of these documents speak of a good ability of the NMCs to adjust to the policy requirements set by the transformation of the global economic environment. On the other hand, the implementation of their new industrial policies is demonstrated by available statistics only to a more or less limited extent.

The most important improvements took place in their R+D and innovation systems with major increases of business R+D spending in some "high-tech subcontracting countries" CEECs. A further remarkable change is the dynamic re-industrialisation of the Baltic countries, with a marked environmental and resource-saving orientation.

Job creation in manufacturing is as yet observable mainly in those cases where effective incentives to the inflow of FDI to labour-intensive sectors have been able to add competitive CEEC locations to the global production networks of leading multinational firms. This development, on the other hand, seems to have a quite strong sectoral concentration, with car assembly dominating the creation of manufacturing jobs in Hungary, Slovakia, Romania,

Poland and the Czech Republic. This strong sectoral concentration also means increased vulnerability given the fact that the car industry is one of the most business cycle dependent sectors of manufacturing. The Baltic countries are an exception to this trend with their more SME-based, and to a certain extent green oriented job creation processes.

The green orientation of industrial policy in the CEECs seems to be still in its initial phase. However, policy documents underline the strong commitment of most NMC governments to this industrial policy stance. Therefore, and of course conditional upon the availability of adequate financing, the years 2014-2020 can be expected to give rise to a widespread trend of green job creation in several CEECs, mainly of course the ones with more environment-conscious political elites (the Baltic republics, Slovenia, the Czech Republic, and potentially Slovakia and Hungary).

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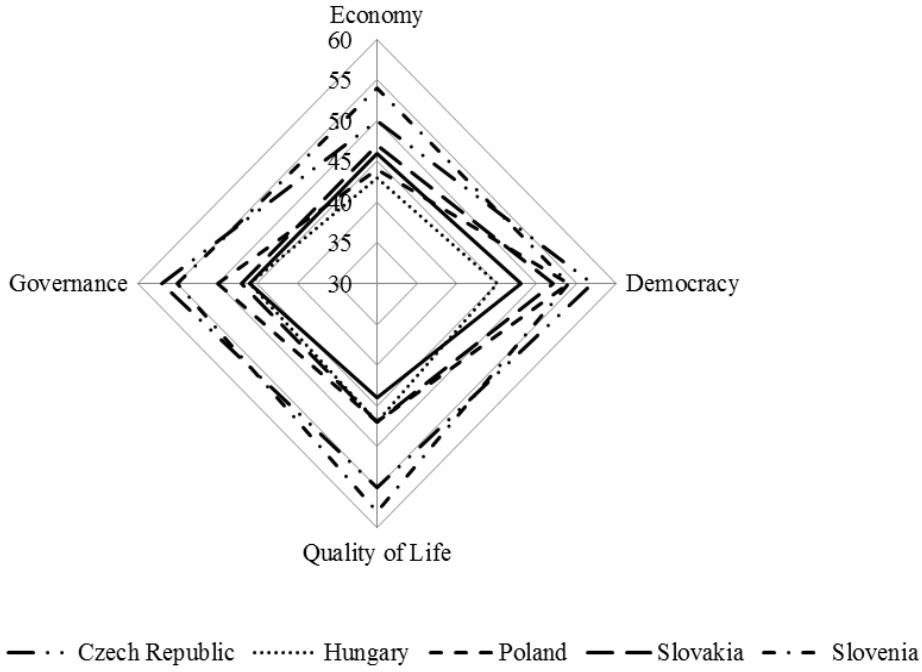
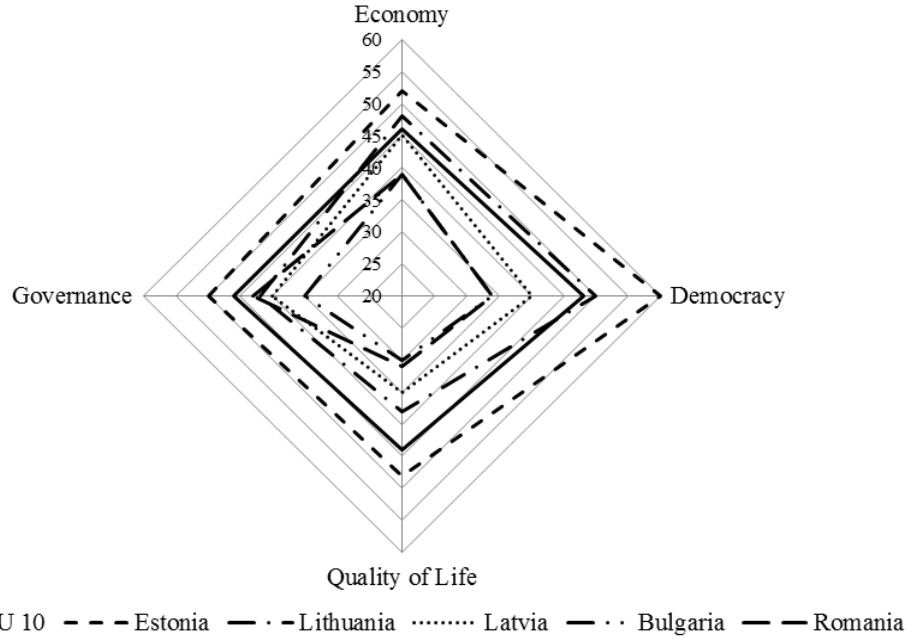
Appendix: Additional data about the CEECs

Figure 10: The Catch up Index of Hungary, Poland, the Czech Republic, Slovakia and Slovenia (2012)



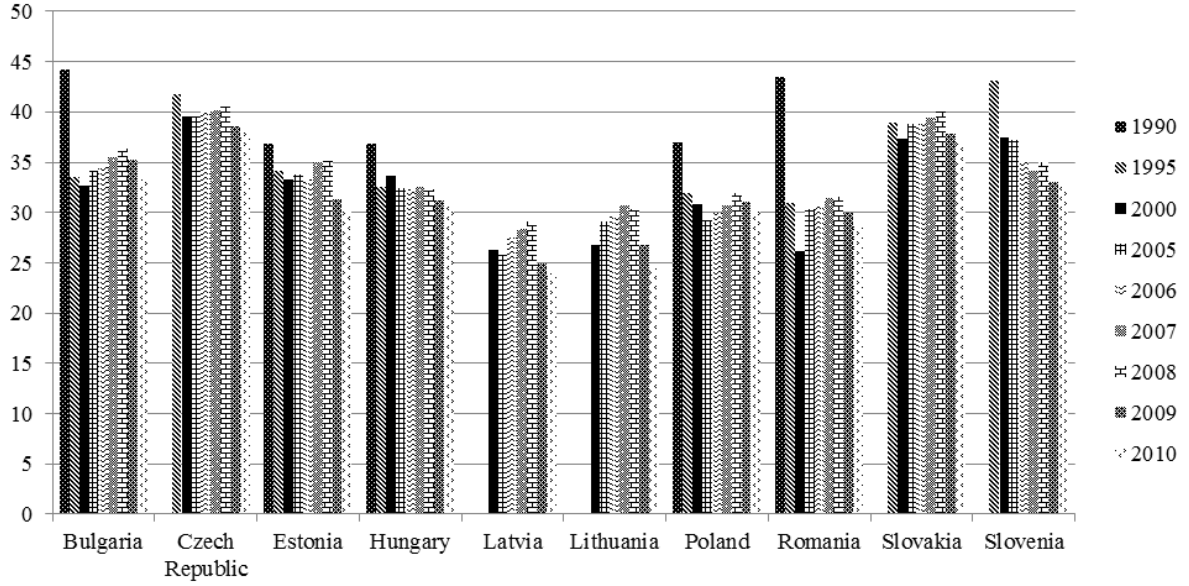
Source: thecatchupindex.eu

Figure 11: The Catch up Index of Estonia, Latvia, Lithuania, Romania and Bulgaria (2012)



Source: thecatchupindex.eu

Figure 12: Employees in industry (includes manufacturing), percentage of total employment (1990-2010)



Source: http://data.worldbank.org/indicator/SL.IND.EMPL.MA.ZS

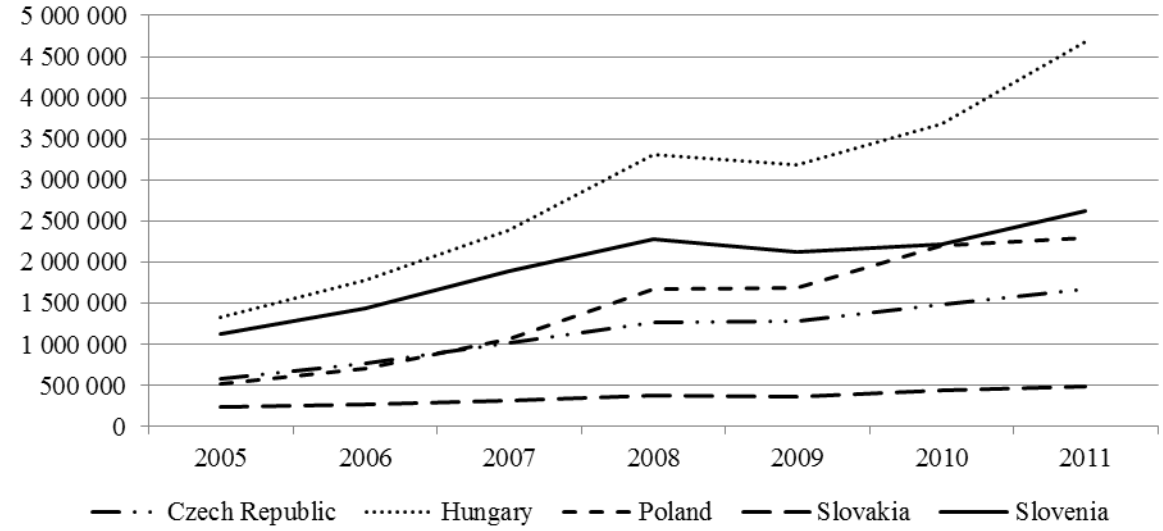
The employment in industry (includes manufacturing) is relatively low in the countries analysed (between 24-34 per cent of total employment in 2011).There are two reasons for low industrial employment in in the CEECs. First, in the more industrialized countries of the sample employment in the service sector is high, like in the Czech Republic and Slovenia. In the less developed countries of the sample, employment is high in the agricultural sector, like in Bulgaria or Romania.

Factors of their success and competitiveness are assessed by analysing patterns of export market shares. In the literature, we can find several techniques of classifying manufacturing industries. For example, we can classify them according to skills levels, educational intensity, innovation or technologies (WIFO, 2011, Sapir, 2010). We decided to use the following classifications to illustrate the differences between the examined countries:

- high-tech industries (e.g. exports of pharmaceutical products)
- medium-high tech industries (e.g. exports of electrical, electronic equipment)
- medium-low tech industries (e.g. exports of iron and steel)
- Low-tech industries (e.g. exports of articles of apparel, accessories, not knit or crochet).

a. High-Technology Industries

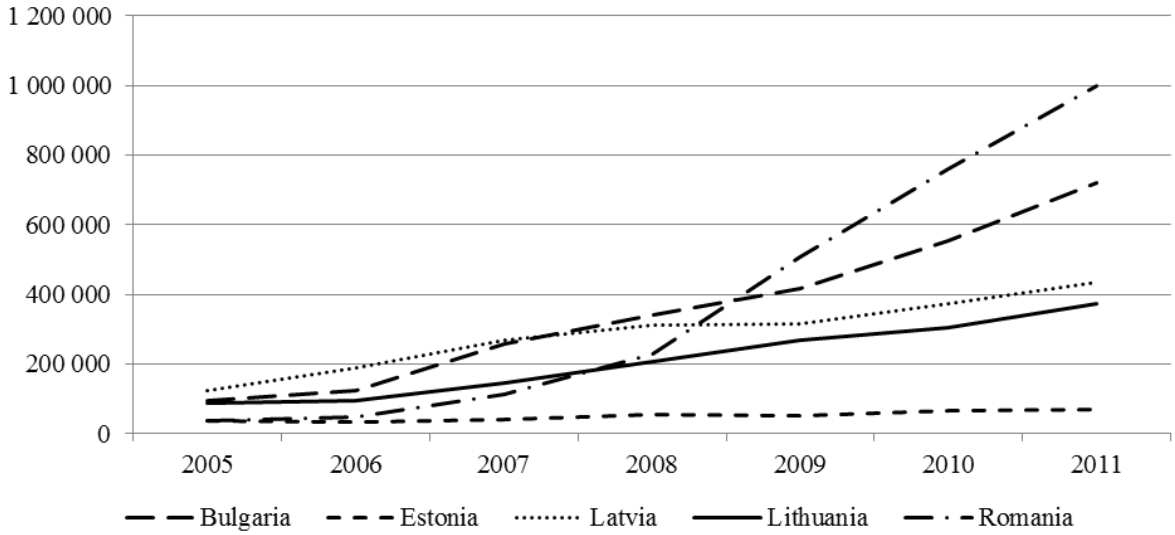
Figure 13: HS: 30 Exports of pharmaceutical products of Hungary, Poland, the Czech Republic, Slovakia and Slovenia (in USD thousands, 2005-2011)



Source: HS:30 http://www.trademap.org/tradestat/Product_SelProduct_TS.aspx

These countries are usually regional distribution centres of pharmaceutical products..[34]. Specialisation of generic production improves their export performance. For example, in Hungary from 2005 to 2011, the value of pharmaceutical exports was tripled (in USD).

Figure 14: HS: 30 Exports of pharmaceutical products of Estonia, Latvia, Lithuania, Romania and Bulgaria (in USD thousands, 2005-2011)



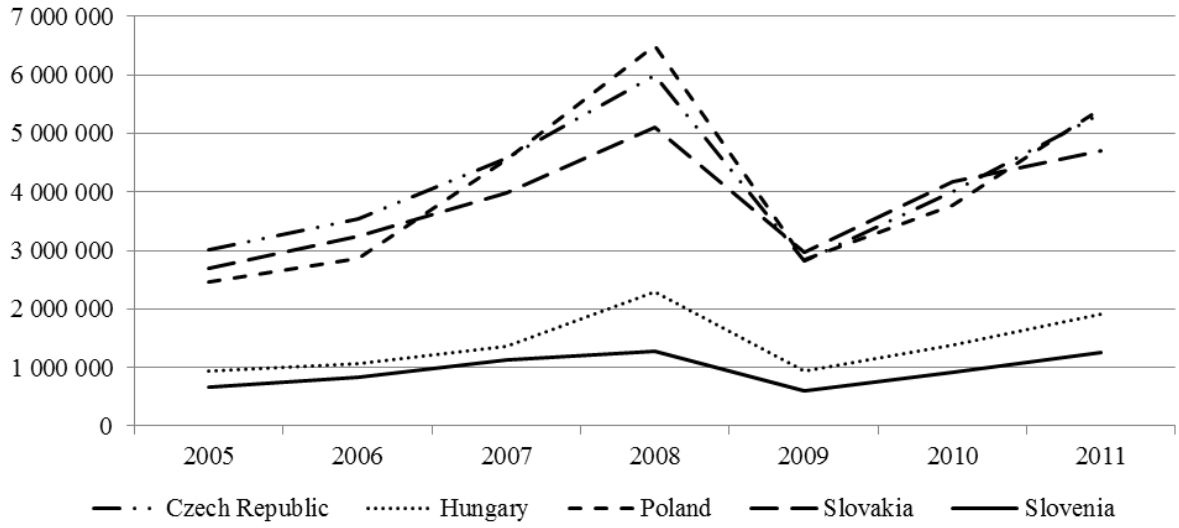
Source: HS:30 http://www.trademap.org/tradestat/Product_SelProduct_TS.aspx

[34] The ten leaders are – according to the net revenues in 2011 – **Sanofi csoport**, **Richter Gedeon Nyrt.**, **Teva Zrt., Egis Nyrt.,** Bayer-Hungária Kft., **GlaxoSmithkline Kft.**, **Novartis Kft.**, Pfizer Gyógyszerkereskedelmi Kft., Roche Kft., Sandoz Hungária Kereskedelmi Kft. (Figyelő TOP200, 2012) **Producers.**

b. Medium-Low Technology Industries

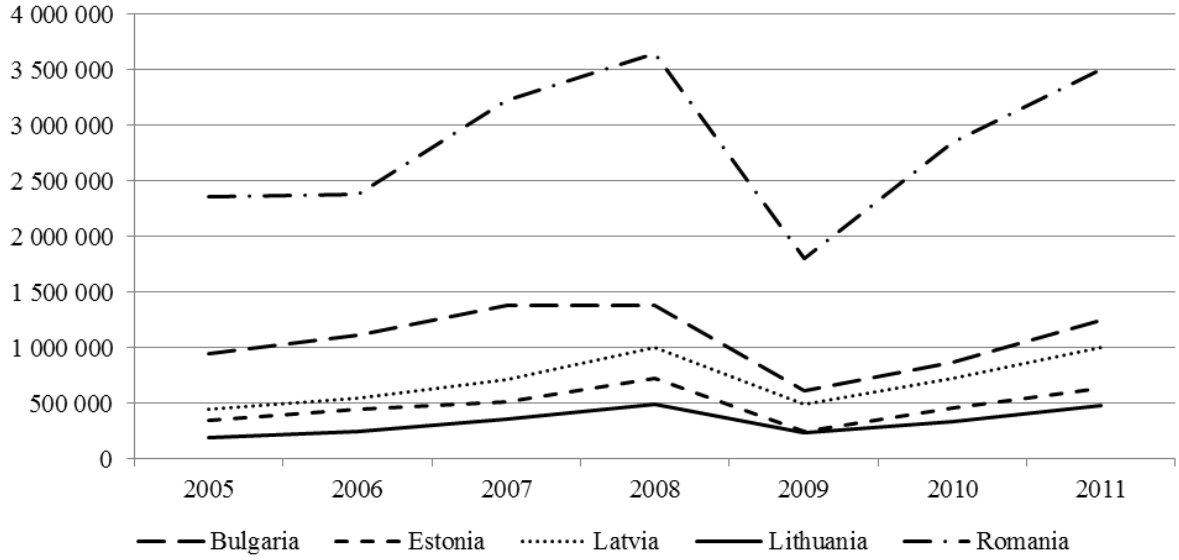
Medium-low technology industries, such as iron and steel industry, show procyclical characteristics.

Figure 15: HS: 72 Exports of iron and steel of Hungary, Poland, the Czech Republic, Slovakia and Slovenia (in USD thousands, 2005-2011)



Source: HS: 72 http://www.trademap.org/tradestat/Product_SelProduct_TS.aspx

Figure 16: HS: 72 Exports of iron and steel of Estonia, Latvia, Lithuania, Romania and Bulgaria (in USD thousands, 2005-2011)

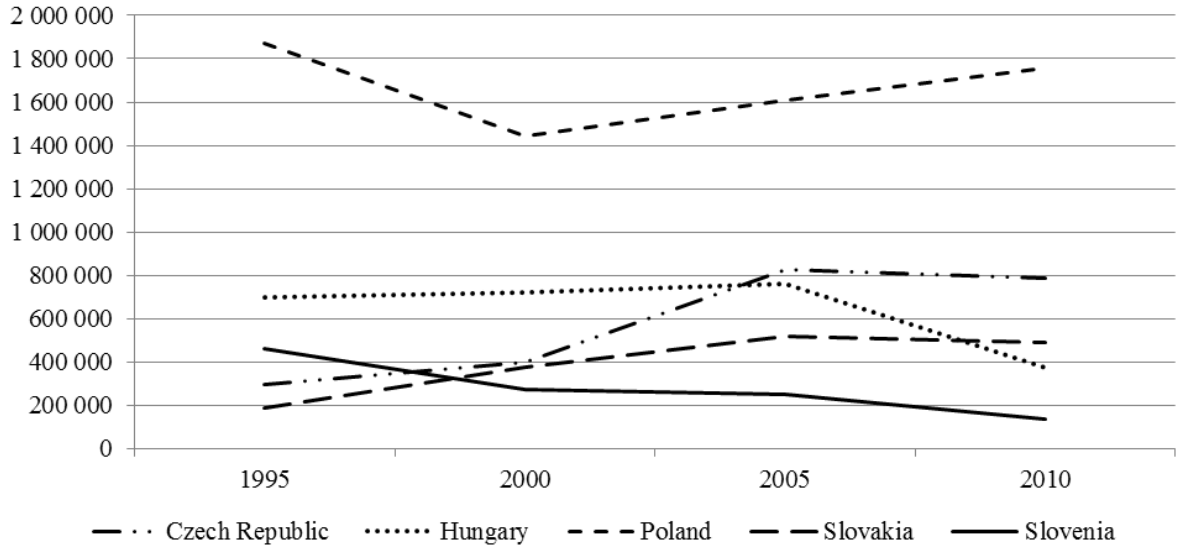


Source: HS: 72 http://www.trademap.org/tradestat/Product_SelProduct_TS.aspx

c. Low-Technology Industies

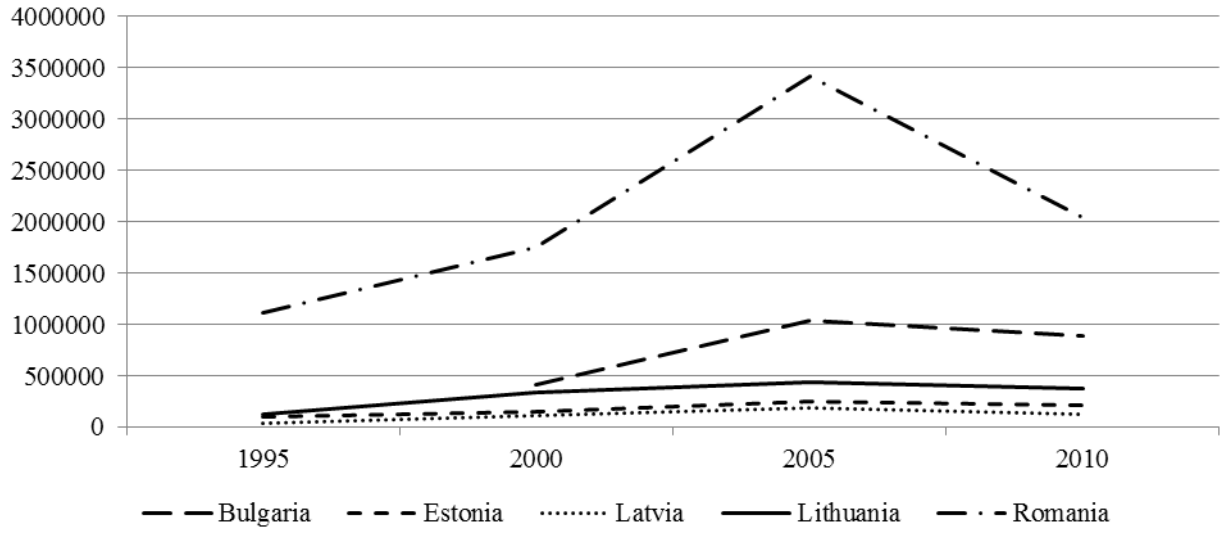
The effect of quota elimination per the WTO Agreement on Textiles and Clothing enacted in December 2004, on Romania's export of articles such as apparel and clothing accessories is observable.

Figure 17: HS: 62 Exports of articles of apparel, accessories, not knit or crochet of Hungary, Poland, the Czech Republic, Slovakia and Slovenia (in USD thousands, 1995-2010



Source: HS: 62 http://www.trademap.org/tradestat/Product_SelProduct_TS.aspx

Figure 18: HS: 62 Exports of articles of apparel, accessories, not knit or crochet of Estonia, Latvia, Lithuania, Romania and Bulgaria (in USD thousands, 1995-2010



Source: HS: 62 http://www.trademap.org/tradestat/Product_SelProduct_TS.aspx

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Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs a change: The financial crisis has exposed long neglected deficiencies in the present growth path, most visibly in unemployment and public debt. At the same time Europe has to cope with new challenges ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundations for a new development strategy that enables a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four year research project within the 7th Framework Programme funded by the European Commission started in April 2012. The consortium brings together researchers from 33 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). Project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: www.foreurope.eu

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