EUROPEAN ECONOMY

Economic Papers 336 | August 2008

An analysis of the possible causes of product market malfunctioning in the EU: First results for manufacturing and service sectors

Fabienne Ilzkovitz, Adriaan Dierx and Nuno Sousa

Economic and Financial Affairs
DIRECTORATE-GENERAL

EUROPEAN COMMISSION

Economic Papers are written by the Staff of the Directorate-General for Economic and Financial Affairs, or by experts working in association with them. The Papers are intended to increase awareness of the technical work being done by staff and to seek comments and suggestions for further analysis. The views expressed are the author's alone and do not necessarily correspond to those of the European Commission. Comments and enquiries should be addressed to:

European Commission
Directorate-General for Economic and Financial Affairs
Publications
B-1049 Brussels
Belgium
E-mail: Ecfin-Info@ec.europa.eu

This paper exists in English only and can be downloaded from the website
http://ec.europa.eu/economy_finance/publications

A great deal of additional information is available on the Internet. It can be accessed through the Europa server (http://europa.eu)

ISBN 978-92-79-08261-0
doi 10.2765/88566

AN ANALYSIS OF THE POSSIBLE CAUSES OF PRODUCT MARKET MALFUNCTIONING IN THE EU:

First results for manufacturing and service sectors

FABIENNE ILZKOVITZ
(European Commission, Université Libre de Bruxelles, ICHEC)

ADRIAAN DIERX
(European Commission)

NUNO SOUSA
(European Commission)

ABSTRACT

Within the context of the follow-up to the Single Market Review, the European Commission has screened EU manufacturing and service sectors for problems of market malfunctioning. This paper investigates the nature of these problems in the 23 selected sectors and focuses on the following four dimensions of market functioning: regulation, integration, competition and innovation. In spite of the data limitations, regulation appears to be a cross cutting factor affecting market functioning in many sectors. The service sectors, in particular, show signs of an unexploited potential in terms of market integration and competition pressures. In all selected sectors there are indications of an unsatisfactory innovation performance. Overall, the analysis appears to confirm the results of the initial sector screening.

JEL classification: F15, L16, L50

Keywords: European economy, economic integration, regulation, competition, innovation, Internal Market, Single Market, structural policy, manufacturing sectors, service sectors

Acknowledgements: This report was undertaken at the Directorate General for Economic and Financial Affairs under the direction of Klaus Regling, Marco Buti, Jan Host Schmidt and Gert-Jan Koopman. The authors gratefully acknowledge the contributions of C. Buelens, Andrea Conte, Yann Ducatteeuw, Olivia Galgau, Viktoria Kovacs, Barbara Moench, Francesco Montaruli and Dominique Simonis.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The conditions under which EU product markets operate have changed considerably since the 1990s. The Single Market Programme, the introduction of the euro and the several initiatives of product market reforms within the context of the Lisbon Strategy have led to increased market openness and price transparency and boosted further competition pressures across the EU. Despite these positive developments, problems persist in the functioning of key markets and, as shown by the Single Market Review, the potential of the Single Market is not fully exploited. This is the reason why the new Single Market strategy, developed by the Commission in its Communication "A Single Market for 21st century Europe", proposes new methods of governance of the Single Market, which are based on a bottom-up approach to policy-making and rely on a better knowledge of the functioning of markets.

Follow up of the screening aimed at identifying the nature of the problems affecting market functioning…

As part of this new approach, we screened all manufacturing and services sectors for problems in terms of market functioning. The screening, which was carried out in the autumn of 2007, resulted in a selection of 23 sectors which are important for growth, jobs and consumers and which present indications of market malfunctioning[1]. This note follows up on this first sector screening with an investigation of the nature of the problems affecting market functioning in the selected sectors. This investigation has multiple objectives: first, it checks the robustness of the screening results by analysing if all the selected sectors are indeed facing challenges from a policymaking point of view; second, it offers guidance for the subsequent in-depth market monitoring analyses; and finally, it aims at contributing to developing a consistent and comprehensive policy strategy most suited to address the particular needs of any given sector. It should nevertheless be kept in mind that the investigation is limited to supply-side issues and should be complemented with an analysis of demand-side issues. Only then can the latter objective be fully achieved.

….focusing on four intertwined dimensions of analysis: regulation, integration, competition and innovation

Even though the problems affecting market functioning in the selected sectors are deeply intertwined, we have opted to structure this analysis along four dimensions, namely regulation, integration, competition, and innovation. Regulation is an exogenous policy driven dimension which directly affects integration, competition and innovation in the markets. Competition pressure is increasingly associated with international market integration as markets often extend beyond national borders. But integration and competition are also closely related to innovation as the increased competition pressures encourage firms to increase their innovation efforts to remain competitive.

[1] As explained in the Commission Staff Working Document "Implementing the New Methodology for Product Market and Sector Monitoring: Results of a First Sector Screening" (SEC(2007)1517), for the purposes of this exercise market malfunctioning should be understood in the broad sense. It does not necessarily correspond to the narrower economic notion of "market failure" describing the condition where the allocation of goods and services by a market is not efficient (Pareto-efficiency).

Achieving a good performance overall in terms of competition, integration and innovation will result in the better functioning of the supply-side of the markets, which should allow that allow higher growth rates of productivity and employment. As such it is a necessary, but not a sufficient condition for greater consumer welfare. The consumer perspective is a crucial element of a comprehensive analysis of the causes of market malfunctioning in a given sector. However, the necessary data at the sectoral level to make this element of the analysis operational are now being developed. The Consumer Scoreboard is currently being developed to provide the necessary indicators (covering issues such as complaints, prices, consumer satisfaction, switching and safety) for a more comprehensive analysis.

The analytical approach that is adopted in this note is horizontal in nature and focuses on sectors rather than markets. This indicator driven approach will need to be complemented by a more qualitative analysis of the key issues affecting different sectors. In addition, while an analysis focused on markets would allow for a better understanding of firms' behaviour and a more precise identification of potential bottlenecks, it would be difficult to implement at this stage due to data constraints. Even though the findings of this analysis should rather be taken as working assumptions, they constitute a starting point for more in-depth market monitoring exercises that ought to be implemented in a subsequent stage and which should rely more heavily on market analysis enriched by an extensive use of qualitative information covering both demand-side and supply-side issues.

In spite of the data limitations, there are converging indications that regulation is a cross cutting issue affecting market functioning in many sectors

The starting point for the analysis is an examination of the extent to which the observed problems in market functioning can be related to the policy environment. While regulations are motivated by the public good, e.g. addressing market failures or non-economic objectives, they may also curb efficiency-enhancing competition. This is the focus of the OECD indicators on product market regulation (on which our analysis is based), while the effects of regulation on other goals (for example environmental and consumer protection) are not taken into account. Despite the several programmes of reforms put in place over the past decade and a half, product markets in the European Union appear to remain relatively heavily regulated. It should be pointed out, however, that the available OECD indicators run until 2003 and that further liberalisation has taken place in a number of sectors since that date (e.g. telecoms, transport etc).

Quantitative information on direct regulations at the sectoral level is somewhat outdated and is available for only a limited number of non-manufacturing sectors, namely energy, transport and communication, retail distribution and some business services. Looking at the knock-on effects of regulations in these non-manufacturing sectors on other sectors of the economy to which they sell intermediate inputs, it appears that in 2003 the distribution, energy, transport and business services stood out as the sectors where the European Union disadvantage vis-à-vis the United States in terms of higher levels of regulation was the largest. By contrast, the impact of regulation in financial services (as measured by the OECD based on indicators focussing on competition restrictions) was lower in the European Union than in the United States even if this sector remained one the most affected to regulations in both regions. Notice however that we lack suitable indicators that would lead to a clear identification of specific regulatory problems in individual manufacturing sectors.

Many of the selected sectors, particularly services, seem to face unexploited potential for further market integration…

The level of integration, or in other words the extent to which the international trade and foreign investment flows have been liberalised and the prices of goods and services have converged across borders, is a fundamental element to take into account in analysing the functioning of markets. Indicators of (intra and extra-EU) trade flows, intra-EU cross-border mergers and acquisitions and intra-EU price dispersion have been used to assess the degree of market integration at the sectoral level.

The analysis shows that, whatever the indicator used, the degree of integration seems to have increased in both the manufacturing and services sectors since the second half of the 1990s. However, indications of integration problems can be found in 15 out of the 23 selected sectors. On the basis of the available data, this is particularly clear in services sectors like electricity and gas where integration is hampered by the lack of cross border physical infrastructure, and in retail trade, business services and financial services (especially at the retail level) where entry barriers and regulations remain important. Three manufacturing sectors also show particularly strong indications of insufficient levels of integration, namely printing, publishing and reproduction, fabricated metal and other transport equipment. However, some intrinsic characteristics of these sectors (namely cultural and linguistic differences in the case of publishing and high transport costs in the case of fabricated metals) limit the scope for cross border market integration.

…as well as insufficient competition pressure.

Effective competition is a very broad and multidimensional concept which cannot be fully assessed by a set of indicators. Moreover, while a definition of the relevant geographical and product markets would be necessary for a comprehensive and fully robust analysis, this would require data gathering exercises which would be clearly unfeasible at this stage. The four types of indicators used, nevertheless give some potential insights into the different dimensions of competition. These different dimensions reflect elements of performance (price-cost margin), market structure (market concentration), conduct (turbulence among the top leaders) as well as a competition policy dimension (number of competition law infringements).

On the basis of the indicators used, there are indications of potential competition problems in 19 out of the 23 selected sectors, including two manufacturing sectors: basic metals and motor vehicles. These are also the only two manufacturing sectors having higher mark-ups than in the United States. Moreover in basic metals the number of competition law infringements is above the average and in motor vehicles the degree of concentration is high relative to other manufacturing sectors. There are indications of potential competition problems in most services sectors. All the services sectors, with the exception of electricity and gas and inland transport, have higher mark-ups than in the United States and four of these sectors combine several indications of competition problems, namely hotels and restaurants, auxiliary transport activities, post and telecommunications and financial services. This conclusion is somewhat surprising for these two last sectors where several measures of liberalisation and deregulation have been taken to open these sectors to competition. Given the particularly complex nature of the concept of "competition problem" further more in depth and qualitative analyses will be required to confirm the pictures sketched above.

In all the selected sectors there are indications that market malfunctioning seems to be associated with an unsatisfactory innovation performance

The analysis of the innovation performance at the EU sector level faces important constraints due to problems of measurement and of data availability and quality. Therefore, the analysis focuses on a limited number of imperfect indicators for which sectoral data can be collected. Three input measures have been used in the analysis, reflecting R&D intensity as well as investment in new technologies and human capital (approximated by the contributions of ICT and labour quality, respectively, to the growth of value added in the sector). Two output/outcome measures were identified: patent applications and the contribution of total factor productivity (TFP) to the growth of value added in the sector.

Innovation problems are detected in all the selected sectors, with the exception of the furniture and recycling sectors, for which only limited data were available. In 11 out of the 23 selected sectors, a combination of indications of problems regarding innovation inputs and outputs can be found and in all the other sectors, there is at least some evidence of problems regarding inputs or outputs. Moreover, it is particularly problematic that many of the sectors where there are clear indications of innovation problems are producer of ICT goods like office and computing machinery, electrical machinery and communication equipment. Moreover, the services sectors identified, such as wholesale and retail trade and business services, use ICT intensively.

Overall, this assessment of possible causes of market malfunctioning confirms the selection made at the screening stage

Only for two sectors which are not part of the 23 selected sectors (air transport, and coke, refined petroleum and nuclear fuel), there are strong indications of problems in terms of regulation, integration, competition and innovation. All the sectors selected by the screening show signs of problems in at least one domain, and in almost half of the selected sectors there are indications of problems in all domains. While the lack of innovation and inadequate market regulation appear as a cause of market malfunctioning in almost all of the sectors identified, services are more affected by lack of integration and insufficient competition. In particular, there are indications of weak integration and competition in electricity and gas, retail trade, transport, post and telecommunications, financial services and business services. However, it is important to take into account that the latter is a particularly heterogeneous sector.

The domain for which most evidence of serious problems has been found is innovation.

This is consistent with the political attention given to the development of a Single Market for knowledge ("the fifth freedom"). This finding also shows that the emphasis put by Member States on reforms in the area of R&D and innovation is the right strategy. However, given the remaining problems regarding integration and competition particularly in services, it is somewhat disappointing that Members States have been much less active in the implementation of the reform measures in these areas. For sectors like electricity and gas supply intervention at the Community level is crucially important to complement the measures taken by Member States.

However there is not necessarily scope for policy intervention in all sectors

In sectors like printing, publishing and reproduction and fabricated metal, there is limited scope for policy intervention to promote further integration as it is naturally determined to a large extent by the cultural and linguistic affinities/ differences and high transport costs respectively. By contrast, in other transport equipment, the home bias in public procurement may still play an important role, while in financial services, insurance and other business services the legal barriers to entry that were in place until recently may explain to a large extent the current situation. Regarding network industries we find indications that the remaining problems sectors are of diverse nature requiring different kinds of policy interventions. In the case of post and telecommunications, the problems seem to be closely related to insufficient competition pressure and therefore policy intervention should aim at reducing barriers to entry and at improving the consumers' empowerment and in particular access to information. In electricity, gas, the problems seem to be more closely associated with insufficient integration and therefore policy intervention may be more necessary to tackle inadequate investment in cross-border network infrastructure.

To conclude this exercise should be seen in the wider context of the market monitoring approach to policymaking that the Commission is promoting. This approach, which will be in the near future enriched by further information regarding consumers' markets to be gathered by the Consumer Market Scoreboard, will thereby serve as the basis for a multi-annual programme of in-depth market monitoring exercises. In this light, the next steps will focus on implementing in-depth market monitoring exercises featuring some of the sectors that have been scrutinised thus far, and on extending the screening and the analysis of the causes of market malfunctioning of the selected sectors to the consumer dimension and to the level of each Member States. In both these areas work has already started and further results will be available during the first quarter of 2009.

AN ANALYSIS OF THE CAUSES OF MARKET MALFUNCTIONING IN THE EU

1. INTRODUCTION

One of the initiatives put forward by the European Commission in the Single Market Review Communication of 20 November was the proposal to adopt a new approach to market monitoring. The objective of this proposal is to promote an approach towards policymaking which is less legalistic and more based on sound economic evidence.

In order to put in practice this proposal the Commission has recently conducted a screening exercise to identify the key sectors to which priority should be given for future in-depth market monitoring initiatives. This note aims at complementing this exercise with an investigation of the possible causes of the problems affecting market functioning in these priority sectors.

The objectives of this investigation are multiple: first, it checks the robustness of the screening results by analysing if all the sectors that have been selected as a result of the screening are indeed facing challenges from a policymaking point of view; second, it provides a starting point and guidance for the subsequent in-depth market monitoring analyses; finally, it aims at developing a consistent and comprehensive policy strategy most suited to address the particular needs of any given sector. It should nevertheless be kept in mind that the investigation is limited to supply-side issues and should be complemented with an analysis of demand-side issues.

The analysis starts with an overview of the regulatory framework that conditions the functioning of markets in the EU and then continues by exploring three distinct (albeit intrinsically intertwined) policy areas: first, integration in order to determine the extent to which EU markets are well integrated internally as well as externally within the global market place; second, competition to check whether EU markets are contestable; and finally, innovation to examine how dynamic EU sectors are in terms of benefiting from new technologies and introducing new products in the market.

The rest of this note is structured as follows: section 2 provides more information related to the background and context of this initiative; section 3 starts by describing the adopted methodological approach followed by a presentation of the analysis made of the four dimensions scrutinised, namely regulation, integration, competition, and innovation. Section 4 draws the main conclusions from the analysis and finally section 5 points out avenues for further work.

2. BACKGROUND AND CONTEXT

The implementation of a more systematic and integrated approach to the monitoring of the functioning of key goods and services markets as envisaged in the 20 November Communication rests on the methodology that was developed by the inter-service group on product market and sector monitoring during the fist half of 2007[2].

This methodology encompasses two steps. The first step consists of a horizontal screening exercise aimed at selecting the sectors which should be given priority in terms of market

[2] See European Commission (2007a) for a full description.

monitoring. This is done by identifying the most important sectors for growth, jobs, consumers and adjustment in the EU and that present signs of problems of market malfunctioning (both in terms of economic efficiency and consumer welfare). So far the consumer perspective could not be adequately taken into account due to the lack of data. However the development of the Consumer Markets Scoreboard will allow closing this analytical gap. The second step involves a market-based in-depth investigation of the sectors that have been identified in the screening in order to better understand the reasons for malfunctioning and to draw concrete policy recommendations. The economic examination should in particular investigate in depth the three elements that constitute the backbone of the organisation of sectors and markets: their industrial structure, the conduct of the firms and the performance in terms of efficiency and consumer welfare.

The first stage of the methodology (the screening) was already implemented by the Commission services leading to the identification of 23 sectors, see table 1[3]. These results were published in a staff working paper that accompanied the Communication of 20 November[4]. The sectors that have been selected are evenly distributed between manufacturing and services. The former cover mainly investment (equipment) and intermediary goods sectors (both from more capital intensive industries and from the more high technology/skilled labour intensive industries). The latter include a variety of activities related to distribution (retail, wholesale, hotels and restaurants), financial services as well as network industries like "Electricity, gas and water supply", "Inland transportation" and "Post and telecommunications". In addition, professional services such as engineering consultancy, legal and architectural services and the like (sector 74 "other business services") have also been selected. In total these 23 sectors represented 44% of total EU value added and 46% of total EU employment in 2004.

3 For a more comprehensive description of the main characteristics of the selected sectors see Annex 1.

4 See European Commission (2007b).

Table 1 - Sectors selected in the screening

SELECTED SECTORS
22 - Printing, publishing and reproduction
25 - Rubber and plastics
27 - Basic metals
28 - Fabricated metal
29 - Machinery
30 - Office, accounting and computing machinery
31 - Electrical machinery and apparatus
32 - Radio, TV and communication equipment
34 - Motor vehicles, trailers and semi- trailers
35 - Other transport equipment
36 - Furniture, other manufactured goods n.e.c.
37 - Recycling
E - Electricity, gas and water supply
50 - Sale, maintenance and repair of motor vehicles
51 - Wholesale trade
52 - Retail trade
H - Hotels and restaurants
60 - Inland transport
63 - Supporting and auxiliary transport activities
64 - Post and telecommunications
65 - Financial intermediation
66 - Insurance and pension funding
74 - Other business activities

3. ANALYIS OF THE CAUSES OF MARKET MALFUNTIONING

I. APPROACH

The objective of this analysis at the sectoral level is to provide a first assessment of the nature of the causes of poor performance (from a supply side point of view) in the sectors previously selected, notably to determine the extent to which the observed underperformance is related to market malfunctioning. The idea is to eventually explore alternative policy responses aimed at tackling the identified problems.

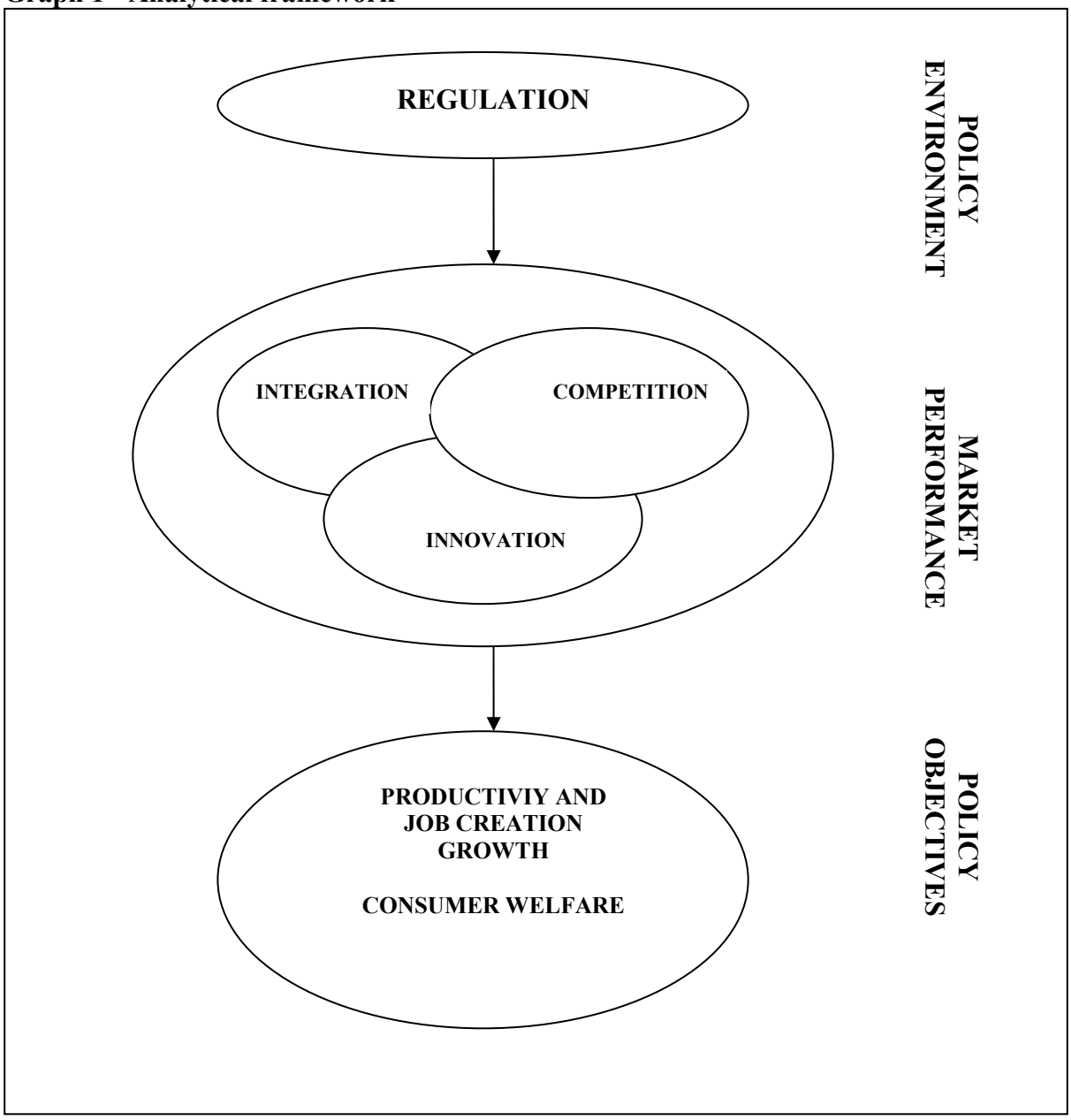
While ultimately the problems affecting market functioning in these sectors should be examined in light of the overall welfare costs for consumers and producers, given the complexity of such task we have opted to structure this analysis along four "policy areas", namely regulation, integration, competition, and innovation. A fifth policy area is also considered crucial to achieve a comprehensive analysis of the causes of market malfunctioning in a given sector: the consumer welfare[5]. However the necessary data at the

[5] In the screening methodology the level of consumer satisfaction was used as criterion to assess whether markets in a sector are functioning well. The rationale behind this approach is that markets can only be considered as well functioning if they guarantee an efficient use of resources but they must also respond well to the needs of users (consumers and businesses), by allowing an informed identification and selection of the suppliers that offer the best goods and services at an affordable price.

sectoral level to make this analysis operational are not yet fully developed[6]. The current development of a Consumer Scoreboard by the Commission services in close cooperation with national authorities, statistical offices and stakeholders will in the short run provide the necessary indicators (covering issues such as complaints, prices, consumer satisfaction, switching and safety) for such an analysis.

For the sake of simplicity (and to keep the exercise as objective and manageable as possible), the analysis developed in this note deals with each of the four areas considered separately. However, clearly these four dimensions of market functioning are closely intertwined and therefore from a policymaking point of view an integrated approach is required (see graph 1).

Graph 1 - Analytical framework



6 Until now data on consumer satisfaction, particularly for sectors other than services of general economic interest are very limited both from a quantitative and qualitative point of view. New data on these issues will be available in 2008.

Regulation is as an exogenous policy driven dimension that frames the environment in which markets function. It directly results from the use of most policy instruments that can be called for to influence the behaviour of market players, crucially affecting the competition, integration and innovation dimensions in the markets. First, the regulatory environment directly affects the level of competition pressure that firms face. The intensification of competition pressure leads in turn to allocative efficiency gains while giving also firms the necessary incentives to increase their productive efficiency[7]. Moreover, competition pressure is increasingly associated with international market integration as markets often span beyond national borders. The lifting of trade and investment restrictions and the resulting competition pressure from foreign firms contribute to further discipline the monopolistic or oligopolistic behaviour of domestic firms, forcing them to behave in a more competitive way. Finally, integration and competition are also closely related to innovation as the increased competition pressures `encourage firms to seek new ways of doing business to remain competitive, which in turn spurs entrepreneurial drive and innovation efforts[8]. Provided that other necessary framework conditions are there (namely in terms of skills availability) and if this competition pressure is sustained, in the long run the result will be a gain in terms of dynamic efficiency. Achieving a good performance overall in terms of competition, integration and innovation is a necessary condition for the better functioning markets that allow higher growth rates of productivity and employment as well as greater consumer satisfaction. As far as consumer welfare is concerned, this condition is not sufficient as both strategic behaviour of providers and behavioural biases of the consumers affect the markets' outcomes.

The conditions under which EU product markets operate have changed considerably since the 1990s[9]. The Single Market Programme and the introduction of the euro have led to increased market openness and price transparency, which have boosted the pressures of competition triggered by globalisation and the diffusion of information and communication technologies. Several other product market reforms aimed at strengthening integration and competition have also been implemented in individual Member States within the context of the Lisbon Strategy for Growth and Jobs (see box 1).

---

7 For a exhaustive investigation of this it would be necessary to look into other aspects of market performance such as entrepreneurship, financing, firms' entry and exit rates as well as firm-level adjustment. These issues are crucial for more in-depth market monitoring exercises, which would greatly benefit from the use of firm-level data.

8 The relationship between market structure and innovation has been explored since Schumpeter (1942). Lately the literature has shifted from the view of market structure as an (exogenous) determinant of R&D activity to the recognition of a dynamic interaction between firm size, market structure and innovation (Scherer, 1992). Recently the existence of an inverted U-shape relationship between innovation and competition is acknowledged. While, at first, the intensification of competition gives firms added incentives to innovate to stay in the market and better resist pressures from competitors, further entry in the market entry when it is too strong may reduce mark ups to such an extent that the incentives to innovate are reduced because the costs cannot be recovered.

9 For a more in-depth description of main developments, see Ilzkovitz *et al*. (2007) and EU Economy Review 2008, forthcoming.

Box 1: Reforms carried out to improve the functioning of product markets since the 1990s

Within the context of the Lisbon Strategy for Growth and Jobs, several reforms have been implemented to improve the integration, competition and innovation in the European Single Market. These reforms are closely monitored by the European authorities, via the Member States' Annual Implementation Reports and the Commission's Annual Progress Report[10].

Measures taken to improve the integration of product markets have included the implementation of Single Market directives and reforms aiming at modernising public procurement. The reform measures taken in the area of competition have aimed at improving the powers and means of competition authorities, at reducing unnecessary state aid measures and at improving the regulatory environment in specific sectors.

Most measures included in reform programmes at both EU and Member State level are aimed at promoting investment in research and new technologies and at supporting business start ups, investment in risk capital and education and training. These include: *i*) Financial incentives for R&D have been created or expanded in all euro-area countries; *ii*) The tightening of the links between research and business via the promotion of public-private partnerships and the creation and development of innovation poles and networks or facilitation of university spin-offs; *iii*) Measures to upgrade general education; *iv*) Measures to promote ICT use in education and training, online government services and e-commerce and the investment in broadband internet infrastructure; *v*) Programmes to facilitate access to risk capital to young and small enterprises and the setting-up new firms.

Finally a number of reforms have been aimed at reducing market distortions caused by public interventions, including: *i*) Corporate tax reforms aimed at removing or easing distortions; *ii*) Cuts in state aid*; iii*) The implementation of "better regulation" programmes*, iv*) Measures to improve the efficiency of public administration, namely via the setting up of on-line government services; *v*) The opening up of public procurement markets.

Despite these positive developments problems persist in terms of regulation, integration, competition, and innovation which are experienced to a different degree by the various sectors. In this note, the different sectors will be analysed along each of these four dimensions on the basis of a set of pre-defined indicators. The regulation dimension is somewhat different in nature than the other three dimensions that are taken into account. The former captures the institutional framework in which firms operate but it does not directly reflect market outcomes. In contrast, information on competition, innovation and integration performance can be used more directly to make qualitative assessments about market functioning, which is in turn conditioned by the regulatory framework in place.

The assessment whether there are indications of problems in a given sector is made using a pre-defined benchmark. If possible, the performance of the same sector in the US is used as the benchmark because it allows tackling the issue of the sectoral heterogeneity. *A priori,* the US is an appropriate benchmark for this exercise given that it is a well integrated market of a size comparable to the EU. Given the other structural similarities, namely in terms of factor endowments, the US is a direct competitor to the EU for many products in the world market.

10 Comprehensive information on European measures in favour of entrepreneurship and competitiveness until 2002 is also available at: http://ec.europa.eu/enterprise/enterprise_policy/charter_directory/index.htm.

Moreover the US is also a suitable benchmark for analysis of innovation issues given that it is generally regarded as a technological leader. Whenever a direct comparison with the US is not possible due to unavailability of data the performance of a given sector is benchmarked against the performance of other sectors at the EU level. In this case, when justified by the intrinsic characteristics of the sectors, we make the distinction between manufacturing and services sectors adopting the manufacturing average and the services average as two different benchmarks[11].

II. REGULATION

The starting point for this analysis is an examination of the extent to which the observed problems in market functioning can be related to the policy environment. In this respect, the quality of economic regulation is a crucial issue to be considered. The regulatory framework governing product markets (both rules and institutions) affects market characteristics and performances.[12] Notice that in this note we focus exclusively on product market regulations and do not take into account other types of regulation like for example labour and environmental regulations, which can also have considerable effects on the functioning of markets. However, these effects should nonetheless be considered in the more in-depth analyses of particular sectors or markets.

Generally, product market regulations are introduced to improve the functioning of markets by addressing public interest concerns about market failures including imperfect competition, externalities and asymmetric information. .However, often these regulations do not meet the purposes they have been designed for or their implementation leads to unintended negative (collateral) effects[13]. For example, regulations can introduce or augment barriers to entry curbing the competition pressure in the market. They may also alter firms' incentives to invest, to adopt leading technologies available in the market and to innovate in-house. Moreover regulations can introduce further distortions in the market as their cumulative impact is likely to be especially important for small and medium-sized enterprises, which generally lack the resources to deal with the administration burden resulting from laws and regulations.

However, an in-depth investigation of the impact of the regulatory framework on market functioning would also require detailed qualitative data to fully take into account the different features and objectives of the regulation imposed on firms. By ignoring the qualitative features of regulations one risks conducting a partial analysis that overlooks many of the potential benefits of regulation, which often go beyond purely economic considerations.

---

11 The EU averages are constructed taking into account all sectors of the economy and not just the sectors that have been selected in the screening stage.

12 The OECD (1997) defines regulation as “the diverse set of instruments by which governments set requirements on enterprises and citizens.” Regulations include laws, formal and informal orders and subordinate rules issues by all levels of government as well as rules issued by non-governmental or self-regulatory bodies to which governments have delegated regulatory powers.

13 In Arnold *et al*. (2007) a number of economic and policy factors are listed to explain why the regulatory framework may be flawed. First, some regulations may drift away from their original public interest aims, resulting in the protection of special interest groups. Second, regulations (and their implementation) sometimes involve costs that exceed their expected benefits, leading to so-called "government failure". Third, technical progress, the evolution of demand and progress in regulatory techniques can make the design of regulation obsolete.

While we acknowledge these intrinsic limitations of quantitative indicators of regulation, for the sake of consistency with the rest of the analysis in this paper the focus will be put on the available quantitative information on regulation. Therefore, we use the OECD regulation indicator as the main source of information to draw an overall picture of the level of regulation in European markets[14]. The methodology developed by the OECD focuses only on those regulations that affect competition where competition is an appropriate policy objective[15]. In this way it implicitly acknowledges that many regulations are welfare enhancing by addressing market failures or by pursuing non-economic objectives. The OECD indicator aims at quantifying the degree to which regulatory settings are anti-competitive while making no attempt to measure the stance of regulation with respect to public policy goals or to evaluate the efficiency of the regulations in meeting such goals.

Overall markets in the EU remained relatively heavily regulated in 2003, despite the several programmes of reforms put in place over the past decade and a half. Visible progress was achieved between 1998 and 2003 in reducing barriers to competition across the EU. Moreover it should be pointed out that since 2003 further deregulation has taken place in a number of sectors (e.g. telecoms, transport etc). Furthermore, there has been a process of convergence among Member States towards lower levels of regulation as on average the countries that had the highest level of product market regulation are those that have carried out the most substantial reforms, see Conway *et al*. (2005). In general, these liberalisation efforts entailed a decline in state control (via the elimination of price controls and direct controls of businesses) and the elimination of barriers to trade and investment (via lower tariffs and lower restrictions to foreign investment). Barriers to entrepreneurship (including in particular administrative burdens and legal barriers to entry in sheltered markets) have declined less dramatically, notwithstanding the increased use of one-stop shops. Nonetheless, it is clear that product markets are more regulated on average in the EU than in the US.[16] This makes the issue of regulation particularly important when analysing the functioning of markets in the EU.

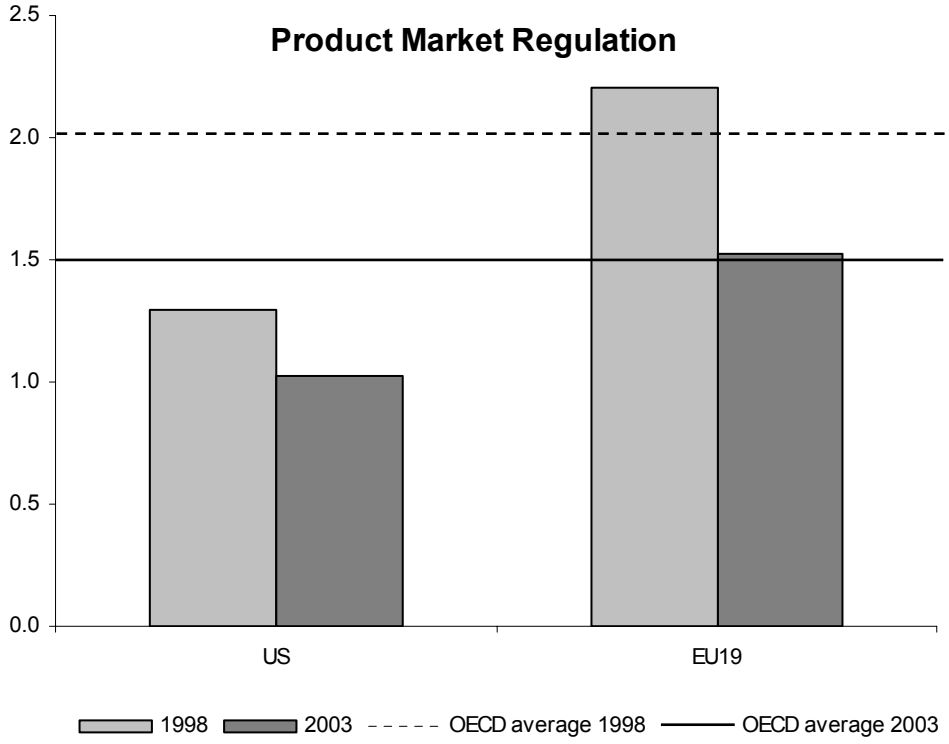
---

14 The information contained in the OECD database is based on the answers provided by OECD Members to a questionnaire containing 805 questions in the following domains: general policies (antitrust, control, market access, etc.), regulatory and administrative policies, administrative requirements for business start-ups, regulation of professional services, regulation in transportation industries, and regulation in the retail distribution industry (see Nicoletti *et al*., 2000). The data allow building indicators of product market regulation at various levels of aggregation, using weighting techniques such as principal component analysis.

15 All these indicators are constructed from the perspective of regulations that create barriers to entrepreneurship and restrict competition in domestic markets where technology and demand conditions make competition viable.

16 EU is a simple average of data referring to 19 Member States, namely: AT, BE, CZ, DE, DK, EL, ES, FI, FR, HU, IE, IT, LU, NL, PL, PT, SE, SK, UK.

Graph 2 - OECD indicators of product market regulation in 1998 and 2003



Source: Conway, P. *et al*. (2005)

Box 2: Measures of level of product market regulation

Three main sources of data can be used to assess the level of regulation in the EU and other economies (see Dierx et al (2007) for a more exhaustive overview). First, the Fraser Institute indicator of general economic freedom, combines data summarising the degree of regulation of credit markets, labour markets and business with information on the strength of property rights, the state involvement in the economy, financial stability and freedom of trade. The indicator has been calculated every five years since 1970 and annually since 2000. Second, the World Bank database "Doing Business" provides indicators on the cost of doing business by identifying specific regulations that enhance or constrain business investment, productivity and growth. Data are available for 2003, 2004, 2005 and 2006. Finally, the product market regulation database constructed by the OECD contains indicators of barriers to entrepreneurship, state control and barriers to trade and investment. Data have been collected for two years only: 1998 and 2003. While these three organisations use different data sources, simple Spearman and Pearson tests show a significant negative correlation between the 2003 OECD indicators of product market regulation and the Fraser indicators of economic freedom (except in the case of state involvement/control).

While there is not much direct evidence of how regulation affects the functioning of markets *per se*, these quantitative indices of regulatory burden allowed the development of an increasing body of empirical research that shows that product market deregulation has a positive effect on market entry, productivity and growth. For example, Nicoletti and Scarpetta (2003) found that reducing barriers to entry in service in certain European countries, most notably Germany, France, Italy and Greece, would boost annual multi-factor productivity growth in the overall business sector by about 0.1 to 0.2 percentage points. Indirect effects

would boost manufacturing-wide annual productivity growth by 0.1 to 0.2 percentage points, (see also Griffith and Harrison (2004) and Griffith *et al.* (2006)). The assumption is that measures aimed at reducing regulation that inhibit competition lead to a reduction of slack in the use of resources and improves the functioning of markets (namely by easing start up conditions, simplifying existing regulations and enhancing entrepreneurial activities) which trigger greater investment and increase innovation efforts ultimately spurring economic growth[17]. The impact of regulation on the entry and exit of firms is particularly important a mechanism through which the functioning of markets is directly affected (and eventually economic performance). For example Scarpetta *et al*. (2002) found the contribution of entry and exit of firms to aggregate productivity growth ranges from 20% to 40% in several OECD countries[18]. Cincera and Galgau (2005) also find a clear link between deregulation and higher rates of entry and exit which in turn affect positively macroeconomic outcomes as measured by labour productivity growth.

For the current exercise it is important to go beyond the comparative analysis of the aggregate levels of regulation imposed in the EU and the US and to investigate to what extent these regulations affect the functioning of markets in different specific sectors. Regulations are very often specific to particular sectors and/or markets and the exposure of firms to regulation (either sector-specific or economy wide) can vary importantly (depending for example on their position relative to the technological frontier).[19]

While the sector level may still be too aggregate to uncover the mechanisms by which regulations can affect the functioning of markets, even such an analysis remains difficult to implement due to the scarcity of information. To the best of our knowledge the only information collected on regulation at the sectoral level are published by the OECD. However, these indicators are characterised by two shortcomings. The first is the most recent OECD data are for 2003. This is particularly problematic for sectoral analysis as it overlooks all measures taken since 2003 which have targeted regulation in specific sectors. Currently the OECD is working on the updating these data which should be available by the end of 2008. The second shortcoming is that the sectoral coverage of the OECD database is very limited as it focuses on non-manufacturing sectors only[20]. However arguably these are the sectors where most regulations aimed at restricting competition (and market entry in particular) in developed economies are concentrated. Furthermore, the impact of regulations on the quality, the variety and the price of products is exacerbated in these sectors given that the consumers' and businesses' ability to get around them is curtailed by the limited degree of import penetration.

---

18 The results show that exit of low productivity firms has a positive contribution to aggregate growth across all countries and that in high technology sectors, the entry of new firms has a larger than average contribution to total growth, whereas in mature industries the exit of firms has larger contributions to growth.

19 De-regulation (and the ensuing increase in competition pressure) may lead to stronger innovation efforts particularly in the firms that are closer to the technological frontier as they attempt to stay ahead of their competitors (the so-called escape-competition effect on innovation). The impact on firms that are further from the technology frontier is less clear-cut as these firms will feel discouraged from investing further on innovation as the effort necessary to take the lead may be considered untenable for them (a discouragement effect of entry), see Aghion (2005) and Aghion and Griffith (2006).

20 Two groups of sectors are covered: i) energy, transport and communication and ii) retail distribution and some business services (namely accounting, architects, engineering and legal services).

Bearing in mind all these caveats, on the basis of these indicators it is clear that in 2003 the level of regulation imposed on businesses in almost all of the sectors covered remained higher in the EU than in the US despite the important reforms introduced namely to liberalise network industries in the EU, see annex 2. The exceptions are the liberalisation and deregulation processes in the electricity and postal industries which seem particularly well advanced compared to the US[21]. It should be pointed out, however, that compared to other sectors in the EU these remain relatively heavily regulated.

However to fully grasp the economic impact of the regulations imposed in the non-manufacturing it is important to bear in mind that their effects spill over to other sectors as they affect the cost structures of firms elsewhere in economy (particularly those that purchase inputs from the non-manufacturing sectors). The OECD Regulation Impact (REGREF) indicators use the available data on the regulation burden imposed on the non-manufacturing sectors (and on financial services sectors) to provide an overall measure of its impact across the economy including both the direct and indirect effects (on the sectors to which they sell intermediate inputs).

Box 3: The OECD Regulation Impact Indicators

The OECD Regulation Impact (REGREF) indicators aim at providing a measure of the overall impact of the regulation imposed in non-manufacturing sectors on all the sectors of the economy. This overall impact includes the indirect effects of regulation on the sectors which buy intermediate inputs from the regulated non-manufacturing sectors. However this measure is still incomplete as it does not include any regulations that are directly imposed on manufacturing sectors. The indicator therefore does not inform whether there is a specific regulatory problem in an individual manufacturing sector itself. For more detailed information on the methodology used in the construction of these indicators see Conway and Nicoletti (2006).

The value of this indicator in a given sector is thus determined by: i) the level of anti-competitive regulation in the non-manufacturing sectors as measured by the OECD product market regulation indices (see annex 2) and ii) on how much the sector purchases of non-manufacturing inputs (measured using total input coefficients derived from harmonised input-output tables). The higher the value of the indicator in given sector the greater the impact of regulation of that sector.

The REGREF indicators are calculated for 39 (ISIC rev3) sectors in 21 OECD countries over the period 1975 to 2003.

Table 3 shows the OECD regulation impact indicators for the sectors that have been selected in the screening phase in the EU and the US (the latter to be used again for benchmarking purposes). Overall, in almost every sector the impact of regulation is higher in the EU than in the US, which is unsurprising as it reflects the higher regulatory burden in the EU's non-manufacturing sectors. The only exceptions are the "printing, publishing and reproduction" sector (22) as well as "financial intermediation" (65) and "insurance and pension funding" (66), where regulatory impediments to competition seem somewhat higher for the US than for the EU OECD countries on average. Nonetheless the financial sectors remain among the sectors that are most affected by regulation in the EU. In contrast, "electricity, gas and water supply" (E), "other business activities" (74), and the transport sectors namely "inland transport" (60) and "support and auxiliary transport activities" (63) stand out as the sectors

[21] In contrast, in sectors like air transport and gas supply the gap *vis-à-vis* the US in terms of regulatory burden remained among the highest in 2003.

where the EU disadvantage *vis-à-vis* the US in terms of higher levels of anti-competitive regulation is largest.

On the basis of this table we identify the sectors where there are indications that the regulatory environment may present important challenges for market functioning: i) when the sector is heavily regulated and ii) where the degree of regulation is higher than in the US. We marked with ** and * when both or just one of these conditions is fulfilled respectively.

Table 3 - OECD Regulation Impact (REGREF) Indicators in 2003

SECTORS	EU[22]	US	Signs of regulation problems
22 - Printing, publishing, and reproduction [23]	0.104	0.058	*
25 - Rubber and plastics	0.102	0.067	*
27 - Basic metals[24]	0.109	0.077	*
28 - Fabricated metal	0.109	0.077	*
29 - Machinery	0.103	0.094	-
30 - Office and computing machines	0.103	0.104	-
31 - Electrical machinery	0.102	0.067	*
32 - Radio, TV and communication equipment	0.103	0.074	*
34 - Motor vehicles	0.109	0.101	-
35 - Other transport equipment	0.102	0.057	*
36 - Furniture, other manufactures	0.1	0.069	*
37 - Recycling	0.1	0.069	*
E - Electricity, gas and water[25]	0.341	0.195	**
50 - Sale, maint. and repair of motor vehicles[26]	0.389	0.318	**
51 - Wholesale trade	0.389	0.318	**
52 - Retail trade	0.389	0.318	**
H - Hotels and restaurants	0.077	0.064	*
60 - Inland transport[27]	0.362	0.195	**
63 - Sup. and auxiliary transport activities	0.362	0.195	**
64 - Post and telecommunications	0.269	0.266	*
65 - Financial intermediation[28]	0.303	0.344	*
66 - Insurance and pension funding.	0.303	0.344	*
74 - Other business activities	0.313	0.220	**

Despite the data limitations, there are indications that regulation is a cross cutting issue affecting market functioning in many sectors. Only two out of the 23 sectors that were identified in the screening do not show any indications of relatively heavy regulation. The regulatory framework is particularly stringent when it comes to creating barriers to entrepreneurship, therefore contributing to limit the entry of new firms in sheltered sectors. Therefore problems created by the regulatory framework are closely intertwined with competition and integration problems. For example, in "business services" (74) problems are

22 The EU average includes all Member States belonging to the OECD.

23 Refers to "Pulp, paper, paper products, printing and publishing" (21t22).

24 Refers to "Basic metals and fabricated metal products" (27t28).

25 Refers to "Electricity, gas and water supply" (40t41).

26 Refers to "Wholesale and retail trade; repairs" (50t52).

27 Refers to "Transport and storage" (60t63).

28 Refers to "Financial intermediation" (65t67).

particularly related to the conditions for entry into the professions and excessively restrictive codes of practice imposed on members of the professions (e.g. restrictions on advertising). Finally, it is important to notice that the regulation impact indicators used in this analysis are are primarily based on the information related to the regulatory framework in services (see box 3). For a more thorough investigation of regulation in manufacturing sectors it would be important to have data on sector-specific regulation directly imposed on these sectors. These data are not available at the moment. However, this is an issue which clearly needs to be investigated further in the more in-depth market monitoring exercises.

III. INTEGRATION

III.1 Motivation for the analysis

The level of integration, or in other words the extent to which the international trade and foreign investment flows have been liberalised and the prices of goods and services have converged across borders, is a crucial element to take into account in analysing the functioning of markets[29]. The effect of the removal of (tariffs and non-tariff) barriers to cross border transactions is equivalent to an increase in the size of the market, giving firms an opportunity to capture the benefits of increasing returns to scale both in production as well as in distribution and marketing activities (see for example Ades and Glaeser (1999), and Alesina *et al*. (2000)).

However, firms will take advantage of this opportunity only if they can overcome the increase in competition pressure that should be expected in the integrated market. Integration is a powerful device to discipline the monopolistic or oligopolistic behaviour of firms, forcing them to behave in a more competitive way and to seek new ways of doing business and innovate while driving the least efficient players out of business[30]. Eventually, provided that the competition pressure is sustained this process of industrial restructuring will also result in dynamic efficiency gains. Bernard *et al*. (2003) find evidence based on US plant data that the reallocation of resources in favour of more productive firms triggered by a 5% reduction in trade barriers due to globalisation can be quite large; the equivalent to 40% of total factor productivity growth in the manufacturing sector.

In the EU, the Internal Market Programme and more recently the creation of the EMU, the accession of the Central and Eastern European countries and the strengthening of the globalisation phenomenon have contributed to reinforce the integration of product markets via increased trade and FDI flows. However, the pace of market integration within the EU (and particularly among the EU15) seems to have slowed down over the recent period. The intra-EU trade to GDP ratio increased strongly during the second half of the 1990s but stabilised since 2000. The convergence of price levels in the EU25 has also progressed substantially but within the EU15 price dispersion has remained more or less stable in recent years. While such a slowdown in the pace of integration is expected, given that the remaining barriers are increasingly difficult to remove, the potential for further progress does not appear to be completely exhausted as the US remains a more integrated trade area than the EU (see Ilzkovitz *et al.* (2007)). Moreover, the remaining barriers to integration are often market specific and therefore their impact on market functioning will vary importantly across sectors.

---

29 For this exercise integration refers exclusively to the free movement of goods and services.

30 The reduction of rent seeking activities inspired by trade and investment restrictions could spur entrepreneurial activities (see Harrison (1994), Tybout (2003), Pavnick (2002) and Bernard *et al*. (2003)).

III.2. Methodology used for the analysis

The adopted approach for this analysis aims to capture the different features of the process of market integration. Firstly, we look at the trade component of integration (or market access effect) which is triggered by the removal of tariff and non-tariff barriers to allow firms to enter new markets and/or introduce new ranges/varieties of goods. For this, we consider two complementary indicators; the first was developed by Knetter and Slaughter (1999) and captures the degree of thickness of intra-EU trade relations; the second is the degree of import penetration (both intra-EU and total), which is used to examine the relative importance of foreign suppliers in domestic consumption[31].

Alternatively foreign markets might be served via the setting up of production capacity abroad. This is particularly important in some services sectors where production often remains largely non-tradable. In this case trade based indicators are not suitable to fully assess the degree of integration. Therefore the share of intra-EU cross border mergers and acquisitions (M&A) in total M&A deals was used as an additional indicator to capture the entry of firms in foreign markets via the acquisition of foreign firms[32]. The importance of this aspect of market integration is measured by the number of intra-EU cross-border deals (i.e. the bidder and target companies are located in two different EU countries) over the total intra-EU deals in a given sector. However the impact of integration on M&A activity in the tradable sectors is ambiguous given the potential substitutability between arm's length trade and the setting up of subsidiaries to gain market access (in other words the low number of M&A activity can be an indication of easy market access through trade). At the level of the whole economy, there is no evidence of this substitutability between trade and M&A flows: the increase in intra-EU trade which took place after the launch of the Single Market Programme was accompanied by a surge in intra-EU M&A activity. Nevertheless, in the case of tradable sectors the M&A indicator should be interpreted together with the indicators based on trade data in order to provide an overall picture of the international integration of the sector[33].

Finally, we also adopt an indicator of intra-EU price dispersion. The removal of barriers to trade and capital flows leads firms to reassess their strategy in the face of an integrated market where the opportunities for arbitrage and price discrimination are quickly exhausted eventually leading to a process of cross border price convergence. To capture the extent to which this process is underway the best is to examine price developments notably regarding the degree of cross-border price dispersion: the higher the level of integration, the lower the firms' ability to price discriminate and therefore the lower the level of price dispersion across the different national markets. However, it is important to be aware that price differences do

---

31 The market thickness indicator provides information on the number of trade flows taking place and therefore on the extensiveness of trade relations regarding the partners/sectors composition of exports. However it does not give information on the values of these trade flows and therefore of their intensity. This is why we have also used the import penetration indicator.

32 Ideally, this indicator should have been constructed using data on total FDI flows to cover not only M&A but also greenfield investment which is another important channel for firms to set up operations in foreign markets. However, internationally comparable FDI data are only available for two years. Furthermore, these data were available at a more aggregated NACE level than the one used in this exercise and many of the EU countries were missing from the data set.

33 Nonetheless in sectors where trade flows are still hampered by non-tariff barriers, this ambiguity is reduced and a high level of cross border M&A deals can be interpreted as a sign of greater integration.

not only reflect market fragmentation but also to some extent, differences in demand patterns (due to differences in income levels, preferences,…). Moreover, price dispersion may also reflect firms' pricing strategies to recover investments in R&D and innovation by selling different product varieties in different markets and/or charging higher prices for the same product in higher income markets compared to the prices charged for lower income markets. These are not necessarily signs of integration problems[34].

Box 4 - Indicators and data used

1. Market thickness

• **Definition:** the share of total possible bilateral trade flows (in terms of exports) for which trade actually happens within a given sector. The indicator, as developed by Knetter and Slaughter (1999) captures how "thick" product markets are in terms of breadth of trade flows. It is defined as a count of the number of goods in which trade is observed between two countries divided by the total number of possible goods which could be traded between these two countries.

• **Interpretation:** The indicator is equal to 1 if every country pair has two way industry trade in industry i at time t and 0 if there is no bilateral trade between country pairs. The higher the degree of market integration (the fewer barriers to transactions between Member States remain), the higher the number of firms entering new export markets and the higher the market thickness indicator. To decide whether a given sector shows signs of problems in terms of market integration we compare the market thickness indicator in the sector with the EU average for manufacturing when dealing with manufacturing sectors and the EU average for services when dealing with services sectors[35].

• **Source of data:** The indicator was calculated both for 1995 and 2004 using COMTRADE bilateral intra-EU trade flows only (excluding the trade with the rest of the world). The indicator is only constructed for the NACE sectors for which trade data are available, which excludes most of the services sectors.

2. Import penetration

• **Definition:** ratio between the value of imports divided by the value of apparent consumption[36]. Two different import penetration indicators are considered, one taking into account only intra-EU exports and imports and the other using total (intra and extra EU) exports and imports.

• **Interpretation:** The two indicators were taken into account because a sector can have different levels of integration at the EU and at the world levels and this difference is relevant for policymaking. For example, a sector may have a low import penetration indicator at the EU level, while importing a considerable amount of goods from the rest of the world. In this case it is evident that the sector has no integration problems. The low level of intra-EU imports may simply reflect the fact that the EU has a comparative disadvantage in the sector and is a net importer from the rest of the world. On the other hand, in a given sector there may be considerable imports from EU countries but not from non-EU countries. Whether or not this reflects trade barriers vis-à-vis producers outside the EU is an issue to investigate.

---

34 To take into account such sector specific ability to price discriminate associated with investments in product differentiation it would be necessary to use as benchmark the price dispersion level in the same sector in an integrated market with characteristics similar to the EU. Unfortunately this is not possible due to lack of data.

35 The need to adopt two different benchmarks for manufacturing and services is justified by the intrinsic differences in terms of the tradability of these two types of sectors.

36 Apparent consumption is defined as domestic production minus exports plus imports.

As a general rule, we consider that a given sector has problems in market integration if both the intra-EU and total import penetration indicators are below the benchmark, but not if only one of them is below the benchmark. In the latter case some further investigation should be carried out in order to understand the difference between the two indicators. Two different benchmarks are adopted for manufacturing and services, namely the EU manufacturing average and the EU services average respectively.

• **Source of data:** The import penetration indicators were calculated for 1995 and 2004. COMTRADE data were used for trade flows while the gross output series were extracted from the EUKLEMS database. The data problems encountered for these indicators were similar to the ones of the market thickness indicator and therefore for most of the services sectors it was not possible to compute the indicators.

3. Share of cross border M&A deals over total deals

• **Definition:** The number of intra-EU cross-border M&A deals divided by the total (domestic and cross-border) number of M&A deals. The indicator was calculated for the periods 1997-2001 and 2002-2006.

• **Interpretation:** The interpretation of this indicator is similar to that for import penetration. The indicator is bound between 0 and 100 and generally the higher its value the greater the level of integration in the sector. In other words, *a priori* a higher ratio of cross-border M&A deals is taken as an indication that both the entry of firms into new markets and the industrial restructuring is taking place which is associated to increased market integration. While this interpretation is unambiguous in non-tradable services, for tradable sectors some caveats are needed. For example if an increase in M&A deals coincides with a reduction of import penetration in that sector the net effect in terms of integration is ambiguous. The adopted benchmarks were the EU averages for manufacturing and services respectively.

• **Source of data:** The data are taken from the Thomson Financial Services database on mergers and acquisitions activity and cover only intra-EU M&A activity[37].

4. Price dispersion

• **Definition:** The coefficient of variation of prices for a given sector, i.e. the ratio between the standard deviation and the average of prices across EU countries calculated for the 1996-2006 period.

• **Interpretation:** A low level of the price dispersion indicator is interpreted as an indication of high level of integration. Two separate benchmarks were used, namely the median for manufacturing industries and the median for services[38].

[37] There are some drawbacks associated with this database which are important to consider: first, the M&A data used refer to a count of the number of deals and do not provide information on the value of these deals. Using value data is not advisable given that only around 40% of the values of the total M&A deals covered in the database are reported. Second, the number of deals may be inflated by the methodology used in the construction of the database: if a firm acquires the entire target company at once, this is counted as one deal, whereas if a firm acquires a target company in successive steps over several years, the buyout of this company will be counted in the database as several deals.

[38] The mapping of the COICOP price categories into NACE could not be done for all the sectors that were not selected in the screening phase. This made it impossible to use the EU average as a benchmark.

• **Source of data:** Consumer price data according to the COICOP classification developed by Eurostat[39]. Ideally producer price data should be used but such data are unavailable. The fact that these price data refer to final goods sold to consumers (therefore including the mark-up added by the retail outlets as well as taxes such as VAT) is one important drawback of this dataset. Another is that since the data refer to retail consumer prices they are not appropriate to assess price dispersion of intermediate goods. In fact, some of the NACE sectors do not have a correspondence in the COICOP price category (for example "basic metals" (27) or "recycling" (37)).

III.3. Main findings

III.3.1 Market thickness

Table 4 shows that in 2004 only one of the selected manufacturing sectors had a below average market thickness indicator: "other transport" (35). The "building and repairing of ships and boats" and "aircraft and spacecraft" sub-sectors were responsible for this result. Below average market thickness in these sub-sectors could be attributed to a low degree of competition in public procurement which acted as a barrier hampering foreign firms' activities. Nevertheless, since 1995 the degree of market thickness has improved in these sub-industries.[40]

The market thickness indicator is substantially lower in the services sectors (for which trade data are available) than in manufacturing. The degree of market thickness in the "electricity, gas and water supply" (E) sector is particularly low. Several factors can explain the still limited cross border supply and distribution of electricity and gas: the lack of investment in interconnection infrastructures which hamper the integration of the different national energy markets; and the fact that trade in electricity and gas occurs between neighbouring countries, thereby limiting the number of bilateral trade flows that can be established.

Market thickness was also below average in the "other business activities" sector (74). This is also not surprising given that: (i) in many of these sectors face to face contact between suppliers and consumers is required; (ii) important legal and other entry barriers for cross-border transactions remained in place until recently; (iii) demand is likely biased towards domestic suppliers due to cultural and linguistic affinities, thereby limiting the scope for further integration. Contrary to the evolution in most other sectors, the market thickness indicator has decreased since 1995. A more in-depth analysis of this sector seems necessary in order to offer a clearer picture of the reasons behind this evolution.

III.3.2. Import penetration

Since 1995 the level of import penetration has increased in most manufacturing sectors. Table 4 shows that in 2004 only six manufacturing sectors (out of the 23 selected in the screening) remained below the EU average for both the intra-EU and the total import penetration

[39] Given that the market screening phase of the exercise relied on the NACE classification of sectors, it was necessary to establish a correspondence between the COICOP price categories and the NACE classification. The availability of price data according to the COICOP classification does not allow us to obtain prices at the disagregated product level. As a consequence, several COICOP categories correspond to one NACE sector. This is why the average of the COICOP price categories for a given NACE sector was taken as representing the price for that sector.

[40] In contrast, the indicator is above average for the "railroad and transport equipment nec" subsector.

indicators: "printing, publishing and reproduction" (22), "rubber and plastics" (25), "basic metals" (27), "fabricated metal" (28), "machinery" (29) and "furniture and other manufacturing" (36). In these six sectors foreign supply via imports (both from within the EU and with the rest of the world) remains relatively limited suggesting the existence of problems in terms of market integration. Among these sectors, import penetration was the lowest in "printing, publishing and reproduction". This is not unexpected given that in this industry cultural and language barriers limit the scope for further integration. Similarly, in "fabricated metal", "basic metals" and "furniture" trade integration is also hampered by intrinsic characteristics of the sectors: in this case high transport costs. In contrast, the low level of import penetration in the other sectors can potentially be attributed to remaining economic barriers to market integration. For example, there is some evidence that a significant amount of technical barriers to trade persist in the "rubber and plastics" sector, particularly in the "plastics" sub-sector.

Among the manufacturing sectors "motor vehicles" (34) and "other transport equipment" (35) are interesting cases. For "motor vehicles" (34) while the level of total import penetration is below the benchmark, there are no indications of problems in terms of intra-EU import penetration. Hence, *a priori*, this sector can not be considered as presenting problems in terms of import penetration since it is well integrated into the EU. The relatively low level of imports from outside the EU may in fact reflect the comparative advantage of the EU relative to the rest of the world in the sector. In the "other transport equipment" (35) sector, intra-EU import penetration is below the benchmark, while total import penetration is close to the benchmark. Market segmentation is this sector may be associated with the low degree of competition in public procurement.

With respect to the services sectors, data were available for only two sectors among the list of sectors selected in the screening, namely "electricity, gas and water supply" (E) and "other business activities" (74). The degree of integration was slightly higher in the former. Moreover the level of import penetration in the sector has increased over the 1995-2004 period.

III.3.3. Cross-border mergers and acquisitions

Table 4 shows that on average this indicator is lower for the services sector than for manufacturing, which validates the general assertion that the former remain less integrated.

Among the manufacturing sectors a general increase in this indicator can be observed over the recent years. On average the share of cross-border deals in the 2002-2006 period increased in comparison to the 1997-2001 average in all of the manufacturing sectors with the exception of "furniture and other manufacturing goods nec" (36) where the average decreased slightly. Nevertheless, cross border M&A activity is below the adopted benchmark in 7 of the manufacturing sectors selected in the screening stage: "printing, publishing and reproduction" (22), "fabricated metal" (28), "office, accounting and computing machinery" (30), "electrical machinery and apparatus" (31), "radio, TV and communication equipment" (32), "motor vehicles and other transport equipment" (34+35) and "furniture" (36).

Regarding services, this indicator remains below the adopted benchmark in 6 sectors: "electricity, gas and water" (E), "retail trade" (52), "hotels and restaurants" (H), "financial intermediation" (65), "insurance and pension funding" (66) and "other business activities"

(74). Nonetheless, in most of the services sectors, the degree of M&A activity increased over the 2002-2006 period compared with the 1997-2001 period There are however three exceptions, namely "electricity, gas and water supply" (E), "retail trade" (52) and "hotels and restaurants" (H). The latter two sectors also show the lowest importance of cross-border deals. Given that these are sectors where the scope for cross border trade is limited or inexistent (the cases of "hotels and restaurants" (H) and "retail trade" (52)) this M&A based evidence can be interpreted as suggesting that significant barriers to integration remain.

III.3.4. Price dispersion

Since 1996 the degree of price dispersion has decreased substantially in all the sectors under consideration, which suggests a general increase in the level of economic integration.

However, as expected there are considerable differences between manufacturing and services. In 2006, the degree of price dispersion across the EU remains substantially higher in services than in manufacturing, reflecting the still fragmented nature of many services industries. Among the manufacturing sectors, price dispersion was above the median (the adopted benchmark) in "printing, publishing and reproduction" (22), "office, accounting and computing machinery" (30), "radio, TV and communication equipment (32), "motor vehicles" (34) and "other transport equipment" (35). In two of these sectors the coefficient of variation significantly exceeds the benchmark: "radio, TV and communication" and "office, accounting and machinery". One possible explanation is that price dispersion in these sectors reflects the firms' power and higher ability to discriminate between different markets given the technology intensive and highly differentiated nature of these products.

Among the services sectors, the highest degree of price dispersion is observed in "electricity, gas and water supply" (E), "insurance and pension funding" (66), "financial intermediation" (65) and "other business activities" (74). In the electricity and gas sector most of the price dispersion is likely to reflect differences in local taxation (which is country-specific and varies widely from one country to another). Other factors such as cross-country differences in terms of the sources of electricity generation may also play a role. In "financial intermediation" and "insurance and pension funding" price dispersion reflects the fact that integration of financial markets is still far from complete, but also that the characteristics of financial products vary across countries. Arguably the high price dispersion in the "insurance and pension funding" sector can also be partly due to differences in pension systems, which would imply differences in the use of individual insurance and pension funding schemes across countries. Finally, the important entry barriers in the "other business activities" sector would explain the large price dispersion found in this sector.

III.4. Identification of poorly integrated sectors

On the basis of the four indicators considered we have tentatively classified the sectors in three main categories: sectors that can be considered as being relatively poorly integrated, i.e. the sectors (marked ** in table 4) where several indicators point to insufficient integration, sectors (marked *) for which we cannot exclude problems of integration on the basis of at least one of the indicators used and sectors for which there are no indications of problems on the basis of indicators used. However, further in depth and qualitative analyses of each of the considered sectors would be required to confirm these classifications.

First, when considering the evolution in the period between 1995 and 2006, we find that, whatever the indicator used to measure market integration, the degree of integration has increased in both the manufacturing and services sectors.

Second, many of the services sectors selected in the screening show indications of integration problems, confirming the belief that they are less tradable than manufacturing and suggesting that non-tariff and other entry barriers remain in these sectors. Five of the services sectors selected in the screening have clear indications of integration problems: "electricity, gas and water supply" (E), "retail trade" (52), "financial intermediation" (65), "insurance and pension funding" (66) and "other business activities" (74). The low values of the market thickness and import penetration indicators in the "electricity and gas" sector are due to the lack of cross border physical infrastructure necessary that hamper trade in electricity and gas. Prices in this sector remain importantly influenced by local taxation and by the different degree of liberalisation in the different countries. In retail trade and business services, entry and legal barriers continue to limit the integration of markets. However, in the latter the scope of integration is also hampered by the home bias in domestic demand due to cultural and linguistic affinities. In the "financial intermediation" and "insurance and pension funding" sectors regulation remains an important barrier to integration. There are also some indications of integration problems in "hotels and restaurants" (H), and "supporting and auxiliary transport activities" (63). In the latter sector, evidence points to significant public procurement barriers to integration.

Third, despite the evidence pointing to a lower degree of integration in services than in manufacturing, there are still some manufacturing sectors which appear as poorly integrated: "printing, publishing and reproduction" (22), "fabricated metal" (28) and "other transport equipment" (35). In the publishing sector there is only a small share of domestic demand supplied by foreign output and the share of cross-border M&A deals as well as price dispersion are below their respective benchmarks. This reveals that markets within this sector remain fragmented. However, the scope for policy intervention is limited due to the presence of cultural and language barriers. In the "fabricated metal" sector the variety of products traded and the degree of price dispersion are above the benchmark. However, the trade flows and the M&A activity remain relatively limited. While there is evidence pointing to significant technical barriers to trade, transport costs also play a role in keeping markets segmented as production in the sectors is generally heavy. Nearly all of the indicators available in the "other transport" sector point to significant market segmentation (the only exception being the total import penetration indicator which is only slightly above the benchmark), which may be partially due to the low degree of competition in public procurement in the sub-sectors linked to defence or aerospace.

Table 4 - Signs of integration problems among selected sectors[41]

SECTORS	Market thickness	Intra-EU import penetration	Total import penetration	Share of cross-border M&A deals over total deals	Price dispersion	Signs of integration problems
22 - Printing, publishing and reproduction	0.92	0.10	0.14	17.0	0.019	**
25 - Rubber and plastics	0.98	0.30	0.42	33.2	0.012	*
27 - Basic metals	0.92	0.34	0.55	32.6	n.a	-
28 - Fabricated metal	0.97	0.14	0.20	27.6	0.013	**
29 - Machinery	0.98	0.38	0.58	n.a	0.012	-
30 - Office, accounting and computing mach.	0.95	0.69	1.60	27.3	0.044	*
31 - Electrical mach. and apparatus	0.93	0.55	0.86	27.5	0.014	*
32 - Radio, TV & comm. equipment	0.91	0.58	1.28	27.9	0.060	*
34 - Motor vehicles, trailers and semi- trailers	0.94	0.52	0.67	28.3	0.025	*
35 - Other transport equipment	0.78	0.32	0.73	n.a.	0.019	**
36 - Furniture, other manuf. goods n.e.c.	0.98	0.33	0.67	21.4	0.016	-
37 - Recycling	n.a	n.a	n.a	n.a	n.a	-
E - Electricity, gas and water supply	0.16	0.04	0.06	23.5	0.052	**
50 - Sale, maint. and repair of motor vehicles	n.a	n.a	n.a	26.2	0.012	-
51 - Wholesale trade	n.a	n.a	n.a	25.5	n.a	-
52 - Retail trade	n.a	n.a	n.a	15.2		**
H - Hotels and restaurants	n.a	n.a	n.a	15.3	0.028	*
60 - Inland transport	n.a	n.a	n.a	28.8	0.031	-
63 - Supporting and auxiliary transport activities	n.a	n.a	n.a	27.7	0.033	*
64 - Post and telecommunications	n.a	n.a	n.a	29.3	0.025	-
65 - Financial intermediation	n.a	n.a	n.a	23.4	0.040	**
66 - Insurance and pension funding	n.a	n.a	n.a	22.4	0.046	**
74 - Other business activities	0.34	0	0	22.5	0.039	**
EU average all manufacturing EU average all services	0.89 0.46	0.38 0.06	0.71 0.06	28.7 23.8	0.018 [42] 0.032	

[41] The shaded numbers represent, for a given indicator, the sectors that were selected as having problems according to that indicator.

[42] The values refer to the median for services and manufacturing respectively.

IV. COMPETITION

IV.1 Motivation for the analysis

In general, effective competition pressure is an essential element for the good functioning of markets. Competition can lead to an overall positive impact on economic performance and to higher social welfare as firms aiming to safeguard or increase their customer base are driven to increase their efficiency and to offer products at lower prices and better quality than their rivals.[43] The objective of this section is thus to identify, among the sectors filtered out at the screening stage, those in which market malfunctioning can be associated with indications of insufficient competition pressure.

The analysis presented in this section rests on the definition and application of a methodology aimed at measuring the intensity of competition in the 23 sectors, which have been identified as being important while showing signs of market malfunctioning in the screening. However, this is an inherently difficult task. Effective competition is a very broad and multidimensional concept which cannot be fully assessed by a set of indicators. Moreover measuring competition pressure in the current exercise is further complicated due to the lack of data at the market level. Therefore the aim of this exercise is to find indications of problems and to provide potential insight into different dimensions of competition rather than to offer definite conclusions. In particular, no finding of this section can be interpreted as indicating an infringement or the absence of an infringement of any provision of EC or national competition law.

IV.2. Methodology used for the analysis

The horizontal analysis that is developed in this section is based on a set of indicators reflecting the fact that effective competition is a multidimensional concept which cannot be fully captured by a single measure. Indeed, competition assessments of particular markets (e.g. analysis of "relevant markets" as defined under EC competition law in merger or antitrust cases[44]) require an in-depth knowledge of the characteristics of the market including a thorough understanding of the behavioural relationships of the agents present therein (between competitors, vertical relations, the relationship between suppliers and customers, etc), which goes beyond the scope of this exercise. Hence, the option chosen for this analysis was to use four types of indicators that aim at capturing different dimensions of competition, and to consider them in combination. These different dimensions reflect elements of market structure (measured by market concentration), performance (price-cost margin), conduct (turbulence indicators), as well as a policy dimension (number of competition law infringements).

---

43 The pursuit of profitability should incite firms to compensate the mutually exerted downward pressure on prices by reducing their costs. Such cost reductions (efficiency gains) can arise through four different channels: i) improvements in allocative efficiency as resources are allocated to their most efficient use; ii) improvement in productive efficiency as firms are given added incentives to use their inputs in the most efficient way iii) a reduction of the "managerial slack" (so-called "X-inefficiency"), and iv) improvements in dynamic efficiency as individual firms are led to invest and innovate more in new products and production technologies.

44 Commission notice on the definition of the relevant market for the purposes of Community competition law, OJ C 372, 9.12.1997

A number of caveats should be put forward at this stage. First, the indicators retained (e.g. mark-ups and concentration) while standard in the literature are nonetheless theoretically ambiguous and may sometimes contradict each other. Second, while the competition indicators that are used should in theory refer to "relevant markets" as defined under EC competition law, due to data constrains the analysis will be done at the level of sector of activity[45]. Data on markets generally only become available as a result of specific market investigations, which are well beyond the scope of this exercise. Third, while the data are usually provided at a common geographic level for all sectors (e.g. national or EU), this often does not coincide with the "true" geographical markets, which can be wider or narrower[46].

To identify sectors with weak competition we first consider each of the adopted indicators in isolation. However, it is important to be aware that the conclusions drawn from the individual indicators depend on the benchmark chosen. While perfect competition would be the ideal benchmark, it is unrealistic in practice. Due to the existence of sunk costs and imperfect information, the notion of workable competition is in principle a more realistic approach to define a benchmark. It implicitly recognises for example that positive price-cost margins may be essential to cover fixed costs and that these margins may vary between industries. In this light a simpler and more pragmatic approach has been applied in this exercise. Wherever data availability allows it, the level of competition in a sector will be judged against the US benchmark (i.e. by comparing the EU indicator with the US indicator). When this is not possible due to lack of comparable US data the cross-sectoral average is taken as the benchmark.[47].

Finally, given that each of the considered indicators can only provide a partial assessment of competition pressure in a given sector in order to draw more general conclusions we conclude the analysis with an horizontal overview of all the indicators. In doing this we can identify sectors where on the basis of the latter there are important indications of competition problems (i.e. when most indicators point to that same conclusion) and sectors where there are no indications of problems. Furthermore, special attention is given to the indicator based on mark-ups, which – among the indicators available to us – reflects the degree of price competition intensity best. Finally, we will also identify sectors where the indicators used do not lead to any clear cut diagnostic (i.e. cases where there will be indicators pointing to different conclusions). These will be regarded as sectors where, at least at this stage, one cannot exclude the existence of competition problems.

---

45 Indeed, a single sector may in fact either include several product or geographic markets or be narrower.

46 For example, computing an "EU-wide" indicator of, say, market share for sectors that have been identified as having possible "integration-problems" in section 2, may only be of limited relevance. For the sake of completeness, we will nonetheless do so.

47 We distinguish between manufacturing and services sectors using the average of the two groups as benchmarks. Only regarding competition law infringements we do not make this distinction.

Box 5 - Indicators and data used

1. Mark-ups (or price-cost margins)

• **Definition:** ratio of the difference between price and marginal cost over price (see Christopoulou and Vermeulen (2007)).

• **Interpretation:** The indicator is presented as the differential between the EU and the US. Positive values imply that the mark-ups in the sector are higher in the EU than in the US. We make the general assumption that mark-ups are normally decreasing with the intensity of competition and are thus indicative of the degree of competition. There are however important limitations with the interpretation of the mark-ups in the context of the current exercise given that are theoretically market-specific, since they are affected by market specific characteristics such as the importance of sunk costs and the degree of business risk, notably of R&D-intensive activities[48]. Moreover it is difficult to distinguish to what extent high mark-ups signal a low degree of competition in (low risk) markets and to which extent they reflect the result of successful firm strategies in a competitive and risky market where R&D investment and therefore some degree of market power is necessary.[49]

• **Source of data:** The data used to compute mark-ups are taken from Christopoulou and Vermeulen (2007), which estimates mark-ups for 50 sectors in 8 euro area countries and the US over the period 1981-2004. The estimates are obtained by applying the methodology developed by Roeger (1995) to the EUKLEMS data. The assumptions on which this estimation is based are profit maximization, cost minimization and constant returns to scale.

2. Degree of market concentration

• **Definition:** The indicator retained to measure the degree of market concentration is the eight-firm concentration ratio (C8), i.e. the cumulative market share of the eight largest firms in a sector. The market share of company *j* in sector *i* is defined as the ratio of the company's turnover (reported at market prices) in sector *i* to total sector turnover (i.e. the sum of the turnover of all the companies in the sector)[50].[51].

• **Interpretation:** A high degree of concentration may, under specific circumstances, be interpreted as providing an indication of the existence of market power and therefore as an indication of low competition[52]. The two adopted benchmarks are the cross sectoral average for manufacturing sectors and for services sectors.

• **Source of data:** The indicator is computed with data from the Orbis database for the year 2005.

---

48 R&D intensive activities are associated with higher mark-ups due to the higher differentiation of production (and therefore market power) which will allow firms to recover the costs of innovating.

49 Limitations of more practical nature should also be taken into account when interpreting mark-ups, which are computed in this exercise as the difference between the price and average cost, see Christopoulou and Vermeulen (2007). Given the latter are not entirely exogenous, a fall in mark ups can actually be driven by an increase in average costs associated with strategies to raise barriers to entry rather than a reflection of an increase in the competitive pressure. These issues should be taken into account in the more in-depth market monitoring exercises.

50 Each company in the database is assigned to a particular NACE sector. There are drawbacks to procedure as the turnover of a company will be allocated to a single industry while it can be active in several industries.

51 Additionally we compute the Herfindahl-Hirschman index (HHI), which is defined as the sum of the squares of the market shares of all firms in the market. This captures the distribution of firm size by giving proportionally greater weight to the market shares of the larger firms. The results are reported in Annex 4.

52 However, in the absence of substantial entry barriers potential competitors may exert a sufficient force to limit market power of the firms in the market.

3. Market turbulence

• **Definition:** The indicator retained to measure the degree of market concentration is the "total number of different firms index" (TNF), which following the methodology used in London Economics (2007) is defined as the ratio of the number of firms that have belonged to the group of the 8 largest firms in the years between 2002 and 2005 over the maximum number of different firms (32) that could have potentially been included in this group in this period. A more direct approach to measure turbulence would be the tracking of entry/exit rates and of the volatility of market shares. Entry rates measure the importance of entry barriers and the degree of contestability of the market while exit rates can be interpreted as an indicator of the selection process associated with elimination of the least efficient firms[53]. However, data for entry-exit rates are limited in terms of geographic and sectoral coverage and data on the volatility of market shares would only be available in the course of investigation of specific markets (e.g. in specific merger and antitrust cases under competition law).[54]

• **Interpretation:** A value close to 1 would mean a higher number of entries and exits of firms in the C8 which would suggest significant competitive pressure. As the indicator is presented as the differential between the EU and the US a negative number signals a lower level of turbulence (entry/exit in the C8) in EU than in the US.

• **Source of data:** The data are extracted from the Orbis financial database.

4. Infringements to competition law

• **Definition:** The number of infringements to EC competition law, using data on the number of antitrust cases in which the Commission took a decision between 1999 and 2006 finding an infringement of Article 81 or 82 of the EC Treaty.

• **Interpretation:** While the identification of breaches of competition law in the past is not in itself an accurate indication of current or future competition problems, it can nonetheless provide indications of which sectors may be more prone to problems of that sort. The benchmark used for this indicator is the EU cross-sectoral average.

• **Source of data:**
The data used are from the anti trust cases dataset of the European Commission[55].

IV.3. Main findings

Table 5 lists the sectors that have shown signs of market malfunctioning and identifies those where these are most likely to be associated with insufficient competition pressure.

53 As noted above, it is possible that in some (contestable) markets entry rates are low because the mere threat of entry causes the incumbent firms to maintain prices and output at competitive levels, thus pre-empting entry.

54 An analysis of turbulence based on production shares of the main firms in 67 manufacturing sectors in the EU15 is available in Veugelers. (2004). The results suggest that levels of concentration are generally quite stable, despite the significant turbulence often observed within the top market players in each industry. The usefulness of this analysis for the current exercise is limited given the higher level of sectoral aggregation and the incomplete geographical coverage of the data used.

55 The data can be downloaded from http://ec.europa.eu/comm/competition/antitrust/cases/index.html

IV.3.1 Degree of market power

Given that mark-ups are affected by sector/market specificities (due for example to sunk cost), cross-country comparisons are clearly more informative than cross-sector comparisons[56]. In this light, the mark ups data for the euro area are benchmarked against the US. While this option is not meant to signal US mark-up as "optimal", it can nonetheless be considered as an appropriate benchmark in the sense that it gives an indication of what could actually be achievable in terms of mark-up (and competition intensity) in a market of similar size.

The differences between mark-ups in the euro area and in the US for each sector are reported in table 5. A positive value (i.e. a higher mark-up in the euro-area than in the US) is interpreted as a sign of relatively low competition (or high market power) in the EU. In 11 out of the 23 sectors that were selected in the screening phase, the mark-up is higher in the euro area than in the US. Moreover, it seems that higher mark-ups in the euro area are more frequently observed in the services sectors. In only 2 services sectors only (out of the 11 selected in the screening) are mark-ups lower in the euro-area than in the US, namely "electricity, gas and water supply" (E); and "inland transport" (60). Among the manufacturing sectors, the "basic metals" (27), and the "motor vehicles" (34) sectors are characterised by higher mark-ups in the euro area[57].

IV.3.2. Degree of market concentration

The indicator of market concentration shown in this table is the eight-firm concentration ratio (C8) which is computed for each sector in the EU. The obtained values are then benchmarked against the averages for the manufacturing and services sectors respectively. Values higher than the adopted benchmarks are interpreted as indications of relatively low degree of competition[58]. Among the 23 sectors considered, eight show signs of relatively high concentration. Four of these sectors are manufacturing sectors, namely "office accounting and computer machinery" (30), "radio TV and communication equipment" (32), "motor vehicles trailers and semi trailers" (34) and "other transport equipment" (35). The remaining four belong to the services sectors, namely "electricity, gas and water supply" (E), "hotel and restaurants" (H), "inland transport" (60) and "post and telecommunications" (64). The sectors with relatively high values for C8 also exhibit relatively high values in terms of the HHI.

IV.3.3. Turbulence in the market

The turbulence indicator retained for this table is the total number of different firms index (TNF), which is computed for each sector in the EU and the US. A sector is considered to show signs of malfunctioning if the TNF in the EU is lower than the TNF in the same sector in the US. Within the group of 23 sectors listed in the table, four sectors seem to be characterised by lower turbulence in the EU, namely "machinery" (29), "radio, TV, communication equipment" (32), "electricity, gas and water supply" (E), and "post and

---

56 For example, the cross-industry average mark-up in the euro area is 1.53, whereas in the US it is 1.45 (not reported in the table). However, these averages mask important heterogeneity across sectors.

57 It should be noticed that in the "motor vehicles" sector, the differential in mark ups vis-à-vis the US that is found in Christopoulou and Vermeulen (2007) is mainly driven by an unusually low estimated profit margin in the US rather than being evidence of a particularly high margin in the EU.

58 It should be recognised however that there may be good reasons why market concentration can differ across industries. Due to data constraints, the comparison between the EU and the US cannot be made.

telecommunications" (64). While these four sectors are evenly distributed across manufacturing and services, it should be noted that the services sectors belong to network industries, which are still in a phase of market opening and where entry barriers are high. It should also be noted, that in most sectors turbulence among the largest eight firms is generally low in both the EU and the US. The findings from the "in-out index" (IOI) confirm those obtained with the TNF.

Table 5 - Signs of competition problems among selected sectors

SECTORS		EU-US mark-up differential	Market concentration (C8)	Turbulence (TNF)	Number of antitrust cases	Signs of competition problems
22	Printing, ….	-0,11	21,14	0,06	17	*
25	Rubber and plastics	-0,01	29,62	0,03	4	-
27	Basic metals	0,11	33,26	0,03	7	**
28	Fabricated metal	-0,04	24,07	0,00	0	-
29	Machinery	-0,12	32,37	-0,06	12	*
30	Office, account. and comp. mach. (***)	-0,02	59,15	0,09	5	*
31	Electrical machinery	-0,01	17,26	0,13	2	-
32	Radio, TV and comm. equipment	-0,09	38,50	-0,03	4	*
34	Motor vehicles, trailers,	0,14	51,09	0,00	4	**
35	Other transp. equip.	-1,7	47,29	0,06	4	*
36	Furniture	-0,02	16,40	0,09	7	*
37	Recycling	n.a	31,47	0,00	1	-
E	Electricity, gas and water supply	-0,13	28,15	-0,13	10	**
50	Sale, maint. and rep. of motor vehicles	0,39	8,72	0,03	4	*
51	Wholesale trade	0,04	16,29	0,25	3	*
52	Retail trade	0,23	22,55	0,13	2	*
H	Hotels & restaurants	0,11	30,83	0,06	0	**
60	Inland transport -	-0,08	28,59	0,03	2	*
63	Sup. and auxiliary transport activities	0,11	18,87	0,09	6	**
64	Post &telecoms	0,10	39,44	-0,03	15	**
65	Financial intermediation	0,17	14,34	0,06	8	**
66	Insurance,…	0,19	20,62	0,25	2	*
74	Other business activities	0,18	11,73	0,19	3	*
Benchmarks		US	Average manufacturing (34.56) Average services (26.67)	US	Average (5.07)	

IV.3.4. Infractions to competition

The last individual indicator considered is the number of antitrust cases by sector. For this indicator the benchmark adopted is the average for all sectors given that a priori there is no valid justification to differentiate between services and manufacturing sectors in this respect. In total, 8 sectors reported more occurrences of cases than the average, being therefore considered as potentially problematic for the purposes of this monitoring exercise. The two sectors with the highest number of cases are "printing and publishing reproduction" (22) with 17 cases and "post and telecommunications" (64) with 15 occurrences.

IV.4. Identification of sectors with weak competition

In this section we have analysed the 23 sectors selected in the screening in view of finding indications of weak competition. Each indicator was scrutinised individually but in order to classify a sector as "malfunctioning" from a competition point of view we now consider the four types of indicators (mark-up, concentration, turbulence and number of antitrust cases) in combination.

As indicated above, we tentatively classify the sectors into three categories based on the four types of indicators: *i*) sectors for which there are strong indications of competition problems (marked in table 5 with **); *ii*) sectors for which we cannot exclude the hypothesis of competitions problems despite contradictory indications given by some indicators (marked in table 5 with *); and *iii*) sectors for which there are no compelling signs of problems in terms of competition, as revealed by this methodology. Sectors are deemed to have strong competition problems (**), either if at least three indicators point to weak competition (shaded in the table above), or if two indicators point to weak competition, one of them being the mark-up. This is justified by the importance we attach to mark-up. Sectors for which we cannot exclude competition problems (*) are those where one or two (excluding the mark-up) indicators signal a low degree of competition. However, further in depth and qualitative analyses of each of the considered sectors would be required to confirm these classifications.

On this basis, out of the 23 sectors under analysis seven can be classified as showing strong indications of problems namely "basic metals" (27), "motor vehicles, trailers, and semi-trailers"(34), "electricity, gas and water supply" (E), "hotels and restaurants" (H) "supporting and auxiliary transport activities" (63), "post and telecommunications" (64) and "financial intermediation" (65). Overall it seems that problems of competition are more likely to be observed in the services sectors. Indeed, five of the seven sectors classified as showing strong indications of competition problems are services sectors. This can largely be explained by the high mark-ups in these sectors relative to the US - the only exceptions being "electricity, gas and water supply" and "inland transport".

On the basis of the adopted indicators we do not find any indication of weak competition in only four sectors: "rubber and plastics" (25), "fabricated metal" (28), "electrical machinery and apparatus" (31) and "recycling" (37). In contrast, in seven sectors of the 22 sectors that were not selected in the screening, we found important indications of competition problems, namely "wearing apparel, dressing and dying of fur" (18), "wood and of wood and cork" (20), "coke, refined petroleum and nuclear fuel" (23), "water transport" (61), "air transport" (62), "research and development" (73), and "other service activities" (93).

Finally, despite the observed signs of competition problems that we found it seems that there has been a slight intensification of competition pressure in many sectors the EU over the last years. While the opportunity to carry out a detailed dynamic analysis is limited we find that for example mark-ups in the EU for the sectors for which data are available have been mostly decreasing (-0.06 on average), between the period 1981-1992 and the period 1993 to 2004. Furthermore, we can observed the evolution of the two indicators of market concentration (C8 and HHI) from 2002 to 2005 and in both cases there is a decrease in concentration levels in the EU in many sectors, particularly in "Rubber and plastic" (25).

V. INNOVATION

V.1 Motivation for the analysis

A well-integrated, competitive and dynamic Single Market helps to create an innovation-friendly environment in Europe, which supports long-run competitiveness and sustainable economic growth. Despite being relatively close to the world productivity frontier, the EU has not reached its potential in terms of innovative capacity (see Griffith and Harrison, 2004). The relatively poor performance in terms of innovation creation and technology adoption may be explained by a wide range of policy and institutional factors. Indeed, innovation is a complex process characterised by the interaction between different actors (firms, universities, banks, venture capitalists, governmental agencies and consumers) which operate within a specific institutional framework (laws, rules, regulations, norms and standards) shaped by a wide spectrum of public policies (Edquist, 2001).

In recent years, innovation policies have mainly focused on the enforcement of intellectual property rights (IPRs) and competition as tools for sustaining the creation and the diffusion of technological change across firms. Indeed, IPRs do not generate proper incentives for firms to invest in innovative activities if they fail to ensure that innovation is properly rewarded and preserved (Jaffe, 1988). Interactions between IPRs, incentives for knowledge creation and the structure of product markets in which the innovation takes place need to be considered when defining appropriate policies (Gilbert and Newbery, 1982). For example, competition policies have aimed at the design of the correct market structure to support innovation by recognising the existence of important differences across sectors in the dynamic interaction between firm size, market structure and innovation (Scherer, 1992).

Several sectoral specific components - such as the extent of scale economies, capital intensity, and the degree of a sector's technological content - affect innovation processes, inputs and outputs and the interaction between the actors which lead to technological change (Doms et al., 1995). Ideally, one would like to measure the performance of the entire innovation system as a whole (Malerba, 2002), namely the systemic evaluation of all the dimensions which are encouraging technological change rather than the separate assessments of each specific component. However, this task is very difficult because of the complexity which characterises the innovation system itself and the heterogeneity of the different dimensions concerned. Even though the measures of the individual elements cannot describe the performance of the entire system, all of them combined may give some insights on how the system is actually performing (Carlsson *et al*., 2002).

An important sectoral distinction applies to services versus manufacturing sectors. Indeed, the growing structural specialisation of industrialised economies towards services sectors implies that their innovative performance will be a crucial determinant of long run growth in Europe. Services sectors are often perceived as being less innovative than manufacturing, because R&D spending and the number of patents obtained by services firms is relatively low. However, these two indicators are somewhat misleading since innovation in services tends to take the form of incremental changes introduced to processes and procedures. Moreover, the conceptual tools developed to study (technological) innovation in manufacturing are not as effective when applied to the services, since the latter are characterised by the prevalence of incremental, non-technological, process and organisational innovation (OECD, 2005a). Further work is needed to better capture the innovative capacity of services sectors.

V.2. Methodology used for the analysis

The analysis of innovation performance at the EU sector level faces important constraints related to both the measurement of innovative activities and the quality of available data. Internationally comparable measures of technological change are particularly hard to find for some variables; in turn, this makes difficult a comparative assessment of overall innovation systems at the sectoral level. This analysis will focus on a limited number of innovation inputs, outputs and outcomes for which sector-level data are available.

Innovative inputs refer to the investment performed by firms aimed at introducing technological innovations. The most common measures of input are R&D investment, R&D personnel, and other investment in tangible and intangible knowledge assets such as technologically new equipment and know-how. Innovative outputs refer to the direct result of the innovative activity such as scientific publications, patents, technologically new or improved product, process and services. Finally, innovative outcomes indicate the broader economic result obtained by a firm thanks to the performed innovative activity such as greater market shares, a higher total factor productivity (TFP) growth, and other related measures of economic performance.

The three input measures used in the analysis below reflect R&D intensity, namely the share of R&D spending in value added, as well as investment in new technologies and human capital (approximated by the contributions of ICT and labour quality, respectively, to the growth of value added in the sector). Two output/outcome measures were identified: patent applications and the contribution of total factor productivity (TFP) to the growth of value added in the sector.

Not all these indicators are available for services: information on R&D intensity and the number of patent applications with the European Patent Office (EPO) are available only for EU and US manufacturing sectors but not for services. The sectoral performance in terms of these two measures of innovation has been evaluated by taking a simple EU/US ratio. A ratio lower than one in terms of the R&D variable indicates, therefore, a relatively poor performance of EU compared to US in that specific sector. On the contrary, we use the aggregate ratio of EU/US manufacturing applications at the EPO as a benchmark for the patents variable in order to adjust for the built-in home advantage bias towards EU. A sectoral value lower than the aggregate ratio will, therefore, indicates a relative weakness of the EU in terms of patenting activity in that sector.

Box 6: Growth accounting framework in the EUKLEMS

An extended growth accounting framework is used to disentangle at the sectoral level the contributions to value added growth of capital and labour according to ICT and skill intensity, respectively. A distinction is made between ICT capital and non-ICT capital, on the one hand, and the quantity (in terms of hours) and quality (in terms of labour composition) of labour, on the other hand. As a result, the measure of TFP calculated better reflects the impact of "pure" disembodied technological change on value added growth.

The analysis is carried out in the following way. First, we compare the determinants of aggregate growth in manufacturing and in services for the EU and the US and we identify the determinants of the EU-US productivity gap[59]. Data are presented in terms of annual growth rates for the EU and the US in the period 1996-2004. Second, we repeat the analysis for each sector at the NACE 2 digit level. To assess the performance of the different sectors in the EU, we use the contribution to growth in the US of the different production factors as benchmarks.

Unfortunately, data are not available for all the two-digit NACE sectors. Indeed, the EUKLEMS database provides a complete set of information on the growth accounting indicators at a macro-sector aggregation and only partial information on some 2 and 3 digit sectors. However, it is still possible to obtain a complete data series at the 2 digit level by assuming a constant structure of the production function within macro sectors.

The data on investment in human capital, ICT as well as on TFP growth have been computed using an extended growth accounting approach developed in the context of the EU-KLEMS project (see box 6)[60]. This data source provides comparable information on economic growth, productivity, employment creation, capital formation and technological change at the industry level for all EU and other major industrialised countries.

Box 7 - Indicators and data used

1. R&D intensity

- **Definition:** The ratio of the share of business expenditure on R&D in the value added a given sector in EU over the share of business R&D in value added of the same sector in the US, namely $(R\&D_{EU}/VA_{EU}) / (R\&D_{US}/VA_{US})$.

- **Interpretation:** R&D expenditure represents the most common indicator of innovative input (Griliches, 1979). In this analysis it is used as a proxy of firms' efforts to develop new technologies or to adapt existing ones. When the computed ratio assumes values lower than 1 this is taken as an indication that R&D investments by EU firms are trailing those made by US firms.

- **Source of data:** Data are drawn from EUROSTAT and refer to 2003, the last year for which data are available. The data for the EU cover BE, CZ, DK, DE, EL, ES, FR, IE, IT, HU, NL, PL, FI, SE, UK.

59 The gap indicates the difference between the growth rates of the variables in the EU and in the US. Growth accounting variables are expressed in terms of logarithms.

60 We use data revised in March 2007, which are available on http://www.euklems.net/. The analysis is based on a subsample of 20 manufacturing and service sectors for which there are comparable data between EU and US in the period 1996-2004. An outlier analysis has been performed on the dataset. In particular, the extreme observations have been removed from the sample to ensure data consistency.

2. Quality of labour

• **Definition:** The contribution to value added growth of changes in the composition of the labour force according to three skill-related (high, medium, low) categories of workers. It is computed as the difference between EU and US annual average growth rates over the period 1996-2004.

• **Interpretation:** The upgrading of skills of the labour force is used as a proxy for technological change in the sense that it reflects the increased ability of workers to take up and develop new technologies. A negative value for this variable indicates that the EU is underperforming *vis-à-vis* the US.

• **Source of data:** Data are drawn from the EUKLEMS database. Data for the EU refer to AU, BE, DK, ES, FI, FR, UK, DE, IT, NL.

3. ICT

• **Definition:** the contribution to value added growth of ICT investment in office and computing equipment, communication equipment and software. It is computed as the difference between EU and US annual average growth rates over the period 1996-2004.

• **Interpretation:** ICT investment is a measure of innovative input and it represents a proxy of embodied technological change, such as for example a technological improvement in the design or quality of new capital goods or intermediate inputs. A negative value for this variable indicates that the EU is underperforming *vis-à-vis* the US.

• **Source of data:** Data are drawn from the EUKLEMS database. Data for the EU refer to AU, BE, DK, ES, FI, FR, UK, DE, IT, NL.

4. TFP

• **Definition:** The difference between EU and US TFF annual average growth rates over the period 1996-2004.

• **Interpretation:** TFP is a common (although imperfect) proxy for innovation output namely regarding disembodied technological change, i.e. technological change which is not incorporated in any specific production factor[61]. A negative value for this variable indicates that the EU is underperforming *vis-à-vis* the US

• **Source of data:** Data are drawn from the EUKLEMS database. Data for the EU refer to AU, BE, DK, ES, FI, FR, UK, DE, IT, NL.

5. EPO patents

• **Definition:** The ratio of the number of EU and US patent applications at the European Patent Office filed by EU and US agents in 2003.

61 Within a traditional growth accounting approach with no adjustment for the quality of production capital, TFP growth measures both disembodied and embodied technological progress. When adjustments are made to the capital stock (as in the case of EUKLEMS data), TFP encompasses only disembodied technological change. However, the neoclassical assumptions of perfect competition and constant returns to scale are crucial for the equalisation of TFP growth and technological progress. Indeed, non-technological factors such as adjustment costs, non-competitive market structure, scale and cyclical effects, and measurement errors all affect the TFP indicator since it is obtained as a "residual" of the growth accounting exercise, namely as the component of value added growth unexplained by the growth of the two conventional production factors, capital and labour.

• **Interpretation:** Patents are used as indicator of innovation outputs which are associated with introduction of new products in the market place. When the computed ratio assumes values lower than 1 this is taken as an indication that by EU firms are trailing US firms. We use as a benchmark, the aggregate cross sectoral ratio of EU/US patent applications at the EPO, which implies - by construction - the so-called home advantage bias in favour of the EU. However, this bias is not relevant for this analysis since we compare the relative innovative performance across different EU sectors (and not EU versus US).

• **Source of data:** Data for the EU refer to EU27 and cover only manufacturing sectors. No patent data are available for services. Data for sector 29 refer only to subsector 291.

V. 3 Main findings

The empirical analysis of the innovation performance at the EU sectoral level will be based on three indicators of innovation input and two indicators of innovation output. On this basis table 6 identifies the sectors for which there are indications that the signs of market malfunctioning can be associated to weaknesses in terms of innovation.

Table 6 - Signs of innovation problems among the selected sectors[62][63]

SECTORS	INPUT			OUTPUT/OUTCOME		Sign of innovative problems
	R&D Intensity	Quality of Labour	ICT[2]	TFP[2]	EPO patents	
	RATIO	DIFF.	DIFF.	DIFF.	RATIO	
MANUFACTURING	**0.73**	**-0.15**	**-0.16**	**-2.01**	**1.66**	
22 - Publishing, printing	0.25	0.32	-0.40	-1.03	1.46	**
25 - Rubber and plastics	1.15	0.03	0.37	-19.70	2.62	*
27 - Basic metals	1.43	-1.97	-0.48	-0.69	2.23	**
28 - Fabricated metal	0.77	1.08	0.07	-2.32	3.12	**
29 - Machinery	0.94	-0.41	-0.38	-1.61	2.99	**
30 - Office machinery	0.37	2.95	1.45	-43.36	1.33	**
31 - Electrical machinery	1.02	-0.27	-0.60	-7.93	1.96	**
32 - Radio, TV and comm. equip.	1.07	-1.55	0.09	-7.94	1.39	**
34 - Motor vehicles	1.30	0.20	-0.02	-5.17	3.25	*
35 - O. transp. equipment	n.a.	-0.03	0.72	-1.99	2.33	*
36 - Furniture	0.53	n.a	n.a	n.a	2.21	-
37 - Recycling		n.a	n.a	n.a	n.a	n.a
SERVICES	**n.a**	**-0.10**	**-0.13**	**-0.22**	**n.a.**	
E - Electricity, gas and water supply	n.a.	-0.14	-0.06	1.93	n.a	*
50 - Sale, maint. & repair of motor vehicles	n.a	0.03	-0.30	-5.55	n.a	**

62 The shaded numbers represent, for a given indicator, the sectors that were selected as having problems according to that indicator.

63 Averages at the aggregate level are computed across the sectors for which data are available.

51 - Wholesale trade	n.a	-0.49	-0.98	-1.04	n.a	**
52 - Retail trade	n.a	-0.23	-0.11	-3.86	n.a	**
H - Hotels & restaurants	n.a	0.09	-0.30	-1.22	n.a	**
60 - Inland transport	n.a	-0.33	-0.34	0.59	n.a	*
63 - Sup. transport act.	n.a	-0.62	-2.45	7.31	n.a	*
64 - Post and telecoms	n.a	0.01	-0.87	5.62	n.a	*
65 - Financial intermed.	n.a	0.19	1.02	-3.74	n.a	*
66 - Insurance	n.a	-0.66	-2.36	0.94	n.a	*
74 - O. business active.	n.a	-0.30	-0.44	-1.28	n.a	**

V.3.1 Innovation inputs

The innovative performance of the EU economy appears overall weaker than in the US. Aggregate values for manufacturing and service sectors show - for all the adopted indicators of innovative input - the occurrence of a gap between the EU and the US.

On average, R&D intensity in EU manufacturing sectors reaches a level equivalent to 73% of that in US manufacturing. The largest EU-US gap in terms of R&D intensity can be observed in the office machinery sector, which is one of the most R&D intensive sectors overall. In this sector the EU-US ratio of R&D intensity is 0.37. Only in the publishing and printing sector is this ratio lower (i.e. 0.22). Overall, the EU performance in terms of R&D intensity is relatively weak in 5 out of 10 manufacturing sectors.

The negative sign of the growth accounting input variables (Quality of labour and ICT) confirm the lower performance of European sectors compared to the US. Although these two indicators show a very similar pattern at the aggregated level for manufacturing and services, the sectoral distribution of the EU/US gap varies accordingly to the chosen indicator. In particular, regarding "quality of labour" the EU shows signs of underperformance in 12 out of 20 sectors (5 in the manufacturing and 7 in services) while it performs relatively poorly in terms of ICT capital growth in 15 out of 21 sectors (5 in the manufacturing and 10 in services).The largest gap in the "quality of labour" indicator emerges in two manufacturing sectors "basic metals" (27) and "radio, TV and communication equipment" (32) due to an opposite effect of this variable on value added growth in the EU and in the US. Two services sectors namely "supporting transport activities" (63) and "insurance" (66) show the largest gaps in terms of ICT growth. This evidence seems to confirm the idea that there a need to promote diffusion of ICT technologies in European service sectors.

To sum up, EU performance in terms of R&D intensity, ICT investment and quality of labour is relatively weak in many of the sectors considered. This evidence seems to suggest that there is room for improvement in the EU. Nonetheless the analysis of the evolution of these indicators over time reveals that the gap between EU and US has been reduced in the period 2001-2004 compared to the previous years 1996-2000 in most of the manufacturing sectors (8 out of 10 for the "quality of labour" indicator and 7 out of 11 for the ICT variable) and in some service sectors (7 out of 10 for the "quality of labour" indicator and 4 out of 11 for the ICT variable).

V.3.2 Innovation outputs and outcomes

The comparison of economy-wide aggregate data reveals a disappointing performance of EU sectors in terms of TFP growth. The gap EU/US is a relevant issue in manufacturing (10 out of 10 sectors) whereas the outcome for services highlights a very heterogeneous performance across sectors (there is a relatively slower rate of TFP growth in 6 out of 11 service sectors). Moreover, the differential in TFP is much higher than the comparable indicators (labour quality and ICT) on the innovative input side. This suggests that the knowledge existing and created within the EU is not easily translated into higher sustained economic growth. The broader difference with the US in terms of TFP suggests that there is room for market and institutional reforms aimed at increasing the diffusion of knowledge and the adoption of new technologies among European firms. Furthermore, the gap in TFP growth appears to be especially large in those manufacturing sectors with a higher technological content, i.e. sectors of "office machinery" (30), "electrical machinery" (31) and "radio, TV and communication equipment" (32) and in some services using ICT extensively, i.e., wholesale and retail trade and business services. A very different pattern over time distinguishes the evolution of TFP growth in manufacturing and services. Indeed, most manufacturing sectors (8 out of 10) have reduced their gap with the US in the period 2001-2004 compared to the previous years 1996-2000 while only 2 out of 11 sectors have witnessed a similar result.

Finally, patent data shows signs of underperformance in 3 out of 11 manufacturing sectors. Among these sectors, the poor performance of sector "office machinery" (30) confirms our previous finding in terms of R&D intensity and suggests therefore the existence of a fundamental weakness in the R&D-patent performance of this sector.

V.4 Identification of sectors with limited innovation

On the basis of the indicators used we tentatively distinguish three groups of sectors, namely sectors which do not show any indications of problems in terms of innovation , and sectors where there are indications of moderate (*) and serious (**) concerns related to their innovative process. A star is assigned to a sector which appear weak in at least either one input or output indicator compared to the benchmark adopted for that specific variable. Two stars are given to sectors with problems in both input and output indicators. A further qualitative evaluation of the results would contribute to a more precise identification of the different groups of sectors.

The overall picture indicates that Europe does not perform well in terms of innovation performance compared to the US. We find room for improvement both in terms of research – based on the analysis on R&D investments and patent applications – as well as in terms of technological usage, diffusion and translation into higher economic growth – based on the analysis of the growth accounting indicators. Moreover, this investigation has depicted the relative contribution of different innovation indicators to economic growth and knowledge creation in the EU and in the US.

Innovation problems are detected in all the selected sectors, with the exception of the furniture and recycling sectors, for which only limited data were available. In 11 out of the 23 selected sectors (6 manufacturing sectors and 5 services sectors), a combination of problems regarding innovation input and output can be found and in all the other sectors, there is at least some evidence of problems regarding input or output. Moreover, it is particularly

problematic that many of the sectors where there are clear indications of innovation problems are producer of ICT goods like office and computing machinery, electrical machinery and communication equipment. Moreover, the services sectors identified, such as wholesale and retail trade and business services, use ICT intensively.

4. OVERALL ASSESSMENT

This section aims at presenting the overall assessment of the potential causes of market malfunctioning in the EU based on the indicator analyses presented above. Table 7 below summarises the findings of the analysis across the four dimensions. Sectors are classified into three groups: those - marked with **- presenting indications of serious problems because several indicators point to this conclusion, those - marked with *- where the presumption of problems cannot be rejected because of at least one of the indicators considered and those where there is no evidence of problems on the basis of indicators used. Given the shortcomings of a horizontal analysis of this nature and the fact that at this stage the focus is still on sector level data and publicly available indicators, these findings should necessarily be taken as preliminary. Nonetheless, they offer useful information which complements the screening device carried out in the first stage of the market monitoring exercise. Thereby, the current analysis can be regarded as a robustness check of the screening results on two grounds.

First, it allows the identification of sectors that have been selected in the screening stage but which do not show signs of problems regarding regulation, integration, competition and innovation. In this case, the inclusion of these sectors in the selection could be questioned. However, this does not seem to be the case. Overall, the analysis of the causes of market malfunctioning confirms the selection made at the screening stage. All the sectors selected by the screening show signs of problems in at least one of the domains analysed. Moreover in 10 of these sectors there are indications of problems in all four domains (2/3 of these being services sectors).

Second, as the indicators used for this analysis have been computed for all the manufacturing and services sectors of the economy, it is also possible to check whether there are sectors which have not been selected in the screening stage but for which there are strong indications of problems in terms of regulation, integration, competition and innovation. On the basis of these indicators this seems to be the case for only two sectors, namely "coke, refined petroleum and nuclear fuel" and "air transport". The sector "coke, refined petroleum and nuclear fuel" (23) presents indications of serious problems of integration (low degree of market thickness and import penetration), competition (higher mark ups than US, high levels of concentration and low turbulence in the market) and innovation (lower R&D intensity, ICT investment, quality of labour and TFP growth than in the US). Regarding the sector "air transport" (62) there are some indications of problems with competition (higher mark-ups than the US and high levels of concentration relative to that of other services sectors) and innovation (lower TFP growth and ICT investment than in the US). In both sectors there are some indications of over-regulation of firms' activities in 2003 (the most recent year for which data are available). These findings should be further scrutinised on the basis of more recent, qualitative information. If the indications of problems are validated these two sectors could also benefit from closer market monitoring.[64]

[64] These sectors have not been selected in the screening stage because their direct contribution to growth and employment is not substantial and they did not appear to contribute significantly to the adjustment capacity of the European economy. Moreover no productivity growth gap with the US between 1995 and 2004 was observed for the sector of "cork, refined petroleum and nuclear fuel". By contrast, the "air transport" (62) show problems in terms of labour productivity, which is the economic indicator for market malfunctioning adopted for the first screening.

The analysis presented in this note can also be used to construct general and comprehensive hypotheses concerning the nature of market (mal)functioning from the supply-side point of view in specific sectors and to draw some tentative conclusions regarding the scope for policy intervention. Such hypotheses, which should be completed with additional information regarding demand-side issues to fully take consumer welfare considerations into account, would then serve as starting points for the analyses to be done in subsequent more in-depth market monitoring exercises.

Our analysis suggests that over regulation is a cross cutting affecting all but three of the sectors that have been scrutinised. This raises the question of to which extent many of the problems that we identify in these sectors in terms of integration, competition and innovation are driven by inadequate policy inputs. Thus the analysis of the impact of regulatory framework faced by firms in a given sector/market and the interactions of rules and regulations with market openness and cross border integration, competition environment and market-based incentives to innovate should be given centre stage in the subsequent in-depth market monitoring exercises.

The lack of innovation appears also to be associated with market malfunctioning in almost all of the sectors identified. The exceptions are the sector "furniture and other manufacturing activities" (36) and "recycling" (for which no data were available). Furthermore it is the domain where more indications of serious problems have been found: more specifically in 11 out of the 23 sectors. Many of these sectors producers of ICT goods like "office, accounting and competing machinery", "electrical machinery and apparatus", and "radio, TV and communication equipment", as well as ICT-intensive services sectors like "retail trade" and "other business sectors".

In contrast with innovation where indications of serious problems seem to be evenly distributed across manufacturing and services, the indications of serious problems related to lack of integration and insufficient competition seem to be relatively more concentrated in the services sectors. In particular, there are indications of weak integration and competition in electricity and gas, retail trade, transport, posts and telecommunications, financial services and business services[65].

[65] Notice, that before drawing any policy conclusions relating to "other business services" it is necessary to carry out more analyses at a more disaggregated level given the heterogeneity of the different activities that it includes.

Table 7 - Summary overview of the causes for market malfunctioning

SECTORS	POLICY ENVIRONMENT	MARKET PERFORMANCE		
	REGULATION	INTEGRATION	COMPETITION	INNOVATION
22 - Printing, publishing and reproduction	*	**	*	**
25 - Rubber and plastics	*	*	-	*
27 - Basic metals	*	-	**	**
28 - Fabricated metal	*	**	-	**
29 - Machinery	-	-	*	**
30 - Office, account. and computing machinery	-	*	*	**
31 - Electrical machinery and apparatus	*	*	-	**
32 - Radio, TV and comm. equipment	*	*	*	**
34 - Motor vehicles, trailers and semi- trailers	-	*	**	*
35 - Other transport equipment	*	**	*	*
36 - Furniture, other manufactured goods	*	-	*	-
37 - Recycling	*	n.a.	-	n.a.
E - Electricity, gas and water supply	**	**	**	*
50 - Sale, maint. And repair of motor vehicles	**	-	*	**
51 - Wholesale trade	**	-	*	**
52 - Retail trade	**	**	*	**
H - Hotels and restaurants	*	*	**	**
60 - Inland transport	**	-	*	*
63 - Supporting and aux. transport activities	**	*	**	*
64 - Post and telecommunications	*	-	**	*
65 - Financial intermediation	*	**	**	*
66 - Insurance and pension funding	*	**	*	*
74 - Other business activities	**	**	*	**

These findings broadly support the view that the emphasis put by Member States on reforms in the area of R&D and innovation as the right strategy. According to the MICREF database (see box 8) most of the reform measures enacted by Member States (30% of all implemented measures) in the recent past were in this area. Such measures refer mainly to the development of national research and innovation strategies and policies, increasing public R&D spending, enhancing the diffusion of technology and the use of ICT. However, given the remaining problems regarding integration and competition in services, it is somewhat disappointing that Members States have been much less active in the implementation of the reform measures in these areas (just 6% and 3% of the total number of measures respectively). The measures in the area of competition concerned reforms to increase the powers and means of competition

authorities, to better control state aids and to improve the regulation in specific sectors. With respect to market integration the reported measures relate mostly to the modernisation of public procurement, and the implementation of specific EU directives concerning the Internal Market.

Box 8: Summary description of MICREF database

The objective of the database on microeconomic reforms (MICREF), which has been developed by the Commission (DG ECFIN and JRC) in collaboration with Member States, is to help monitor and analyse the process of the implementation of structural reforms in product markets and thereby to improve the quality policy design and the surveillance of its impact across EU Member States.

MICREF organises and presents product market reform measures undertaken by the EU Member States in a systematic way with a set of descriptive features of the actions undertaken, while placing the initiatives described in the National Reform Programmes into the appropriate historical context. The main value added of MICREF in relation to other databases currently used to analyse microeconomic reforms is that it explores the qualitative dimension of the data as well as their dynamic nature.

The database is organised around three major economic dimensions: *i*) open and competitive markets; *ii*) business environment and entrepreneurship, and *iii*) knowledge-based economy. These dimensions correspond to 7 policy fields: market integration; competition policy; sector-specific regulation; start-up conditions; improving the (small) business environment; R&D and innovation; and education. The different policy actions are then classified according to each of the 7 policy fields.

The principal data source for MICREF are the reports on the implementation of the National Reform Programmes; additional information is drawn from international data sources and Commission reports in order to achieve a complete overview of the measures taken within each specific policy area.

This database will be made public in July 2008. At that time, it will include data for 2004-2006. Further work is currently being carried out to expand the data coverage to the reforms undertaken by the Member States since the launch of the Lisbon Strategy in 2000.

While the MICREF database focuses on the measures taken by the Member States it is not clear cut that this is the appropriate level of governance for policy intervention in all the sectors scrutinised. This depends on the characteristics of the sectors and on the nature of the problems that affecting the functioning of markets. Retail trade and network industries such as electricity and gas supply provide clear examples of two sectors that are affected by problems of similar nature (both are over regulated and show low levels of market integration) but for which the scope for policy intervention at the level of Member States and at the Community level varies significantly.

In retail trade the low level of integration and innovation are probably associated with the regulatory framework that often create barriers to the entry of new firms in the market and slow down the expansion of existing ones. Such regulations mainly target (i) *the location and availability of the service provision* (restrictions on type, size and location of stores, restricted and discriminatory opening hours, etc.); (ii) *advertising and marketing rules* (there are often limits on promotions, loyalty schemes, selling below cost, restrictions on specific products or advertising, etc.); and (iii) *labour market issues* (limited flexibility of employees, setting of minimum wages, etc). They vary widely across Member States and are very often introduced

by regional and even local authorities[66]. The scope for policy intervention at the Community level is therefore limited and such regulatory barriers can best be tackled by each Member State[67].

Network industries in the EU, such as the electricity and gas sector, are currently ongoing a transition phase from state-run national monopolistic markets to an EU-wide competitive market. Despite this liberalisation process, their singular economic features, i.e. the presence of an essential facility and the resulting issue of network access, warrant the continuing presence of sector-specific regulation. The introduction of effective competition can be pursued by measures taken at the Member State level (e.g. market opening or the degree of vertical unbundling) but it is also closely related to promoting access of energy suppliers to markets in neighbouring countries. This requires not only a sufficient level of cross-border interconnection, but also a set of common rules: measures that clearly require intervention at the EU level. Indeed, the "energy package" adopted by the Commission in September 2007 foresees a number of measures to enhance competition in the electricity and gas sectors, notably by strengthening the position of the regulatory authorities, improving cross-border coordination in order to create more integrated markets (for example through the creation of an agency for the cooperation of energy regulators) and providing for a sharper vertical separation between infrastructure management and supply activities.

Finally, it is also important to be aware that there is not necessarily scope for policy intervention in all sectors. In sectors like "printing, publishing and reproduction" (22) and "fabricated metal", there is limited scope for policy intervention to promote further integration as it is naturally determined to a large extent by the cultural and linguistic affinities/ differences and high transport costs respectively. By contrast, in other transport equipment, the home bias in public procurement may still play an important role, while in financial services, insurance and other business services the legal barriers to entry that were in place until recently may explain to a large extent the current situation. Regarding network industries we find indications that the remaining problems sectors are of diverse nature requiring different kinds of policy interventions. In the case of post and telecommunications, the problems seem to be closely related to insufficient competition pressure and therefore policy intervention should aim at reducing barriers to entry and at improving the consumers' access to information. In electricity, gas, the problems seem to be more closely associated with insufficient integration and therefore policy intervention may be more necessary to tackle inadequate investment in cross-border network infrastructure.

---

66 It should be nevertheless pointed out that some regulations (such as the Unfair Commercial Practices Directive) are necessary to guarantee informed choice and empowerment of consumers and are therefore beneficial to the functioning of markets.

67 A recent study by Viviano (2007) illustrates well this point using as an example the experience of two Italian regions Abruzzo and Marche. These two otherwise similar regions have opted for two different regulatory approaches in the retail sector: Abruzzo set tight restrictions on the opening of large stores, while Marche did not impose substantial entry regulations. The results show that in latter the share of retail trade in total employment increased by 0.8 percentage points more than in the former. Fiercer competition also, promoted innovation. The latter however can be further promoted with measures targeted for example at facilitating the uptake of ICT where the Community can play a complementary role to that of national authorities.

5. NEXT STEPS

To conclude it is important to set this exercise in the wider context of the market monitoring approach to policymaking that the Commission is promoting. Thereby this exercise, which will be complemented by a detailed analysis of demand-side issues that affect market functioning in the scrutinised sectors, will serve as a basis for a multi-annual programme of in-depth market monitoring exercises.

In this light the next steps are twofold: *i*) to start to the in-depth market monitoring exercises featuring some of the sectors that have been scrutinised thus far, and *ii*) to extend the screening and the analysis of the causes of market malfunctioning of the selected sectors to the level of each Member States. The Commission services have already started to implement in-depth market monitoring investigations in two sectors, namely retail trade and electrical machinery. The in-depth analysis of these sectors will be made in ad-hoc working groups which bring together staff from all the interested services. The final output of each ad-hoc working group is expected in the first half of 2009and will include a presentation of the policy implications of the findings.

The analysis made at the EU level may be complemented by similar exercises at the level of each Member State, involving a national screening and an analysis of the causes of market malfunctioning at the national level. The Commission services would like to work in close collaboration with the Member States in this area. A national screening would help Member States in identifying areas that create bottlenecks for national growth and adjustment. Moreover, from a Community perspective, it would be useful to investigate whether the problems affecting EU market functioning have a national dimension. This should not come unexpected since the industrial structure and the characteristics of sectors differ from one Member State to another. Finally, such an investigation would allow defining policy actions at the national level which can complement the actions eventually proposed by the Commission services on the basis of its own market monitoring exercise. This last point is particularly important given that has we argued earlier the burden of policy intervention can fall either on the Union or the Member States depending on the sectors and market that are being considered.

References

Ades, A.F. and E.L. Glaser (1999), "Evidence on Growth, Increasing Returns, and the Extent of the Market", *Quarterly Journal of Economics*, MIT Press, Vol. 114(3), pp. 1025-1045, August

Aghion, P. and R. Griffith (2006), *Competition and Growth*, MIT Press, Cambridge

Alesina, A., E. Spolaore and R. Wacziarg (2000), "Economic Integration and Political Disintegration", *American Economic Review*, Vol. 90(5), pp. 1276-1296, December

Arnold J., G. Nicoletti, and S. Scarpetta (2007), "Product Market Policies, Allocative Efficiency and Productivity: A Cross Country Analysis", *OECD unpublished research paper*

Bernard, A.B., J. Eaton, J.B. Jensen, Kortum, S. (2003) "Plants and Productivity in International Trade", *American Economic Review*, 93(4), pp. 1268-1290

Carlsson, B., Jacobsson, S., Holmén, M. and A. Rickne (2002), "Innovation Systems: Analytical and Methodological Issues", *Research Policy*, Vol. 31, 2002, pp. 233

Cincera, M. and O. Galgau (2005), "Impact of Market Entry and Exit on EU Productivity and Growth Performance", *European Economy Economic Papers* No. 222, European Commission, Brussels

Christopoulou and Vermeulen (2007), "Mark-ups in the Euro-area and the US over the Period 1981-2004: A Comparison of 50 Sectors", *European Central Bank Working Paper*, European Central Bank , Frankfurt

Clark (1940), "Towards a Concept of Workable Competition", *American Economic Review*, 30, 241

Conway, P., V. Janod and G. Nicoletti (2005) "Product Market Regulation in OECD Countries, 1998 to 2003", *OECD Economics Department Working Paper*, No 419, OECD, Paris

Conway, P. and G. Nicoletti (2006), "Product Market Regulation in the Non-manufacturing Sectors of OECD Countries: Measurement and Highlights", *OECD Economics Department Working Papers* No. 530, OECD, Paris

Dernis, H., D. Guellec and B. van Pottelsberghe (2001), "Using Patent Counts for Cross-country Comparisons of Technology Output", *STI Review* No. 27, OECD, Paris

Dierx A., F. Ilzkovitz, K. Sekkat, eds. (2004) *European Integration and the Functioning of Product Markets*, Edward Elgar

Dierx, A., F. Ilzkovitz and J.H. Schmidt (2007), "Competition, Regulatory Costs and Economic Growth", unpublished

Doms, M., T. Dunne, and M. J. Roberts (1995), "The Role of Technology Use in the Survival and Growth of Manufacturing Plants", *International Journal of Industrial Organization,* Vol. 13, pp. 523-542

Drejer, I. (2004), "Identifying Innovation in Surveys of Services: a Schumpeterian Perspective", *Research Policy*, Vol. 33, pp. 551-562

Edquist, C. (2001), "Innovation Policy - A Systemic Approach', in Lundvall, B. and D. Archibugi (Eds.), *Major Socio-Economic Trends and European Innovation Policy*, Oxford University Press, Oxford, 25 pp.

European Commission (2003). Chapter 2 - Drivers of Productivity Growth - An Economy-wide and Industrial Level Perspective. In: *The EU Economy: 2003 Review*, European Commission, Brussels

European Commission (2007a), "Guiding Principles for Product Markets and Sector Monitoring", *European Economy Occasional Papers* No.34, European Commission, Brussels

European Commission (2007b),"Implementing the New Methodology for Product Market and Sector Monitoring: Results of a First Sector Screening", *European Commission Staff Working Document*, European Commission, Brussels

European Commission (2007c), *Monitoring Industrial Research: Analysis of the 2006 EU Industrial R&D Investment Scoreboard*, European Commission, Luxembourg

Gilbert, R. J. and D.M.G. Newbery, (1982), "Pre-emptive Patenting and the Persistence of Monopoly", *American Economic Review,* Vol. 72, pp. 514-526

Griffith, R. and R. Harrison (2004), "The Link between Product Market Reform and Macro-economic Performance, *European Economy Economic Papers* No. 209, European Commission, Brussels

Griffith, R., R. Harrison and H. Simpson (2006), "The Link between Product Market Reform, Innovation and EU Macroeconomic Performance", *European Economy Economic Paper* No. 243, European Commission, Brussels

Griliches, Z. (1990), " Patent Statistics as Economic Indicators: A Survey", *Journal of Economic Literature*, Vol. 28, No. 4

Griliches, Z. (1979), "Issues in Assessing the Contribution of Research and Development to Productivity Growth", *Bell Journal of Economics,* Vol. 10, pp. 92-116

Harrison, A.E. (1994), "Productivity, Imperfect Competition and Trade Reform: Theory and Evidence", *Journal of International Economics*, 36, pp. 53-73

Hipp, C. and H. Grupp (2005), "Innovation in the Service Sector: The demand of Service-specific Innovation Measurement Concepts", *Research Policy*, Vol. 34, No. 4, 2005, 517-535

Hollanders, H. and A. Arundel (2005), *European Sector Innovation Scoreboards*, European Commission, Brussels

Howells, J. and B. Tether (2004), *Innovations in Services: Issues at Stake and Trends*, Centre for Research on Innovation and Competition, University of Manchester

Ilzkovitz, F., A. Dierx, V. Kovacs, and N. Sousa (2007), "Steps towards a Deeper Economic Integration: The Internal Market in the 21st Century", *European Economy Economic Papers* No.271, European Commission, Brussels

Jaffe, A. B. (1988), "Demand and Supply Influences in R&D Intensity and Productivity Growth", *Review of Economics and Statistics,* Vol. 70, pp. 431-437

Kanerva, M., H. Hollanders and A. Arundel (2006), "Can we Measure and Compare Innovation in Services", 2006 *TrendChart Report*

Knetter, M. and M. Slaughter (1999), "Measuring Product Market Integration", *NBER Working Paper No.* W6969

London Economics (2007), *Identification of Industrial Sectors with Weak Competition: Analysis of Causes and Impacts*, Report to the DG Enterprise and Industry of the European Commission

Malerba, F. (2002), "Sectoral Systems of Innovation and Production", *Research Policy*, Vol. 31, No. 2

Nås, S. O. (2007), "Measuring Innovation Processes", Paper presented at the 32nd CEIES Seminar *Innovation Indicators-More Than Technology?*, Århus 5-6 February 2006

Nicoletti, G., S. Scarpetta and O. Boylaud (2000), "Summary Indicators of Product Market Regulation with an Extension to Employment Protection Legislation", *OECD Economics Department Working Paper* No.226, Paris

Nicoletti, G. and S. Scarpetta (2003), "Regulation, Productivity and Growth: OECD Evidence", *Economic Policy* No.36, April

OECD (1997), *The OECD Report on Regulatory Reform: Synthesis*, OECD, Paris

OECD (2001), *Innovation and productivity in services*, OECD, Paris

OECD (2004), *Compendium of Patent Statistics*, OECD, Paris

OECD (2005a), *Promoting Innovation in Services*, OECD, Paris

OECD and EUROSTAT (2005b), "Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data", 3rd edition, OECD, Paris

OECD (2006), *Compendium of Patent Statistics*, OECD, Paris

Pavcnik, N. (2002), "Trade Liberalization, Exit and Productivity Improvements: Evidence from Chilean Plants", *Review of Economic Studies*, Vol.69, January 2002, pp. 245-76

Pavitt, K. (1984), "Sectoral Patterns of Technical Change: Towards a Taxonomy and a Theory", *Research Policy*, Vol. 13, 1984, pp. 343-373

Roeger, W. (1995), "Can Imperfect Competition Explain the Difference between Primal and Dual Productivity Measures? Estimates for US Manufacturing", *Journal of Political Economy*, 103, pp. 316-330.

Salter, A. and B.S. Tether (2006), "Innovation in Services- through the Looking glass of Innovation Studies", background paper for Advanced Institute of Management (AIM) Research's Grand Challenge on Service Science

Scarpetta, S., P. Hemmings, T. Tressel and J. Woo (2002), "The Role of Policy and Institutions for Productivity and Firm Dynamics: Evidence from Micro and Industry Data" *Economics Department Working Paper* No.15, OECD, Paris

Scherer, F. M. (1992),"Schumpeter and Plausible Capitalism", *Journal of Economic Literature,* Vol. 30, pp. 1416-1433)

Tether, B.S. and J. S. Metcalfe (2004), "Services and Systems of Innovation", in Malerba (eds.) *Sectoral Systems of Innovation: Concepts, Issues and Analyses of Six Major Sectors in Europe*, Cambridge University Press, Cambridge

Tybout, J.R. (2003), "Plant and Firm-Level Evidence on "New" Trade Theories", in J. Harrigan and K. Choi (eds.), *Handbook of International Trade*, New York, Blackwell Publishig, pp. 388-415

Veugelers, R. (2004), "Industrial Concentration, Market Integration and Efficiency in the European Union", in Dierx, Ilzkovitz and Sekkat (eds), *European integration and the functioning of product markets*, Edward Elgar, London

Viviano, E. (2007), "Entry Regulations and Labour Market Outcomes: Evidence from the Italian Retail Trade Sector", *Bank of Italy Economic Research Department*

ANNEX 1 - Main characteristics of sector selected in the screening stage

SECTORS	Contribution to total employment	Contribution to total value added	Productivity growth 1995-2004	Interlinkages (*)	ICT (**)	Economically important	Important for adjustment
22 - Printing, etc	1.0	1.0	14.3	F	U		X
25 - Rubber and plastics	0.8	1.0	32.3	F		X	
27 - Basic metals	0.5	0.7	28.9	F		X	
28 - Fabricated metal	1.9	1.8	19.3	F/I		X	
29 - Machinery	**1.7**	**2.1**	**25.1**	**B/I**	**U**	**X**	**X**
30 - Office, acc. .etc	0.1	0.1	64.2	I	P		X
31 - Electrical machinery	**0.8**	**0.9**	**24.7**	**I**	**P**	**X**	**X**
32 - Radio, TV, comm. eq.	**0.4**	**0.5**	**154.2**	**I**	**P**	**X**	**X**
34 - Motor vehicles	1.1	1.4	26.7	B/I		X	
35 - O. transport equip.	0.4	0.4	35.8	I	U		X
36 - Furniture,.	1.1	0.8	10.1	I	U		X
37 - Recycling				F	U		X
E – Elect., gas and water	0.7	2.2	52.9	F		X	
50 - Sale, … of motor veh.	2.2	1.7	7.2	B		X	
51 - Wholesale trade	**4.4**	**3.6**	**27.2**	**F/B**	**U**	**X**	**X**
52 - Retail trade	**8.5**	**4.3**	**14.6**	**F/B**	**U**	**X**	**X**
H - Hotels and restaurants	4.5	2.2	-1.3	B		X	
60 - Inland transport -	2.7	2.6	27.6	F		X	
63 – Supp. aux. transp. act.	1.3	1.8	-2.0	F		X	
64 - Post and telecom.	**1.4**	**2.4**	**121.1**	**F**	**P**	**X**	**X**
65 - Financial intermed.	**1.7**	**4.1**	**46.7**	**F**	**U**	**X**	**X**
66 - Insurance	**0.5**	**1.0**	**-13.4**	**B**	**U**	**X**	**X**
74 - O. business activities	**8.8**	**7.0**	**-7.7**	**F**	**U**	**X**	**X**
Total contribution	46.0	44.0					

(*)"B" stands for backward interlinkages, "F" for forward interlinkages and "I" for investment.
(**) "P" stands for ICT - producing sector and "U" for ICT - using sectors.

ANNEX 2 - OECD Non - Manufacturing Regulation Indicators in 2003

<table>
<tr><th>SECTORS</th><th colspan="2">EU*</th><th colspan="2">US</th></tr>
<tr><td rowspan="2">Electricity, gas and water (E)</td><td colspan="2">Electricity: 1.6</td><td colspan="2">Electricity: 2.3</td></tr>
<tr><td colspan="2">Gas: 3.3</td><td colspan="2">Gas: 0.4</td></tr>
<tr><td>Wholesale and retail trade (50-51-52)</td><td colspan="2">2.5</td><td colspan="2">2.6</td></tr>
<tr><td rowspan="3">Transport and storage (60-61-62-63)</td><td colspan="2">Rail: 3.6</td><td colspan="2">Rail: 3.0</td></tr>
<tr><td colspan="2">Road: 1.8</td><td colspan="2">Road: 0.5</td></tr>
<tr><td colspan="2">Airlines: 2.2</td><td colspan="2">Airlines: 0</td></tr>
<tr><td rowspan="2">Post and telecommunications (64)</td><td colspan="2">Post: 2.9</td><td colspan="2">Post: 3.7</td></tr>
<tr><td colspan="2">Telecoms: 1.4</td><td colspan="2">Telecoms: 0.2</td></tr>
<tr><td rowspan="4">Renting of machinery and equipment and other business activities (71-72-73-74)</td><td rowspan="4">2.2</td><td>Accounting: 2.4</td><td rowspan="4">1.8</td><td>Accounting: 1.7</td></tr>
<tr><td>Architect: 1.8</td><td>Architect:1.7</td></tr>
<tr><td>Engineer: 1.6</td><td>Engineer: 1.9</td></tr>
<tr><td>Legal: 2.8</td><td>Legal: 1.8</td></tr>
<tr><td colspan="5">This indicator is constructed on the basis of the same methodology as the economy-wide indicators for product market regulation: higher values mean that more restrictions are imposed on competition in the sector. It is bound between 0 and 6. For more detailed information regarding the methodology for the computation of these indicators see Conway and Nicoletti (2006), "Product market regulation in the non-manufacturing sectors of OECD countries: Measurement and highlights", OECD Economics Department Working Papers No. 530.

* The EU average covers only 19 OECD Members (FR, UK, DE, NL, BE, DK, SE, IE, IT, GR, ES, PT, LU, FI, AT, CZ, HU, PL, SK) and use the US as a benchmark.</td></tr>
</table>