



**DIRECTORATE FOR FINANCIAL AND ENTERPRISE AFFAIRS
COMPETITION COMMITTEE**

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RELATIONSHIP BETWEEN COMPETITION POLICY AND ECONOMIC PERFORMANCE

-- Note by the Secretariat --

This note is submitted by the Secretariat to the Competition Committee FOR DISCUSSION at its forthcoming meeting to be held on 21-22 February 2007. The Annex describing the competition law indicator used to test the connection between competition policy and performance, and the results obtained using it will be circulated separately before the meeting under DAF/COMP(2007)2/ANN1.

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COMPETITION POLICY AND ECONOMIC PERFORMANCE

1. Differences in the degree and nature of competitive pressure in OECD economies could explain some of the variation in their economic performance. Regulatory policies that increase, rather than suppress, the role of competitive forces can raise output per capita by encouraging investment, improving productivity and increasing employment. Experiences of OECD Members show how systematic reforms to promote market competition create resilient, adaptable economies that grow faster and create more jobs. Long-term patterns show that liberalising regulation correlates with faster productivity growth, because constraints on competition slow down the processes of adjustment and adoption of new technologies.

2. As background for the presentations and discussion at the February 2007 Competition Committee meeting, this paper describes the evidence about the links between competition and reforms and measures of an economy's performance. It collects and synthesises the principal results from a decade of OECD research work showing how competition and regulation affect output, productivity, employment, trade and innovation. It reviews contemporary theories about the complex relationships between competition and productivity, considered to be a key driver of growth. Differences in the Members' approaches to competition law and enforcement, as measured by an indicator derived largely from data in Competition Committee reports, are correlated with their performance experiences. Competition promotes efficiency, but the connections with performance may depend on other features of the economic setting and the effectiveness of other institutions that support markets.

3. Understanding more clearly how competition affects an economy's performance could give competition agencies guidance and support in setting their priorities, evaluating their actions and explaining their work to the public. It would help them decide whether they are doing the right things, pursuing objectives and actions that are consistent with goals of economic policy. It would help them determine whether they are doing their work effectively, that is, whether outcomes are consistent with objectives and goals and with the appropriate allocation of their resources. Understanding the links between competition policy and economic performance could help agencies evaluate their strategies and perhaps even some of their enforcement and advocacy interventions. Demonstrating the links will help agencies show the public that what they do makes a difference, in terms that are persuasive outside the community of policy specialists. Neutral observers may "decline to assume as a matter of theory, or accept as an article of faith, that the enforcement of a competition law yields socially useful results. An *a priori* presumption of efficacy is a weak substitute for a systematic assessment of outcomes." (OECD, 2005, p. 19)

4. Economic literature about large-scale effects of competition is more theoretical than empirical. Familiar theory explains how stronger competition should improve performance through welfare gains and efficiency incentives. "The view that competition and entry should promote efficiency and prosperity has now become a common wisdom worldwide." (Aghion and Griffith, 2005, p. 1) This common wisdom is supported by general observations about the characteristics of successful economies. Economists trying to understand why some nations are economically successful have pointed out how impediments to competition also impede innovation, growth and prosperity. (Baker, 2003) Detailed comparisons of industry-level experiences show how differences in productivity between countries can be explained by differences in the strength of product market competition. (Lewis, 2004)

5. The most general propositions about competition and performance have been tested empirically only with measures based on survey responses or legal formalities. Rather than try to examine competition directly, general studies often deal instead with the effects of regulations that restrain competition, while case studies about the effects of competition or competition law enforcement focus on the markets at issue. The US Antitrust Modernisation Commission considered sponsoring a rigorous empirical study of the economic effects of antitrust enforcement, but did not pursue it because of other responsibilities. The European Commission, noting that the overall impact of competition policy has been the subject of very little research, has begun a project to develop a methodology for measuring the effectiveness of competition agency actions, acknowledging that evaluation in terms of performance effects would be difficult and contentious.

1. Concepts, theories and perspectives about competition and economic performance

6. The two core elements of competition policy are the general laws about competitive interactions in markets and the sectoral regulations of competitive conditions in particular markets. Closely related laws and policies also directly affect how markets work. International trade liberalisation and market openness are potentially key facilitators of pro-competitive entry into markets, and studies of differences in competitive pressure often focus specifically on these factors. Other complementary laws and policies, such as those about consumer protection, unfair competition, deceptive marketing practices and public procurement, have received less direct attention. The effects of laws and policies that constrain, or at least complicate, competitive markets have been studied more often. Direct government control of price, output and entry is becoming less common among OECD Members, except for natural monopoly regulation to curb market power. But subsidies, public ownership and other forms of policy intervention or pressure can also distort market conduct and outcomes. Many studies, particularly those done by the OECD, treat changes in policies about ownership, subsidies and regulation as equivalent to changes in market competition.

7. Framework laws and policies that affect the mobility of resources may be important catalysts. Commercial law contract enforcement is the foundation for market exchange, as well as the formal setting for many common controversies about restrictions on competition. Regulations of financial services and securities markets support investment liquidity that in turn facilitates market entry and exit. Bankruptcy principles and processes establish the conditions for reorganising assets that have not succeeded in the competitive contest. Intellectual property protection helps determine how competitive markets affect innovation, since the ability to appropriate the benefits of innovation should increase the incentive to engage in it. Qualities of such framework institutions and confidence in the competence and integrity of public institutions generally may be the most important explanatory factors in studies about the effects of competitive markets on economic performance, particularly concerning less developed economies.

8. Different conceptions of competition and of the goals of competition policy could have different implications about its effects on economic performance. Competition is usually described in terms of rivalry – or, from the perspective of the customer, of choice. The principal policy goal of competition is efficiency. The link between competition and the efficiency norm is so strong that some commentators treat the terms as equivalent, by defining an increase in competition as a change that raises the output of more efficient firms (Vickers, 1995), or arguing that any move that improves efficiency, regardless of its effect on rivalry, should be considered pro-competitive. (Bork, 1977) Norms of opportunity, freedom of entry and fairness are often associated with the social value of competition, though, and related claims about fair treatment, non-discrimination and bargaining power are important themes in competition policy debate. These can lead to tensions with the efficiency goal. In some settings, these process-oriented norms might be consistent with the outcome-based norm of efficiency, but in other settings they might diverge. (Fox, 1981)

9. The relevance of different measures of competition and performance could depend on the policy conception. Simple models of rivalry use concentration to measure competition, with indicators derived from the number and relative size of the rivals. Competition as rivalry might be measured better in dynamic terms, by changes in market shares or by patterns of entry and exit. To measure competition conceived in terms of efficiency, the usual indicator is the level of rents or margins. Common measures of economic performance, in terms of output, growth and productivity, are consistent with a competition policy goal of output-maximising efficiency. Other performance measures could also be important, though. Reducing unjustifiably high prices is sometimes considered to be a goal or effect of competition, so overall effects on price levels and trends could be relevant. Employment and wage effects are also important to the political economy of competition policy, since concerns about short-term adverse effects on individuals could undermine support for changes that promise long-term benefits to others.

1.1 Theories linking competition to performance

10. Familiar economic theories explain the benefits of competition in terms of allocative, productive and dynamic efficiencies. A traditional estimate of the benefit of competition is the loss that would result from the lack of competition, when market power distorts the allocation of resources by raising prices above competitive levels. Estimates of this deadweight loss to society have varied widely, from as low as .1% of output to as high as 11%. (Hines, 1999; Davies-Majumdar, 2002; Kwoka, 2003) Higher estimates of static welfare losses may include not only the “Harberger triangle” of deadweight loss, but also the reduction in consumer surplus or the costs of producers’ rent-seeking, which could be much larger.

11. Most analyses now focus on productive and dynamic efficiencies, which could raise productivity and hence increase output. (Ahn, 2002; Nicoletti and Scarpetta, 2003) Three avenues to greater productivity can be distinguished:

- Efficiency: using current inputs with less slack;
- Improvement: adopting better available technology for using those inputs; and
- Innovation: developing and implementing new technologies and products.

12. Theory shows how competition would encourage productive efficiency through information, incentive and insecurity. Competition should reveal information and push prices toward costs. In auction theory, increasing the number of bidders makes the price converge to the actual value. In oligopoly theory, increasing the number of producers makes prices move toward marginal cost. (Vickers, 1995) Competition makes it more profitable to be more efficient, since in a more competitive environment, where price elasticity of demand is higher, a small cut in price can lead to large gain in market share. Conversely, competition makes inefficiency more risky, since share can be lost as easily as it can be gained. If competition threatens the survival of the firm, managers work harder to avoid bankruptcy. (Ahn, 2002) Competition creates opportunities for comparing performance, enabling owners or the market to check up on managers; that is, competition could improve efficiency in firms whose managers otherwise might not care about it. (Aghion and Griffith, 2005)

13. But generalisation from theory is risky, for theoretical predictions of the effects of greater competition on incentives for efficiency are often “subtle and ambiguous”. (Vickers, 1995) Depending on the setting of the model, competition would improve efficiency in many, but not all, circumstances. (OECD, 2002) The marginal effect of more elastic demand could be smaller than the aggregate effect of having a large market share to begin with, so a monopolist might have even more to gain from greater efficiency. If fixed costs must be taken into account, pressure toward marginal cost pricing in oligopoly prevents achieving scale economies, so average prices rise: there is “too much entry”, implying that more competition, though good for allocative efficiency, is bad for productive efficiency. But the models

reaching this result assume that all firms have the same costs, and thus they assume away the possibility of sorting firms in terms of efficiency. If the models permit entry and relative efficiency determines which firms produce, theory shows that more competition (that is, more firms in the market) could improve productive efficiency overall. In some models of principal-agent incentives, competition would reduce managerial slack if costs are correlated (for example, if all firms face the same exogenous shocks), but changing some parameters can reverse these incentive effects. (Vickers, 1995)

14. Competition could encourage fundamental innovation in technologies, products and services. The traditional argument was to the contrary, though: that tough competition would inhibit innovation and hence slow growth. Contemporary theories and studies show that the relationship between competition and innovation is not so simple, and that it would be sensitive to differences in market conditions. One element of the traditional “Schumpeterian” argument is that a firm invests in innovation because it expects to get market power from it, but competition would eliminate that post-innovation reward. Another element is that a firm needs rents from market power to pay for innovation where capital markets are imperfect or cannot cope with the uncertainty, but competition dissipates those pre-innovation rents. Theoretical models compare the strengths of potentially competing effects and incentives: “rent dissipation” that would reduce available resources, the “improvement” incentive to get closer to best practice by investing in available technology, and the “challenge” effect, of the incentive among firms engaged in “neck and neck” competition to transcend the technology frontier in order to “escape competition” and reap the reward of post-innovation rents. The anticipated profit from innovation to escape competition could outweigh the expected losses from rent dissipation. Which effect would dominate in a sector depends on the technological distance between firms in the sector; which effect would dominate in an economy depends on the distribution of technological characteristics across sectors. Theory predicts that increasing competition leads to more innovation where firms are close to the frontier, to less innovation where firms are farther away, and on average to a wider gap between incumbents and the frontier. Combined, these effects would lead to an inverted-U curve relating competition and innovation, with less innovation at both the highest and lowest levels of competitive intensity. (Aghion and Griffith, 2005)

15. A general observation from experience may be as useful as theoretical modelling of firm-level conduct. In the face of strong competition, more efficient firms should gain more of the market while less efficient firms are more likely to exit; each effect would improve productivity overall. “Perhaps competition works not by forcing efficiency on individual firms but by letting many flowers bloom and ensuring that only the best survive. ... If there are lots of ways of doing things, competition allows many to be tried and then selects the best, something a monopoly finds hard to replicate.” (Nickell, 1996, p. 741)

1.2 Perspectives in studies of links to performance

16. Three links with performance could be distinguished: with competition in markets, with policies that promote market competition and with competition law and enforcement. Few empirical studies tackle the basic question, how market competition affects performance, because competition is hard to measure directly.

17. Concentration and price-cost margins, the most common indicators, are ambiguous at best. High concentration can be consistent not only with efficiency but also with contestability and thus competitive discipline. (Ahn, 2002, p. 13; Sutton, 1991) High profits could reward superior efficiency, while low profits could reflect non-competitive slacking.¹ Neither of these conventional measures captures the

¹ Data constructed to compare mark-ups in some Member economies illustrate the ambiguity of this measure of competition. (Høj, 2007) Some countries where mark-ups look lower have had weaker competition policies and lower growth rates; that is, those low margins could result, not from competitive pressure keeping prices down, but from non-competitive inefficiency permitting costs to rise. Because of the

significance or intensity of “network” competition. Where firms are in competition for a market, market share and mark-ups may not mean the same thing as they would when applied to competition within a market.² Computing either of these conventional measures accurately requires data that is not realistically available, either about the definitions of markets that are needed to measure concentration or about the marginal costs that are needed to measure economic profits. Studies use imperfect substitutes such as census industry classifications for markets or accounting data for profits.³

18. Dynamic measures based on patterns of entry, exit and expansion could relate more directly to the benefits expected from stronger competition. Changes in the relative positions of firms in an industry could indicate strong inter-firm rivalry or differences in efficiency. Wide differences in productivity in an industry could be signs that competitive pressure there is low. But high dispersion could mean either that the sector is not competitive, permitting inefficient firms to survive, or that some firms in it are unusually innovative, seizing opportunities to move ahead. To resolve the ambiguity requires examining whether the differences persist and how they relate to changes in market shares. (OFT, 2004; OFT, 2007) Measuring variations in market shares or comparing firms that coexist within a market require defining that market, though, as well as estimating shares and profitability at the firm level. Data demands for these dynamic measures are thus at least as high as for traditional static measures.

19. Because measurements of the level of competition are so uncertain, there are virtually no direct studies of how objectively-measured competition affects performance. Instead, most published studies assess the intensity of competition from subjective opinion surveys, asking managers how strong their competition is or how many competitors they face. (Stewart, 1990; Blanchflower and Machin, 1996; Nickell, 1996; Dutz and Hayri, 2000; Carlin, 2001; Krakowski, 2005) The survey approach avoids the problem of defining markets and even of defining competition itself: the market and the nature of the competition in it are whatever the responders think they are. Perceptions about competition may have explanatory power, to the extent that managers’ perceptions and convictions about their situations guide their firms’ strategic decisions.

method used these computations could not be done for different points in time, and because of limitations on the data needed to estimate margin levels only half of the OECD Members were included.

² A novel proposal for a profit-based measure of competition, based on the elasticity of profit with respect to efficiency, implies that fewer firms will survive more intense competition; thus, this measure motivated by efficiency could contradict other measures of rivalry. (Boone, 2004) Indeed, it may contradict measures motivated by efficiency too. A study applying four measures – relative profits, concentration (HHI) and two different estimates of mark-ups – to firm-level data for the Netherlands showed that they were often inconsistent with each other, both in the aggregate and at the industry level. (Creusen et al., 2006) Over the period studied (1993-2001), most of the measures point to a slight decline in competition in the aggregate, with sharp changes in some sectors where operations shifted toward industries with lower levels of competition. Policy reforms over this period in the Netherlands should have increased competitive pressure, but strong growth in demand may have permitted firms to be less aggressive. (Creusen et al., 2006a)

³ Measures based on price alone are sometimes used, on the assumption that this half of the margin computation is sufficient. Thus, (Hylton, 2006) uses PPP level as a proxy for the Lerner index to measure the intensity of competition in different countries. Intensity of competitive pressure is sometimes assessed by comparing price levels to their expected relationship to wealth, that is, by deviation from a fitted line relating PPP to per capita GDP. (OECD, 2004) And (Rodriguez, 2006) uses the ratio between producer and consumer prices as an indicator of competition-induced improvements in productivity. Structural measures of aggregate concentration would not reveal much about competition in markets, but might support inferences about political-economy dynamics such as propensity to oligarchy or state enterprise. (Mitton, 2006)

20. OECD research has concentrated on the intermediate question, of how pro-competitive policies and regulations affect performance, to show the empirical connection between strong competition in markets for goods and services and better productivity and employment outcomes. In 1997, the foundation paper for the project on regulatory reform derived economy-wide effects of reforms to increase competition in the key sectors of electricity, telecoms, airlines, road transport and distribution. This report examined how prices, output, employment and productivity in those sectors responded to regulatory reforms and estimated improvements in productivity and other aspects of sectoral performance that would follow from moving to best-practice regulation. To calculate the resulting effects on GDP, unemployment, employment, real wages, inflation and price levels in the largest OECD economies the report added up the effects in individual sectors and also tested interactions in an input-output system and a macroeconomic model. (OECD, 1997) Several papers in this series infer the effects of competition on performance through multiple regression analysis, using indicators that were developed to measure the quality of regulation.⁴ In 2003, an important paper was issued showing how competition and private ownership, as proxied by these indicators of regulation, affect growth in multi-factor productivity. (Nicoletti and Scarpetta, 2003) Recently, OECD Economic Surveys of Member economies have documented the progress and effects of comprehensive reform programs, some of them dating from the 1980s and others more recent. Between 2003 and 2005, most of these Surveys included a special chapter examining conditions of product market competition in general and in key sectors such as retailing, services and network utilities.⁵ Another set of papers updating and applying the indicators of regulation appeared in late 2005 and 2006.

⁴ The OECD has created three sets of indicators about product market regulation: (1) product market regulation (PMR), covering many subject areas for all OECD countries, for 1998 and 2003; (2) service sectors, covering professional services (based on an EU survey, expanded to the rest of the OECD members, for 1996 and 2003), retail (derived from the PMR data, for 1998 and 2003) and banking (entry control and government ownership, created for an ECO paper in 2005) for most OECD countries; and (3) regulatory reform (REGREF), covering sectors where economic regulation and reforms have concentrated (airlines, telecoms, electricity, gas, post, rail, road freight), annually for the period 1975-2003 for 22 OECD countries. The REGREF and PMR indicators are correlated at the two points where they coincide (0.81 in 1998, 0.69 in 2003), so the papers sometimes use the REGREF indicator as a proxy measure of overall regulation for time-series analysis. In addition, an indicator has recently been developed to measure the secondary impact of sectoral regulations, based on the shares of the outputs of regulated non-manufacturing sectors in the intermediate inputs of other sectors, including manufacturing. (Conway and Nicoletti, 2006)

⁵ Special chapters on competition have been prepared for recent Economic Surveys of Australia, Austria, Canada, Denmark, Euro area, Finland, France, Germany, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Slovak Republic, Sweden, Switzerland, United Kingdom and United States. A summary of the evidence and policy lessons from this series of special chapters will be issued as a working paper. The paper will show how regulation affects the strength of competition principally in service and utility sectors. Mark-ups in these sectors are lower where regulations appear more conducive to competition. Mark-ups in manufacturing are less affected by differences in these indicators, although the degree of state control and economic regulation appear to be significant factors even in manufacturing. The results do not directly connect competition with performance, but they support the assumption underlying the overall research program by showing how the indicators about regulation have an impact on a common measure of competition. (Høj, 2007)

Box 1. Latest OECD Research on Regulation, Competition and Economic Performance

Product Market Regulation in OECD Countries: 1998-2003 (Conway *et al.*, 2005)

The original 1998 set of regulatory indicators, designed to measure how policies promote or inhibit competition, is updated and refined and then applied to analyse trends in product market regulation in OECD countries between 1998 and 2003. A randomising method tests whether the summary indicators are sensitive to the weights assigned to the subcomponents, producing confidence intervals that define groupings of broadly similar regimes. The paper confirms that competition improves economic performance. It finds that, between 1998 and 2003:

- Regulatory impediments to competition have declined;
- Regulation has become more homogeneous; and
- The most competition-friendly regimes are the most consistent.

Regulation and Economic Performance: Product Market Reforms and Productivity in the OECD (Nicoletti and Scarpetta, 2005)

To assess how reforms in product markets could reduce the labour productivity gap, which is a key component of cross-country differences in GDP per capita, the theoretical literature and previous empirical work are collected and reviewed. Those earlier results are used to gauge the likely effect of further reforms on investment (domestic and foreign) and on multi-factor productivity. The focus is on the effects of policies aimed at strengthening private governance and opening up access to markets where competition is economically viable. The paper calculates that these improvements in regulation would:

- Increase investment by 2-3 percentage points;
- Increase foreign direct investment by 20% overall, and up to 80% in some countries; and
- Reduce the (multi-factor) productivity gap with high-productivity countries by 4-10%.

Product Market Reforms and Employment (Nicoletti and Scarpetta, 2005b)

Employment effects of reforms aimed at increasing competitive pressures and easing government controls are estimated in a sample of OECD countries over the past two decades. Cluster analysis of aspects of labour and product market regulations reveals four patterns: liberal in both product and labour markets (most of the common law countries); relatively restrictive in both product markets and employment protection (most of continental Europe and Japan); restrictive product market regulations but more liberal labour rules (Ireland, Switzerland and for some purposes Japan), and restrictive rules about all (southern Europe including France). The paper finds that:

- Regulations that restrict competition reduce employment rates;
- Insider bargaining power increases this effect – that is, rent sharing depresses employment;
- Employment could increase 2.5-5 points after a shift to pro-competitive regulatory policies; and
- Sequencing of reform could be a challenge, since employment gains would be greater, but harder to achieve, where regulations are most restrictive.

The benefits of liberalising product markets and reducing barriers to international trade and investment in the OECD (OECD, 2005)

Improvements in GDP and productivity from adopting a package of reforms related to trade liberalisation – tariffs, constraints on foreign investment and regulation affecting inward trade – are computed by applying coefficients derived in previous regression studies. A general equilibrium model of foreign trade is used as a check.

The paper finds that reforms affecting trade could lead to gains in GDP per capita of up to 4-5 percent. Different methods yield different estimates of the gains from reforms that encourage competition through trade liberalisation:

- Direct test: 4.7% gain in GDP per capita;
- Linked through effect on productivity: 2.7% gain in GDP per capita;
- General equilibrium model: 1.9% gain in GDP per capita.

Regulation, Competition and Productivity Convergence (Conway *et al.*, 2006)

Regression analysis examines channels through which more competitive regulation could affect productivity, particularly the diffusion and adoption of information and communications technology and location decisions by multinational firms. To test the effect of regulation on catch-up to best practice, a model of labour productivity is estimated for the business sector as a whole and at sectoral levels. Labour productivity growth in this model depends on the ability to keep pace with growth in the productivity leader, by innovating or by technology transfer.

- Anti-competitive regulation slows productivity growth in sectors where information and communications technologies are particularly important;
- Anti-competitive regulation slows down the process of catching up to the productivity leader;
- Rates of investment in information and communications technologies are several percentage points above average in the US, UK, Canada and Australia because of their competition-friendly regulations; by contrast, constraints on competition lead to ICT investment rates well below average for Greece, Italy, Portugal and France.

21. The third question is even more difficult to address empirically. Competition law enforcement “works at the margins of conduct, often presents difficult counterfactuals, and in any case has effects easily swamped by other forces,” making it hard to develop models and data. (Kwoka, 2003) The economic literature contains little systematic analysis of overall effects. Cross-country comparisons are impaired by the difficulty of quantifying differences in laws and policies and differences in the structure and effectiveness of enforcement institutions.

22. Most efforts to measure and compare laws rely on inputs, not outputs. (Nicholson, 2004) For example, (Hylton, 2006) constructs an indicator from the substantive coverage and remedies set out in the texts of statutes, while (Rodriguez, 2006) uses simply the fact, and date, of enactment of a general competition law. Tests for whether the law is actually being applied effectively typically rely on opinion surveys, such as asking executives or third party experts whether antimonopoly policy is effective.⁶ (Dutz and Hayri, 2000; Dutz and Vagliasindi, 2000) A recent study using the World Economic Forum survey responses implies that competition law at least affects the degree of competition, to the extent that is measured by concentration. (Mitton, 2006) This work finds that concentration is higher in countries with higher entry costs for new firms, weaker competition laws, less control of corruption, weaker rule of law and more burdensome regulation.

⁶ One commonly used survey, from the World Economic Forum, sometimes reports that competition policy is perceived to be effective in countries that have no competition laws or enforcement institutions. Perhaps other policies there have similar effects, or perhaps the responders are indiscriminating. The WEF survey of perceived effectiveness correlates with the existence of laws, though, so these odd data points can probably be disregarded, at least for some purposes. (Krakowski, 2005)

23. Some indicator constructions have tried to combine formal detail with a measure of effectiveness. In (Voigt, 2006), the independence of the enforcement body is assumed to be a proxy for its effectiveness. In addition to indicators for the existence and quality of a competition law and for reliance on economic principle in applying it, this paper develops two indicators about the independence of the enforcement agency, one of them dealing with formal and legal guarantees of independence and the other with experiences that would affect whether the agency has been independent in fact. In this indicator, the assessment of the substantive law counts the number of explicit items, and thus it misses key distinctions between horizontal and vertical restrictive agreements, while counting some aspects of abuse of dominance several times. The substantive indicator's critical treatment of *per se* rules rejects the insight that properly targeted *per se* rules could lead to more effective application of the law than laborious rule-of-reason analysis of every case. Considering all distractions from standard antitrust issues to be weaknesses, while treating all types of economic novelty as strengths, this aspect of the indicator rejects the synergy between competition policy and consumer protection by treating that too as a weakness, while it favours controversial policy prescriptions about conglomerate mergers and economic dependence. The data used to indicate independence, which are evidently based on general assumptions about government organisation, miss some features that matter in competition law; notably, they did not identify some jurisdictions where peer reviews in the Competition Committee have expressed concerns about the enforcer's independence.

24. The indicator of competition policy that has been developed for the OECD's indicators about product market regulation also incorporates some data about effectiveness. (Høj, 2007) Most of this indicator is built from elements representing institutions, laws and enforcement. One element in this mix is the highest financial sanction that has been imposed against hard-core horizontal price fixing. As a measure of the agency's capacity to achieve results and of its power to deter hard-core violations, actual outcomes should be better than the text of the law on the books. In addition to general competition law and enforcement, this indicator covers sector regulation of network monopolies, which accounts for 25% of the indicator's value. The values of the competition policy indicator constructed for 2003 correlate with several aspects of the other regulation indicators. Where the regulation indicators show that state control of business enterprises and legal and administrative barriers to entry in competitive markets are low, competition laws and policies also look stronger. The 2003 indicator results show that competition laws and policies of OECD Members are broadly consistent: on a scale from 0 to 6, all lie between 1 and 3. The values suggest three groupings. Those with the scores indicating stronger competition laws and enforcement were the United States, European Union,⁷ Czech Republic, Korea, Australia, Canada, United Kingdom and Italy. Those at the other end of the scale were Turkey, Portugal, Mexico Japan, Spain, Norway, Austria, Belgium, Greece and Switzerland. The indicators for the Members in the middle were not statistically distinguishable from either the better scoring group or the other, though.

25. Another competition law indicator is used here to test the connection between competition policy and performance. The construction of this indicator and the results obtained using it are described in more detail in an annex to this paper. The first step was to select aspects of competition laws and enforcement regimes that were considered particularly likely to distinguish different approaches. The resulting 11 data series were refined further through cluster analysis. The elements of the resulting indicator do not include all important aspects of competition policy; rather, the indicator emphasises features that vary and thus focuses on how variation in approach could affect performance.

26. Some supposedly empirical studies of the effects of competition law enforcement are more polemical than analytical. One prominent article claims to find little empirical evidence of consumer benefits or significant deterrence from competition law enforcement in the US, basing that conclusion on academic literature about famous monopoly cases in the early 20th century and three previously published

⁷ The random-weights test of sensitivity did not include the EU value, which is between that of the US and the Czech Republic.

studies showing limited effects after cartel prosecutions, as well as a regression analysis of merger enforcement decisions implying that enforcement mistakenly targets efficient transactions. (Crandall and Winston, 2003) Responses to this critique point out its focus on a handful of early and unusual restructuring cases, its biased selection from the large literature on the effects of cartels and cartel enforcement, and its discredited structuralist perspective about merger enforcement. (Werden, 2003) shows that the data in (Crandall and Winston, 2003) is much too aggregated to support its conclusions about merger enforcement, which in any event are based on antiquated notions about the relationship between concentration and profits, and points to cartel enforcement studies that document how collusion and bid rigging have increased prices by from 6.5% to over 36%. (Baker, 2003) reviews the historical record of successful enforcement actions, as well as comparisons of firm behaviour with and without antitrust pressure, and estimates that the overall benefits to consumers and to social welfare in the US, about one percent of output or \$100 billion annually, are much larger than the direct and indirect costs of antitrust enforcement, set at about \$1-2 billion.⁸ A recent examination of competition laws across the world concludes that they have produced no significant benefits. (Rodriguez, 2006) The basic regression model in this paper, however, finds that competition law is significantly correlated with price trends that indicate productivity improvements; to avoid that conclusion, the author instead highlights an alternative construction that assumes the competition law variable is inaccurate, in which the correlation loses statistical significance.

2. Effects on output and growth

27. Long-term performance trends among OECD Members show that the economies with superior growth records have relatively strong competition policies or have made significant reforms to improve competitive conditions in their markets. The US is often taken as the sustained-growth performance target, but growth of per capita GDP was even stronger in Australia, Ireland and Korea over the 20 year period 1980-2000. These four were the only Members whose growth was above average over both of the two decades 1980-1990 and 1990-2000. Each of these four long-term leaders was reducing barriers to entry and competition or strengthening competition policy and enforcement in this period. By contrast, where growth was below average for each of those decades – Germany, France, Italy, Belgium, Denmark, Greece and Switzerland – competition-based reforms were less ambitious.

⁸ Comparison of trends in economic growth and in US antitrust enforcement finds that the antitrust environment is likely to have had a positive impact on growth. (Slotte, 2004) The “Granger causality” method used in this paper does not try to quantify this relationship, though, but only to determine whether it is more likely to run in one direction than the other.

Box 2. Competition policy reforms

Australia

Slow growth in output and productivity and increasing inflation and unemployment prompted a major shift in economic policies beginning in the 1980s, including fiscal, monetary and labour market reforms. To stimulate competition, tariffs and industry support were cut and import controls were eliminated. Deregulation and restructuring of airlines and shipping began in the 1980s. In 1991 the traditional telecoms monopoly was replaced by duopoly in fixed service and three firms in mobile service, and the sector was opened up completely in 1997 (although the historical incumbent was not fully privatised nor subject to full vertical separation of functions). The National Competition Policy, agreed in 1995, led to a comprehensive review of state and national regulations to eliminate unjustified anti-competitive effects. Deadlines for review and reform were particularly important for energy and transport sectors that are state responsibilities. In electric power, from 1993-2003 states phased in separation of functions and opening of markets to retail competition, leading to an integrated market in the east. In natural gas, there is competition in open-access regimes now in most states. State-level reforms in rail include vertical separation, corporatisation and third-party access. Along with the National Competition Policy, in 1995 Australia consolidated enforcement of general laws about competition, consumer protection, procurement and access to essential facilities into a new, independent Australian Competition and Consumer Commission, whose new leadership adopted a vigorous enforcement posture.

Ireland

In the face of major economic crisis in the mid-1980s, Ireland discarded its traditional policies of protection and moved toward greater flexibility, foreign investment and trade. A turning point for the new consensus about economic policy was the 3 year wage agreement reached in 1987. Fiscal reforms improved the public balance sheet, and the public agency charged with rescuing domestic manufacturers was closed down. Liberalisation of airlines and road freight began in the 1980s. Public procurement was liberalised and most remaining state-owned commercial enterprises were privatised in the 1990s. The economy benefited from EU support funds and then from the EU Single Market Program, as Ireland's policy environment made it an attractive base for firms entering to compete in the larger European market. A general competition law was adopted in 1991, to replace the National Prices Commission, but there was no public enforcement authority until 1996, and enforcement is still slowed by the court-based process. Despite the improvements to date in flexibility, adaptability and efficiency, more needs to be done to increase competition in some network industries and sheltered sectors.

Korea

Following the second oil crisis and the recession of 1980, Korea began a long-term program of economic liberalisation and macroeconomic stabilisation to replace targeted credits, tax benefits, import protection and promotion of selected industries. Limits on foreign investment were reduced, banks were privatised, interest rates were deregulated and tariffs were cut. At the outset in 1981, Korea had replaced price control regulation with a comprehensive competition law; the Economic Planning Board was abolished and the enforcement agency, the Korea Fair Trade Commission, became formally independent in 1994. Reforms intensified following the financial crisis of 1997, further reducing trade barriers and liberalising restrictions on inward foreign investment. Regulatory reform priorities included repealing most exclusions from the competition law and eliminating or revising regulations that constrain competition and enterprise. Financial sector regulation was strengthened and consolidated in new institutions. In telecoms, reforms had begun in the 1990s, and the sector is now open to competition. In transport, rate controls were lifted in the 1990s and entry conditions have been eased. The electric power industry has been restructured, but open access and competition are being introduced more slowly.

Netherlands

The Netherlands made fundamental changes in fiscal, social and labour policies in the 1980s to overcome an extended economic slump attributed to the "Dutch disease". Some reforms of market-related policies also began then. By 1992 trucking was liberalised, and by 1993 shop opening hours and other services restraints were relaxed. Telecoms reforms began with corporatisation of the incumbent monopoly in 1989, followed by authorisation of

competitive entry into an increasing range of services; in 1997 a sector regulator was created and competition was opened for all voice telephony services. In 1994, the government announced a reform agenda to make regulation more cost-effective and expose government operations to the market, through a program of targeted incremental improvements. In electric power, although there had been some modest changes in 1989, the principal reform process began with 1998 legislation restructuring the industry and phasing in retail competition over a 10 year period. A completely revised general competition law came into force in 1998, along with a new enforcement agency. After a series of cases against construction cartels in 2003 showed that collusion would be punished severely, the enforcement agency became formally independent in 2005.

New Zealand

Major reforms of the mid-1980s included privatisation of state assets, revamped labour-market legislation and fundamental changes to fiscal and monetary policies. Competition-promoting reforms opened markets, ended price controls and reduced tariffs, subsidies and protected monopolies. Laws that curtailed competition in finance, transport, dairy products and petrol were repealed. The general competition law was overhauled in this process. The body whose previous function had been deciding about price controls was transformed in 1986 into a streamlined Commerce Commission to enforce the new law. After a decade of adjustment followed these widespread changes, as resources and employment shifted among sectors, some aspects of the reforms in labour and product markets were amended in the late 1990s.

UK

Along with major changes in labour, monetary and fiscal policies, the reforms that began in the early 1980s included privatisation in electricity, gas and telecoms in order to encourage market forces and enterprise. Monopolies were ended formally at an early stage (1982 for gas and telecoms, and 1990 for electric power), but industry structures remained non-competitive. Competition in these sectors developed in stages through the 1990s. In telecoms, a new regulator was set up in 1984 and licences were issued for cable TV and competing cellular networks, the duopoly approach was rejected in the early 1990s, accounting separation and price-cap regulation were applied to the still-dominant incumbent in the mid-1990s and in 2000 the local loop was unbundled. In gas, negotiated access and provision for privatisation were in place in the 1980s, by 1990 there was retail competition for large customers by 1995, structural vertical separation, and by the late 1990s, full retail competition. In electric power, structural separation and privatisation in 1990 were followed by creation of a pool-based market and then full retail liberalisation in the late 1990s. In gas and electric power, changes revealed market power risks that were addressed in new legislation in 2000-2001. Improvements in the general competition law and enforcement structure came later in the reform process, through legislation in 1998 (effective in 2000) and more comprehensive changes in the Enterprise Act 2003.

US

Basic changes in competition and regulatory policies began in the mid-1970s. Airline deregulation started in 1978 and was completed by 1983, removing economic controls on prices and entry. In other transport modes, rate and entry controls on interstate trucking were repealed in 1980 (and on within-state trucking, in 1994), along with most rate and service controls over rail freight. In the natural gas market, reforms that began in the late 1970s ended price controls and moved the industry toward a system based on regulated open-access pipeline transport. In telecoms, vertical separation of the traditional monopolist was ordered in 1982 and completed in 1984. This major restructuring resulted from antitrust enforcement; since then, 1996 legislation set a new regulatory framework governing the evolution of competition in this industry. In electric power, the principles for competition-based reform were set by legislation in 1992 and by federal regulatory order in 1996; reform has been pursued in different degrees by many states. Financial services were opened to larger-scale competition from 1980 to 1994, through steps such as letting banks offer higher interest rates and permitting inter-state operations. These sector-level reforms were accompanied by the emergence since the late 1970s of a new consensus for efficiency-based enforcement of the general competition laws. Merger control guided by economic analysis concentrated on large horizontal combinations, while Improvements in enforcement methods, such as the leniency program for uncovering cartels, produced very strong sanctions against price fixing and bid rigging.

28. Stronger competition increases output and growth. A clear correlation between effective competition policy and growth has been demonstrated in a regression analysis of the effects of a wide range of institutional and other determinants. (Dutz and Hayri, 2000) Using survey responses to measure effectiveness, this study finds that the perception that antitrust policy is effectively promoting competition in a country has a distinct, positive, statistically significant effect on its growth, which is separate from the effects of trade liberalisation, institutional quality and a favourable policy environment generally. Other survey-based studies report similar correlations: “the intensity of local competition seems to be strongly correlated with the standard of living, i.e., economies with high levels of competition are richer than economies with low levels of competition”. (Krakowski, 2005, p. 12) Other studies quantify the effect, showing that stronger competition could boost output by several percentage points. The OECD *Report on Regulatory Reform* in 1997 computed the performance consequences of adopting best-practice regulation to support competition for several OECD economies. (OECD, 1997) Adding together the effects of lower prices in the reformed sectors leads to GDP increases of up to .8% (in Japan), while including gains from innovation in the computation leads to increases of up to 1.7% (in France and Japan). Macroeconomic dynamic modelling shows much larger gains in the long-term, ranging from 0.9% in the US up to 5.6% in Japan and Spain. (OECD, 1997) A later study showed similar gains in output and growth following improvements in complementary policies, notably those affecting market openness and trade. Moving to best practice levels for tariffs, constraints on foreign investment and regulation affecting inward trade could increase per-capita GDP in some OECD countries by as much as 5%; on average, gains would be about 3% in each principal region of the OECD. (OECD, 2005a)⁹

29. Experience confirms the models. Reforms to boost competition have increased output and long-term growth. When Australia launched its ambitious National Competition Policy reform process in the mid-1990s, planners predicted long-term gains in GDP of up to 5.5%. An *ex post* study nearly 10 years later quantified the results of these and other major reforms. The Productivity Commission applied a well-established general equilibrium model of the Australian economy to show how performance had improved markedly since the early 1990s. Productivity improvements and price changes in six key infrastructure sectors alone, which were one principal objective of the National Competition Policy reforms, generated a permanent increase in GDP of 2.5%. Better multifactor productivity growth added the equivalent of an additional AUD 7000 (USD 5500) to the average household. (Productivity Commission, 2005) In Korea, reforms in policies about trade, investment and competition that began in the early 1980s led to annual growth rates of 8.5% during the 1980s and almost 7% between 1990 and 1997. In New Zealand, after a period of consolidation and adjustment to the fundamental reforms of the 1980s, growth over the last decade has averaged nearly 4% annually.

⁹ Three different approaches yield 3 different ranges of estimates. Direct test of trade-related reforms, using the PMR indicators, yields the highest estimate. The reform package could increase trade overall by 40% in the OECD area. Every country would gain, but many would gain more from reforms in their trading partners than from reforms in their own regulations. The largest contribution to the average improvement (3.1%) would be from reforming the relevant competition-limiting regulations. Testing the effect of reform on productivity is an alternative econometric approach. Product market reforms to reduce public ownership and ease entry barriers would increase multifactor productivity, which in turn would increase output by an average of 2.7%. Using the productivity improvements in a general equilibrium trade model, applied as a control, yields an average increase in export volume of 5.3%, and in GDP of 1.9%.

Box 3. Performance results

Australia

Gross domestic product (GDP) growth since the turn of the millennium has averaged above 3% per annum and, including the terms-of-trade gains, growth in real gross domestic income has averaged over 4%, among the handful of OECD countries achieving such rapid growth; the unemployment rate has fallen to around 5%, its lowest level since the 1970s; inflation has remained within the target range; and, following a long stretch of fiscal surpluses, Australia is now one of the few OECD countries where general government net debt has been eliminated. Living standards have steadily improved since the beginning of the 1990s and now surpass all G7 countries except the United States. Wide-ranging reforms, particularly to promote competition, were instrumental in this respect. They promoted productivity growth, most notably in the second half of the 1990s. The greater flexibility engendered by these reforms, together with the introduction of robust monetary and fiscal policy frameworks, has also bolstered the economy's resilience to a series of major shocks over the last decade: the Asian crisis in the late 1990s, the global downturn at the turn of the millennium, followed by a major drought, the ending of a house price boom and currently, the commodity price boom. (OECD, 2006)

Ireland

The economy doubled in size in the 1990s, achieving the fastest growth in the OECD over that period. It also achieved the highest growth rate in the first half of the 2000s despite being hit by the worldwide slump in the information and communication technology (ICT) sector. This resilience reflects strong economic fundamentals, including a business-friendly regulatory environment, a flexible labour market, moderate tax rates and sound fiscal policy. It has also helped that a construction boom has taken over from manufacturing in driving activity. (OECD, 2006a)

Korea

Korea has achieved an annual growth rate of 5½ per cent during the past five years, thanks in part to progress in restructuring its economy and strong external demand, particularly from China. The wide-ranging reform programme adopted following the 1997 crisis and the further opening to international competition is [sic] transforming the economy. Nearly half of the major business groups have disappeared, while foreign ownership of listed companies has increased from 15% to 42%. Rising foreign direct investment includes an important foreign presence in the banking sector. With rapid growth, the convergence process has continued, lifting Korea's per capita income to two-thirds of the OECD average. (OECD, 2005b)

Netherlands

After having stagnated during the past five years, the Dutch economy finally appears to have begun to recover. Substantial progress has been made towards correcting the financial imbalances that contributed to the downturn. Furthermore, major labour market, social benefit and health care reforms are underway to enhance labour utilisation and labour productivity. At the same time, cost competitiveness is being gradually restored. ... Even though the level of Dutch productivity is high, its growth has trended down. This differs from the evolution in some other countries, such as the United States and Australia, where productivity growth has accelerated since the mid-1990s. Sluggish productivity growth is often associated with a lack of product market competition, as firms protected from competitive pressures have less incentive to increase their efficiency. (OECD, 2005c)

The economy continues to recover, with GDP growth rising to 3% in 2006. Exports are benefiting from strong world demand and improving competitiveness. Domestic demand is finally picking up as private consumption is underpinned by a stronger labour market. (OECD, 2006)

New Zealand

The New Zealand economy has continued to expand at a vigorous clip, with last year's [2004] growth of just under 4½ per cent bringing the annual average rate of growth since the recession of the early nineties to 3¾ per cent. More importantly, increases in real GDP per person have outpaced the OECD 10 year moving average since 2000, putting the country on track towards achieving the government's longer term objective of lifting GDP per person back into the top half of the OECD, a position it has not held since the early 1980s. This is a deserved reward for the wide reaching macroeconomic and structural reforms put in place over the past 20 years. ... With very strong employment growth and earlier slack now used up, the economy is running at full capacity, with the unemployment rate under 4%, skilled and unskilled labour harder to find, and wage and price increases having picked up. (OECD, 2005d)

UK

Over the last decade, macroeconomic performance has been impressive: GDP growth has been robust and cyclical fluctuations in output have proved smaller than for almost any other OECD country, while inflation has remained close to target. This performance is a testament to the strength of the institutional arrangements for setting monetary and fiscal policy as well as to the flexibility of labour and product markets. ... The most important challenges relate to improving productivity performance, where international benchmarking suggests that priority areas for attention should be the general level of skills, innovation performance and transport infrastructure. (OECD, 2005e)

US

The economic upswing that began in late 2001 has continued at a solid pace, driven by domestic demand that has seemingly been little restrained thus far by energy-price or interest-rate increases. Rapid productivity growth and high corporate profits have contributed to strong business investment, thereby eventually raising employment and, in turn, underpinning household spending. At the same time, net exports have remained a drag on growth and the external deficit has kept widening. With resource slack diminishing and unit labour costs picking up, core inflation has moved higher. ... [T]he fundamental factors that have supported activity so far should carry forward to 2006, sustaining a continued expansion roughly in line with estimated potential output growth of 3¾ per cent per year. ... The longer term outlook looks auspicious, given the remarkable resilience and adjustment capacity the economy has shown. (OECD, 2005f)

30. Survey-based measures of enforcement effectiveness support similar findings, that stronger competition laws and enforcement are correlated with stronger growth performance. (Krakowski, 2005)¹⁰ The newly constructed indicator of competition law and enforcement shows a significant positive correlation with per capita GDP among OECD Members.

3. Effects on productivity and productivity growth

31. Productivity is a likely link: if competition spurs efficiency and hence raises productivity, that in turn should raise output. Dozens of empirical studies show that this link is positive and robust at the level of the firm or industry, where competition clearly improves productivity and productivity growth. (Ahn, 2002) The foundation research is Nickell (1996), analysing the accounts of 670 UK companies from 1972-

¹⁰

A study based on the coverage and remedies of statutes in over 100 countries finds that stronger competition laws are correlated with a perception of stronger competition and in turn with greater output. (Hylton, 2006) The authors suggest that a one point increase in their "scope index" means a .02 increase in the index of perceived competition intensity, which in turn is equivalent to an increase in per capita GDP of \$1000. But they acknowledge that their findings are tentative. They find no correlation with a less subjective measure of the intensity of competition, and they cannot actually identify a link between the scope of the law and the intensity of competition.

1986 and finding that more competition, as indicated by more competitors or by lower rents, is associated with higher productivity growth, while market power, as indicated by market share, is associated with lower productivity levels. Another analysis of UK companies, looking at a decade of establishment-level data, found similarly that productivity is higher where competition is stronger (as indicated by lower rents and market shares), while productivity growth is lower where competition is weaker (as indicated by higher rents); in this study, effects due to competition explain half of the variation in productivity. (Disney, 2003) Similar results are reported about Germany, where firms showed higher productivity growth when operating in markets with intense competition (Januszewski, 2000), and Korea, where plant entry and exit accounted for from 45% to 65% of productivity growth. (Hahn, 2002) Where competition law enforcement is more effective, more efficient firms can grow faster. (Dutz and Vagliasindi, 2000) But a study of firms in the UK and Australia using survey responses to measure the strength of competition found no link to productivity and concluded that labour policies were probably more important. (Blanchflower and Machin, 1996) Another study that also measured competition through executives' responses to questions, about how many competitors they face and how much their sales would drop if they raised prices 10%, found that the intensity of competition had an important effect on productivity, but a complex one: firms with only a few competitors (up to 3) had somewhat better productivity than those in more competitively structured industries (and much better than monopolies). (Carlin, 2001)

32. OECD research about effects of regulation reaches similar conclusions at an aggregate level. Comparison of productivity growth rates over two decades, 1985-1995 and 1996-2003, supports the general conclusion that more pro-competitive regulation fosters productivity growth. Multifactor productivity growth accelerated the most over the decade of the 1990s in New Zealand, Australia, Finland and Ireland (Nicoletti and Scarpetta, 2003); in each of these countries, this era was marked by comprehensive reforms to open markets or eliminate constraints on competition.¹¹ By contrast, most of the countries that experienced a slow-down in multi-factor productivity growth during the 1990s had stricter product market regulation and employment protection legislation. (OECD, 2003) The OECD Report on Regulatory Reform in 1997 computed likely productivity improvements from changes following adoption of best-practice regulation. Summing the improvements in particular sectors, increases in labour productivity range from 0.5% in the US up to 3.5% in Germany; in capital productivity, from 0.5% in the US up to 4.3% in Japan; and in total factor productivity, from 0.5% in the US up to 3.0% in Japan.

33. Regression analysis finds that productivity gains from liberalisation are greater, the greater the gap with technology leader, thus confirming some aspects of contemporary theories about how competition drives innovation. Entry-limiting regulation may hinder the adoption of existing technologies, possibly by reducing competitive pressures, technology spillovers or the entry of new high-tech firms. Anti-competitive regulations significantly curb productivity performance, measured at the industry level. Aligning with best practice could reduce the gap with best practice in multifactor productivity by 10% in the high-gap countries and 4-6% in Japan and the large economies of continental Europe, and it could increase the annual rate of growth of multifactor productivity in continental European economies by between 0.4% and 1.1% over a period of ten years. (Nicoletti and Scarpetta, 2003; Nicoletti and Scarpetta, 2005)

34. Recent OECD analysis identifies a key link between competition, innovation and productivity in modern developed economies. (Conway *et al.*, 2006) This study found that limitations on competition could matter most for technology-driven productivity improvements in sectors that are intensive users of information and communications technologies. Anti-competitive regulation slows productivity growth in sectors where information and communications technologies are particularly important. The greater the gap

¹¹ MFP grew the least in the US, but the level was already high, and the US reform programs had been launched much earlier. MFP growth slowed down in Spain, Germany, France, Japan, Italy, Belgium, Austria and the Netherlands.

with the leader, the greater the adverse effect that constraints on competition have on the adoption of these efficiency-enhancing technologies. Restrictive product market regulations slow the process of adjustment through which best practice production techniques diffuse across borders and new technologies are incorporated into the production process. Remaining differences in product market regulation can partially explain the recent observed divergence of productivity in OECD countries, as they reacted differently to the emergence of new general-purpose technologies over the 1990s. Well-functioning product markets could thus be an important condition for rapid productivity catch-up, if they increase the incentive and lower the cost of incorporating new technologies into the production process. Regulatory differences explain about 12% of the difference in ICT investment among the countries studied.

35. The “inverted U” relationship between competition and innovation is confirmed in an empirical study of UK firms. (Aghion and Griffith, 2005) Innovation intensity suffers when there is either too much competition or too little, and the effect is more pronounced in industries where there is more neck-and-neck competition close to the frontier. An increase in competition reduces the proportion of these neck-and-neck sectors in the economy, producing a pattern of sectors in which technological leaders dominate. The threat of entry has a significant effect: increasing the competitive pressure in this respect increases productivity growth. A study of these effects in European economies reached mixed conclusions, revealing the complexity of the relationships and the difficulty of measuring these phenomena. (Griffith and Harrison, 2004) Reform leading to more competition increases employment and investment, but examining effects of more competition (that is, lower rents) on productivity and innovation leads to some inconsistent results. Developments within the same country over time imply that for most of these European countries reducing rents would reduce innovation and growth; however, comparing different countries implies that the countries with lower rents have higher productivity and innovation. The authors recommend caution in interpreting their results, because of the lack of control for characteristics correlated with regulation and the inherent uncertainty of measures of productivity and competition, and they emphasise that better understanding requires longer time series of micro-level data to model these dynamic process.

36. Some research has found that competition laws and enforcement boost total factor productivity growth; however, this research also found that other institutional factors could be even more important. (Voigt, 2006) Among the four basic indicators of competition policy that were tested in this study, *de facto* independence of enforcement has the most important positive effect on performance. The quality of the formal basis of the competition law and *de jure* independence of the competition agency also have positive effects. Where application of the law is significantly more effective along these dimensions (with indicator scores at least a standard deviation above the mean), the productivity gap with best practice shrinks by 6-9%. But these competition law factors become less important in models that include the quality of other institutions. In a model that includes a very broad measure of government effectiveness, the influence of other institutional and competition policy factors becomes insignificant.

4. Effects on employment

37. Enhanced product market competition can also contribute to growth by increasing employment. Estimates from recent OECD research suggest that, for the typical OECD country, product market liberalisation over the past ten years has cut the aggregate unemployment rate by about 1 percentage point. (Conway, 2005)

38. The theoretical links between competition and employment look complex. Reducing competitive pressure reduces demand for labour. Market power tends to reduce the wage elasticity of demand, while rents encourage employees to demand premiums; as a result, firms choose a higher proportion of capital to labour. Encouraging entry and expanding activity would increase demand for labour. Competition could drive down wages in some sectors where monopoly profits had been shared with labour, yet increase real wages overall by reducing prices. The net effect would depend on the flexibility of labour market

regulation. If the labour market is fully flexible, then employment would increase to the extent that higher real wages increased the supply of labour. Wage moderation would further stimulate demand for labour. How effects on inter-firm competition affect labour markets is less clear and depends on modelling details and labour market institutions. Nonetheless, theory leads to “a strong presumption that easing anticompetitive regulations may lead to employment gains (at least in the medium to long-run)”. (Nicoletti and Scarpetta, 2005b, p. 7)

39. Empirical work confirms the general prediction: competition in product markets reduces unemployment and raises real wages, and the reduction in unemployment is greater where labour market institutions increase worker bargaining power, although workers who have enjoyed that power do not benefit as much from the increase in real wages. (Griffith, 2006) OECD research has also found that regulations that restrict competition have curbed employment rates. (Nicoletti and Scarpetta, 2005b) The effects appear to be magnified by the interaction of restrictive product market regulations with labour market conditions that give insiders strong bargaining power. If rent sharing tends to depress employment, then significant employment gains could follow from liberalisation, and they would be greater where labour markets are more rigid. Projections based on estimated coefficients predict that thorough reforms about state control and barriers to entry would increase long-run employment rates by between 2.5 and 5 percentage points. The effects would be greatest where labour market rules protect insiders the most.

40. The economies with the best sustained growth records not only have shown strong commitment to competition policy, but they also have enjoyed good employment records. In the four countries with above-average growth records over the two decades 1985-2005, unemployment rates at the end of that period ranged from 3.7% in Korea to 5.1% the US.¹²

5. Institutional and development context

41. Competition disciplines market exchange and facilitates an economy’s response to changing demands and opportunities. The record is consistent and persuasive, that successful economic performance follows systematic reforms to open markets and promote competition. The link to performance does not rest only on a precarious foundation of unrealistic theory about perfect competition. Rather, experience shows that policies to promote competition also promote growth and employment.

42. To be sure, growth has sometimes come despite a lack of strong competition. In conditions where growth depends on factor accumulation and imitation of existing technology, policies to limit competition and entry could be consistent with growth. The balance of incentives in some circumstances could mean that greater competition could discourage improvement and innovation. Market liberalisation and antitrust discipline could harm laggard incumbent industries, and thus growth could depend on complementary institutions to facilitate displacements. But where growth can no longer come from factor accumulation and imitation, the economy must shift to innovation at the technology frontier. In such knowledge-based economies, growth requires more competitive institutions. (Aghion and Griffith 2005)

43. Laws to protect competition are indeed more common in more successful economies. A study of competition laws in a wide range of developed and developing countries found that factors increasing the likelihood of adopting a competition law include higher output, greater economic freedom and import liberalisation, higher foreign investment, less manufacturing and government consumption in the economy and better social welfare protections. (Kronthaler, 2005) The study also finds, though, that higher levels of subsidies, corruption and IMF support correlate with a greater likelihood of having a competition law, but

¹² Unemployment in 2005 was higher than the OECD average of 6.7% in the 7 countries where growth was below the OECD average for both decades, except for Denmark and Switzerland.

these results may reveal situations where a competition law has been demanded along with a package of policy reforms.

44. Consistency among policies is greater in countries where regulations are more liberal. Openness to trade goes along with a liberal approach to domestic competition, while restrictive economic regulation is found along with burdensome administrative processes, and restrictive product market regulation is accompanied by restrictive employment protection laws. (Conway, 2005) Homogeneity in regulatory policies implies that different indicators represent different perspectives on a consistent approach to respecting the outcome of market exchange as the principal means of allocating resources. "Competition" may be synonymous with the characteristic functioning of sound, open enterprise economy. At least, formal competition policy accompanies and is evidence of a comprehensively competent set of economic, social and political institutions.

45. The quality of institutions is undeniably critical. In some studies, institutional context is the most important factor. (Voigt, 2006) Subjective measures of the strength of competition and competition policy might simply mirror overall confidence in institutions; however, these measures appear to have a positive effect that is distinguishable from similar measures of the overall quality of public institutions. (Dutz and Hayri, 2000) A study finding that variation in concentration is explained in large part by regulatory burdens and entry barriers, the rule of law and control of corruption observes that weak institutions may prevent most firms from growing yet permit concentration of economic and political power; thus, stronger institutions could facilitate growth by improving opportunities for participation in the economy. (Mitton, 2006) Economies supported by a set of institutions that includes strong competition policy tend to grow faster, perhaps because of how those institutions work together rather than because of something competition policy could do all by itself.

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