



**Factsheet on how competition policy affects
macro-economic outcomes**



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Governments everywhere are increasingly interested in assessing the effects of their policies and the effectiveness of public institutions, and competition agencies are no exception.

As part of its work on evaluating competition interventions, the OECD has been gathering evidence of existing best practices and trying to expand the range of evaluation techniques.

This factsheet summarises existing evidence and provides suggestions and references to help agencies advocate their work. It complements a *Guide for assessing the impact of competition authorities' activities* (2014) and a *Manual on the ex-post evaluation of competition agencies enforcement decisions* (2015, forthcoming).

Find information relating to this work on the OECD website at <http://oe.cd/J3>

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Factsheet on how competition policy affects macro-economic outcomes

Introduction

Sometimes - and particularly in times of economic crisis - stakeholders in governments request competition agencies to provide evidence on the links between competition, competition policy, and macroeconomic outcomes, such as productivity, growth, innovation, employment and inequality. Showing these links can be a challenging exercise and this factsheet has been elaborated to help competition agencies achieve this task.

The factsheet summarises the existing evidence on the wider economic effects of competition and competition policy, and provides suggestions and references to help agencies advocate their work.

This document is a literature review – it does not contain any new research but compiles important existing material.

How is this factsheet structured?

This factsheet is composed of three sections:

- Section 1 is a two-page “narrative” composed of statements about the effects of competition and competition policy.
- Section 2 breaks down this narrative into its component statements. It presents the existing evidence for each of them and provides a very brief explanation of this supporting evidence.
- The final section presents an overview of studies that provide a quantitative assessment of the effects of competition and competition policy on a variety of macro-variables.

Detailed references and links to the papers are provided in the bibliography at the end of the factsheet. Please note some of these links may lead to subscription-only services. In addition, an online version of the factsheet can be found at the OECD website. It allows the reader to obtain detailed information on each reference by rolling the mouse over it or over this sign .

Section 1. Outline of the effects of competition and competition policy

When customers can choose between different providers, they benefit and so does the economy as a whole. Their ability to choose forces firms to compete with one another. Choice for customers is a good thing in itself, but competition between firms also leads to increased productivity¹ and economic growth.

It can be hard directly to measure the effect of – for example – competition law on economic growth. But there is solid evidence in support of each of the relationships shown below.



Most importantly, it is clear that industries where there is greater competition experience faster productivity growth. This has been confirmed in a wide variety of empirical studies, on an industry-by-industry, or even firm-by-firm, basis. Some studies seek to explain differences in productivity growth between industries using measures of the intensity of competition they face. Others look at the effects of specific pro-competitive interventions, particularly trade liberalisation or the introduction of competition into a previously regulated, monopoly sector (such as electricity).

This finding is not confined to “Western” economies, but emerges from studies of the Japanese and South Korean experiences, as well as from developing countries

The effects of stronger competition can be felt in sectors other than those in which the competition occurs. In particular, vigorous competition in upstream sectors can ‘cascade’ to improve productivity and employment in downstream sectors and so through the economy more widely.

The main reason seems to be that competition leads to an improvement in allocative efficiency by allowing more efficient firms to enter and gain market share, at the expense of less efficient firms (the so called *between-firms* effect). Regulations, or anti-competitive behaviour preventing entry and expansion, may therefore be particularly damaging for economic growth. Competition also improves the productive efficiency of firms (the so called *within-firms* effects), as firms facing competition seem to be better managed. This can even apply in sectors with important social as well as economic outcomes: for example, there is increasing evidence that competition in the provision of healthcare can improve quality outcomes.

¹ Unless specified the term productivity refers to total factor productivity.

There is also evidence that intervening to promote competition will increase innovation. Firms facing competitive rivals innovate more than monopolies (although *after* such competition a firm may of course end up with a monopoly through a patent). The relationship is not simple: it is possible that moderately competitive markets innovate the most, with both monopoly and highly competitive markets showing weaker innovation. However, as competition policy does not focus on making moderately competitive markets hyper-competitive, but rather on introducing or strengthening competition in markets where it does not work well, this would still imply that most competition policies serve to promote innovation.

Because more competitive markets result in higher productivity growth, policies that lead to markets operating more competitively, such as enforcement of competition law and removal of regulations that hinder competition, will result in faster economic growth.

Is there evidence that pro-competitive policies are effective?

In addition to this evidence that competition promotes growth, there have been studies directly of the effects of **competition law** itself, and of **product market deregulation**. Although it is difficult to distinguish the effects of individual policy changes, there are some studies showing that introducing competition law raises productivity. Conversely, the selective suspension of antitrust laws in the USA during the 1930s seems to have delayed recovery.

Many studies of the effect of competition law use international comparisons of different countries' experiences, to assess whether countries with competition laws (or longer-standing, or more effective competition laws) achieve faster economic growth. The task is a difficult one because of many other factors that affect the overall economic growth rate, including other policies introduced at the same time (e.g. Eastern Europe's transformation after 1989). Some studies find no effect, but the overwhelming majority of such studies do find a positive effect of competition law on economic growth. Most ascribe this effect to increased productivity, although there may also be an effect on investment, especially in developing countries, perhaps because competition laws boost business confidence and reduce corruption.

The evidence base regarding product market deregulation is stronger still, because there have been many different deregulation events, allowing comparison between industries, between countries and over time. Furthermore, regulatory policies specifically designed to introduce and promote competition – especially in network industries – have resulted in productivity gains.

...but growth is not everything

There are policy objectives other than GDP growth, and the OECD has been a vigorous champion of measuring such objectives more rigorously, and taking them better into account when formulating policy.

The effect of competition on **inequality** has been little studied, and is often assumed to be malign as competition creates winners and losers. However, restricting competition causes harm to the many, while the profits generally go to the few. The poorest in society are often the worst affected by higher prices or lower quality and choice resulting from restrictions on competition.

Similarly, there is often a gap between reality and perceptions when **employment** concerns are prominent. It is true that the productivity gains caused by competition can result in layoffs, but this is no more likely to add to unemployment in aggregate than any other form of technical progress. Furthermore, restrictions on competition have been shown to reduce output and employment.

Section 2. Evidence of the effects of competition and competition policy

This section briefly discusses each of the statements made in section 1 on the effect of competition and competition policy on macro-economic outcomes, and provides the main existing evidence that supports them.

Most importantly, it is clear that industries where there is greater competition experience faster productivity growth. This has been confirmed in a wide variety of empirical studies, on an industry-by-industry or even firm-by-firm basis. Some studies seek to explain differences in productivity growth between industries using measures of the intensity of competition they face.

The evidence to support this statement is mainly found in detailed studies of industries, or individual firms. As British economist Stephen Nickell says, in a paper (Nickell 1996) that has become the classic reference in this literature: “Most important, I present evidence that competition, as measured by increased numbers of competitors or by lower levels of rents, is associated with a significantly higher rate of total factor productivity growth.” Nickell’s paper takes various industry-level measures of competition, and finds that higher competition is statistically significantly associated with faster productivity growth.

There are many other economic studies that provide evidence of this effect, in many cases building upon and deepening Nickell’s work. For example, Disney, Haskell and Heden (2003) use data on 140,000 separate businesses. The authors conclude “Market competition significantly raises both the level and growth of productivity”. Blundell, Griffith and Van Reenen (1999), by examining a set of data on manufacturing firms in the UK, also find a positive effect of product market competition on productivity growth. Januszewski (2002) similarly reports a positive link between productivity growth and competition for a survey of 500 German firms. Aghion et al (2004, 2009) exploit micro-level productivity growth firm level and patent panel data for the UK and the wave of reforms that in the 1980s introduced greater competition in the economy and find that entry from foreign firms has led to greater innovation and faster total factor productivity growth of domestic incumbents, and thus to faster aggregate productivity growth.

Nickell suggests that product market competition works to increase productivity in part because it increases managers’ incentives to work hard in shareholders’ interests, a suggestion tested empirically for the UK and Germany by Koke and Renneboog (2005): “We find strong evidence that corporate governance and product market competition affect productivity growth, but the results differ substantially between Germany and the UK. The role of controlling blockholders and of bank creditors is particularly important in poorly performing firms.”

A large-scale survey can be found in Ahn (2002), who concludes: “A large number of empirical studies confirm that the link between product market competition and productivity growth is positive and robust. [...] Empirical findings from various kinds of policy changes [...] also confirm that competition brings about productivity gains, consumers’ welfare gains and long-run economic growth.”

The analysis is not always straightforward, because there is not a single, right way of measuring competition. Many studies use measures related to the structure of markets, such as the number of firms competing or market shares or the height of barriers to entry. However, in some cases, markets can be highly competitive even with only a few firms in them, if those firms happen to compete vigorously (for example because customers see little difference between their products). So other studies use alternative measures of competition based on the profitability of the firms, such as the price-cost margin (Lerner index). This can be problematic too: profits are hard to measure and compare between firms meaningfully, and high profits can arise for reasons entirely separate from a lack of competition. One of the strengths of Nickell (1996) is that he uses several different measures of competition (and of productivity).

Some studies avoid the problem by using survey-based, subjective measures of competition. For example, [Tang and Wang \(2005\)](#) uses perceptions of competition in a sample of firms in Canada and find that “firms – especially medium-sized ones – that perceive a higher degree of product market competition tend to have higher productivity levels.”

Economic historian [Nick Crafts \(2012\)](#) builds upon this productivity literature, and develops an independent analysis to “highlight the role that competition in product markets, or the lack of it, played in British relative economic decline”. He notes weak competition in the UK in the period of decline relative to other European economies (roughly 1890 to 1980 but with a particular focus on the 1950s and 1960s) and improved performance and stronger competition thereafter. Crafts concludes: “Productivity performance was clearly impaired when competition was reduced from the 1930s, and improved from the 1980s as a consequence of the return to stronger competition”. In addition to the well-known effects of competition on productivity, Crafts identifies improved labour relations as another important driver of this effect.

For a non-technical, but strongly argued, account of how competition in specific sectors leads to productivity growth and better macroeconomic outcomes, see [Lewis \(2004\)](#). This book draws upon the author’s experiences at McKinsey Consulting, presenting comparative studies of different industries in OECD and developing economies, to draw out links between competition and productivity growth. The author concludes: “Beyond macroeconomic policies, economic analysis usually ends up attributing most of the differences in economic performance to differences in labour and capital markets. This conclusion is incorrect. Differences in competition in product markets are much more important. Policies governing competition in product markets are as important as macroeconomic policies.”

Others look at the effects of specific pro-competitive interventions, particularly trade liberalisation or the introduction of competition into a previously regulated, monopoly sector (such as electricity).

An alternative approach, that avoids measuring competition at all, is to examine the effects of policy changes that can be expected to have resulted in a rapid increase in competition (however measured), such as trade liberalisation and other structural reforms.

The trade literature is vast. In general, more openness to trade seems to be associated with faster growth, although the evidence is mixed and effects will arise from many factors other than product market competition. See [Berg and Krueger \(2003\)](#) for a survey. Focusing on competition, [Griffith, Harrison and Simpson \(2006\)](#) uses the introduction of the EU Single Market programme as an instrument to model the effects of increased competition, concluding: “We provide empirical evidence that the reforms carried out under the EU Single Market Programme (SMP) were associated with increased product market competition, as measured by a reduction in average profitability, and with a subsequent increase in innovation intensity and productivity growth for manufacturing sectors.”

Policies liberalising industries that were previously regulated monopolies (especially utilities) also provide clear natural experiments on the effects of competition, although if accompanied by privatisation, it is difficult to disentangle the effects of competition from that of ownership. For example, labour productivity has been found to double or triple in electricity generation (see [Jamasb, Mota, Pollitt and Newbery, 2004](#)) for citations for the UK and developing countries, such as Chile and Argentina), but usually as a part of a wide-ranging reform of the whole sector. In the US, electricity industry structure and reform processes vary regionally, and [Fabrizio \(2004\)](#) uses this to disentangle the effects, finding that private generators facing competition had 20% higher productivity than publicly-owned utilities facing no competition, and 5% higher productivity than privately-owned generators facing no competition.

Other industries can also provide case studies. For example, [Zitzewitz \(2003\)](#) looks at the UK and US tobacco industries, finding that the US industry experienced slower productivity growth during 1890-1911, when it operated as a cartel, than the UK industry, but that its productivity accelerated after the breakup of the American Tobacco Trust. Again, trade liberalisation can provide useful case studies. For example, [Schmitz \(2005\)](#) conducts a case study of US and Canadian iron ore mines after liberalisation led to competition from Brazil. He concludes: “Labor productivity doubled in a few years (whereas it had changed little in the preceding decade). Materials productivity increased by more than half. Capital productivity increased as well. I show that most of the productivity gains were due to changes in work practices.” [Sharpe and Currie \(2008\)](#) report a case study of the Canadian wine industry, forced to face foreign competition under NAFTA, noting: “The successful transformation of the Canadian wine industry has shed light on how increased foreign competition can drive innovation and enhance the competitiveness of an inward-looking industry.”

For deregulation, [Davies et al \(2004\)](#) provides some illustrative cases, particularly noting significant price effects from deregulations that had the effect of introducing competition (for example, low cost airlines within Europe). For cross-country comparisons and literature surveys, see [OECD’s Economic Studies Vol. 1 \(2001\)](#), which is devoted to case studies of liberalisations in selected industries. For telecoms, for example, the authors conclude: “The degree of market competition (proxied by the share of new entrants or the number of competitors) and the time to liberalisation, which can be interpreted as the effect of prospective competition, emerged as the two main explanations for the cross country and time variability in productivity and prices; prospective competition was the only significant explanation for differences in quality remaining after correcting for other country-specific factors.” Other studies in the volume look at road freight, electricity, air transport and retail.

In Australia, the National Productivity Commission has sought to evaluate the effects of its interventions to promote competition, particularly in infrastructure sectors, concluding ([Productivity Commission 2005](#)): “The modelling indicates that observed productivity and price changes in the selected infrastructure services have boosted Australia’s GDP by 2.5 per cent. However, this modelling does not cover all areas encompassed by the NCP reforms. Nor does it pick up impacts from NCP reforms undertaken since 2000, or from earlier reforms that did not add to productivity until after that time; or make allowance for the ‘dynamic’ benefits of more competitive markets [...]”

Taking an opposite approach, [Hasken and Sadun \(2009\)](#) examine the effects of an increase in regulation, finding that increased regulation of retailing in the UK from 1996 reduced productivity growth by about 0.4% p.a. More generally, [Cincera and Galgau \(2005\)](#) find that tighter regulation that reduced entry in European markets raised mark-ups and lowered labour productivity growth.

This finding is not confined to “Western” economies, but emerges as well from studies of the Japanese and South Korean experiences.

A common piece of economic folklore is that rapid economic development in East Asian countries – first Japan, then for example South Korea and others, more recently China – occurred because governments sheltered their industries from competition. Studies of productivity growth in different industries demonstrate that this is not true.

In Japan, work by Michael Porter and others demonstrate that it was those industries exposed to international competition that experienced rapid productivity growth, while those that operated in protected domestic markets stagnated. For example [Sakakibara and Porter \(2001\)](#) conclude: “These findings support the view that local competition – not monopoly, collusion, or a sheltered home market – pressures dynamic improvement that leads to international competitiveness”. [Porter, Takeuchi, and Sakakibara \(2000\)](#) note that over a 50-year period, cartels were almost never found in successful exporting industries in Japan, even though they were prevalent in the rest of the economy.

[Porter et al \(2000\)](#) was published when Japan was seen unequivocally as an economic success. In [Porter and Sakakibara \(2004\)](#), they identify the protected segments of Japan’s economy as being responsible for its weaker economic performance from the 1990s on, for example stating: “Japan’s problem is rooted in microeconomics, in how companies compete and distortions to competition. These microeconomic structures reduce productivity, lower the return on new investment, drive companies offshore and artificially elevate local prices. A more flexible economy in which competition is truly open will increase productivity and create new business opportunities.” [Fukao and Kwon \(2006\)](#), discussed below, similarly find a lack of rivalry between firms responsible for the economic slowdown in Japan.

Other economists have confirmed these findings. See for example, [Okada \(2005\)](#): “I show that competition, as measured by lower level of industrial price-cost margin, enhances productivity growth, controlling for a broad range of industrial and firm-specific characteristics. Moreover, I suggest that market power, as measured by either individual firm’s price-cost margin or market share, has negative impact on productivity level of R & D performing firms.” More generally, the link between product market competition and productivity has been demonstrated in Japan, using similar methodologies to the productivity studies cited above, for example in [Funakoshi and Motohashi \(2009\)](#), who use a sample of 2400 Japanese firms and find a negative relationship between concentration and productivity growth.

The results of Korean domestic reforms in response to the Asian financial crisis also seem to demonstrate the positive effects of increased competition. For example, [Baek, Kim and Kwon \(2009\)](#) note the increase in Korean productivity following the crisis, and the ensuing policy responses, which included strengthening the competition regime. They conclude: “With regard to the determinants of the total factor productivity (TFP) growth rate, the reinforcement of competition after the Asian financial crisis contributed to the TFP growth rate, justifying introduction of various institutions for fair competition during the crisis. When industries are classified into sub industries by technology intensity, it can be said that the TFP growth has been driven by high technology and medium-high technology, and in high technology industry, the reinforcement of competition during post-crisis period and R&D intensity affected the TFP growth rate positively and significantly.”

There is little equivalent analysis of China, although studies have noted that the economic success of China, being export-oriented, is based on those industries that face competition in global markets.

...as well as from developing countries.

Studies of Latin America have suggested that restrictions on competition – particularly restrictions imposed by government – are a key constraint on growth. **Cole et al (2005)** conclude: “We argue that competitive barriers are a promising channel for understanding low Latin TFP. We document that Latin America has many more international and domestic competitive barriers than do Western and successful East Asian countries. We also document a number of microeconomic cases in Latin America in which large reductions in competitive barriers increase Latin American productivity to Western levels.”

In contrast, in some Latin American countries, liberalisation has produced significant economic gains (see **Pavcnik, 2002**) for a study of Chile’s reforms in the 1970s and 1980s), confirming that the role of competition in promoting productivity growth is not limited to the most advanced economies.

There is a rapidly increasing literature studying the effects of increased market openness in India. For example, **Aghion, Burgess, Redding, and Zilibotti (2003)** find positive effects of liberalization on economic performance across manufacturing sectors and states in India over the 2000s.

A study on South Africa (**Aghion et al, 2008**) shows that mark-ups on prices, which are used as a measure of competition, are higher in South African manufacturing industries than they are in corresponding industries worldwide. It also argues that competition policy (i.e. a reduction of mark-ups) should have largely positive effects on total factor productivity growth in South Africa (in particular, a 10% reduction in the mark-ups would increase productivity growth by 2 to 2.5% per year).

That does not mean that the poorest countries should necessarily emphasise competition policy over other economic reforms. In the poorest countries, any economic reform that results in workers moving from essentially zero-productivity subsistence farming into productive work can cause large increases in output. It is no surprise that emerging economies – some of them with weak competition policy – experience faster growth than economies with ten times their levels of per-capita income. Nonetheless, in a study covering 179 countries, **Gutmann and Voigt (2014)**² conclude: “Since the effects on low-income countries are particularly pronounced (lower perceived corruption levels and higher levels of total investment), it seems that the introduction of competition laws finds the most support in the data from these countries. In that sense, introducing competition laws to lend a hand to the invisible hand is a viable policy recommendation not only, but especially in developing countries.”

²

Discussed in more detail below.

The effects of stronger competition can be felt in sectors other than those in which the competition occurs. In particular, vigorous competition in upstream sectors can 'cascade' to improve productivity and employment in downstream sectors and so through the economy more widely.

Most of the more detailed microeconomic studies referenced above seek to relate productivity growth in a sector to the degree of competition in that sector. While important, this narrow focus misses an important benefit in that more competition in upstream sectors can improve performance downstream. This is one of the reasons why competition in infrastructure construction and provision, and in utilities, is particularly valuable.

Barone and Cingano (2008), for example, demonstrate that manufacturing productivity growth is harmed by regulations reducing competition in services (especially financial services and energy provision). They note: "These findings have relevant implications in terms of competition policy. For example, our estimates imply that removing the regulation of price and tariffs among professions, industries making intense use of their services (as Chemicals and Pharmaceuticals) would grow by 0.5% more relatively to less intensive users (as Fabricated Metal Products)."

Bourlès et al (2013) study the effect of regulation on upstream service sectors on productivity growth downstream, concluding: "We find evidence that anticompetitive upstream regulations have curbed Multifactor Productivity (MFP) growth over the past 15 years, more strongly so for observations that are close to the productivity frontier." The latter finding implies that upstream reform might be particularly important for high-income countries which already have sophisticated technology.

Forlani (2010) carries out a similar analysis for France, concluding "The empirical estimations show that the market power of services affects downstream firms' productivity. It is found that there is a statistically significant relation between firms' productivity and competition in the service sector: as competition increases, so does the average productivity of manufacturing. This relationship is stronger when only network industries are considered."

The main reason seems to be that competition leads to an improvement in allocative efficiency by allowing more efficient firms to enter and gain market share, at the expense of less efficient firms. Regulations, or anti-competitive behaviour preventing entry and expansion, may therefore be particularly damaging for economic growth. Competition also improves the productive efficiency of firms, as firms facing competition also seem to be better managed.

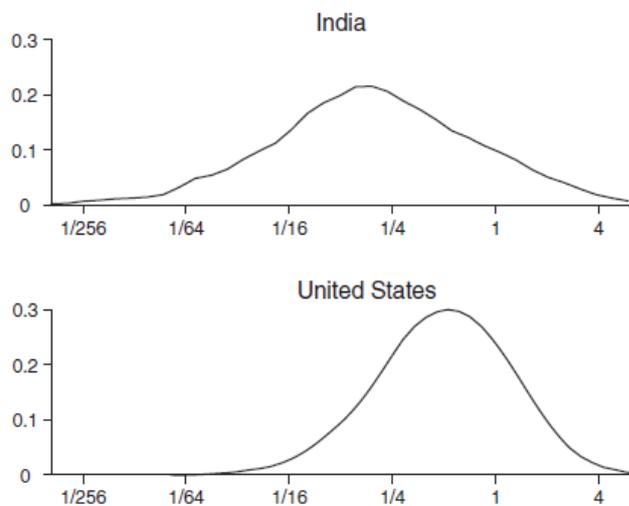
The studies just discussed demonstrate an empirical link between competition and productivity growth, but the confidence we can have in this finding is reinforced by empirical evidence on the detailed mechanisms: why does competition result in faster productivity growth?

The main reason appears to be a reallocation effect between firms. More competitive markets dynamically allocate resources to the most productive and innovative firms. Better firms enter and succeed while the worst firms fail and exit. The finding that productivity growth is largely driven by reallocation from less to more productive firms is discussed at length in [Arnold et al \(2011\)](#), in the context of the effect of anti-competitive regulation, and also in the report of the OECD’s project Supporting Investment in Knowledge Capital, Growth and Innovation ([OECD, 2013b](#)).

For example, [Harris and Li \(2008\)](#) find that 79% of UK productivity growth arises from between-firm effects (i.e. displacement of less efficient firms by more efficient rivals) rather than within-firm effects (i.e. individual firms becoming more efficient). Also for the UK, [Disney, Haskell and Heden \(2003\)](#) find: “Our main finding is that, for 1980–92, external restructuring accounts for around 50% of establishment labour productivity growth and 80–90% of establishment TFP growth.” Similarly, [Hahn \(2000\)](#) finds 45–65% of productivity growth in the Korean industry arises from entry and exit. [Fukao and Kwon \(2006\)](#) explain reduced productivity growth in Japan in the “lost decade” by a reduction in the degree to which market shares reallocate from less productive firms to more productive ones, concluding: “We also found that the metabolism— the expansion of employment and output by high-TFP firms and the contraction or exit of low-TFP firms—is not working well in Japan’s manufacturing sector.”

Hsieh and Klenow ([2009](#) and [2012](#)) note that India and China seem to allow much larger numbers of very low-productivity firms to survive than do the US (see below). A lack of effective competition is surely one reason for this. The effect is huge: the authors calculate that if in the 1990s China and India had allocated resources between firms as efficiently as the US (i.e. if the more productive firms employed more labour and capital, to the degree they do in the US), their total factor productivity could have risen by as much as 50%.

Figure 1: Distribution of Total Factor Productivity between different manufacturing plant (mean = 1)



Source: [Hsieh and Klenow \(2009\)](#) © Published with the permission of Oxford University Press

In addition to these ‘between-firm’ effects, competition may also have ‘within-firm’ effects, through improvement in the management. As noted earlier, [Nickell \(1996\)](#) suggests that product market competition works to discipline managers, when shareholder control is weak (by noting that the productivity-enhancing effects of competition were greater for companies in which shareholdings were dispersed, compared to firms owned and managed by an individual).

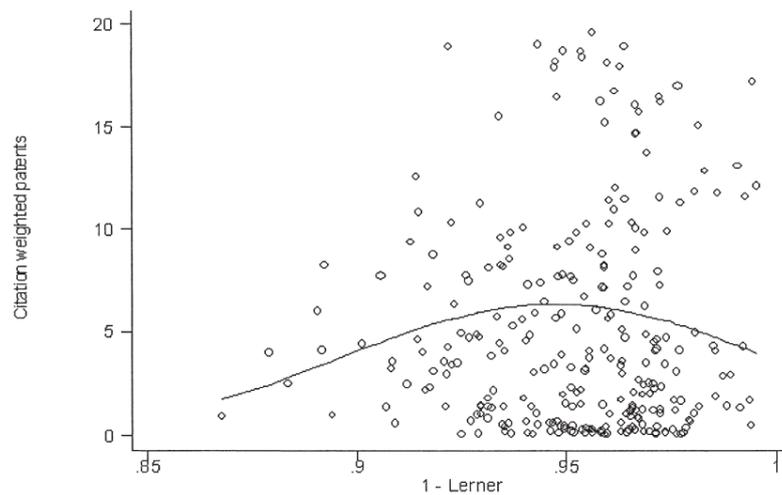
More recently, Van Reenen and his colleagues have been particularly active in examining links between product market competition and quality of management. In several papers (see for example [Bloom and Van Reenen \(2007\)](#)) these authors have demonstrated that differences in productivity between countries depend on differences in management quality (measured through a survey), and in particular on how many badly managed firms there are. Countries with low productivity growth often have a long ‘tail’ of very badly managed firms at the bottom of the distribution (as opposed to being worse all across the distribution), in a similar pattern to the productivity differences illustrated above. It seems plausible that product market competition helps eliminate this ‘tail’, either through firm exit or through the disciplining effects of competition on managers. Competition is robustly and positively associated with higher management practice scores. The authors conclude: “We find that poor management practices are more prevalent when product market competition is weak and/or when family-owned firms pass management control down to the eldest sons (primogeniture).”

There is also evidence that intervening to promote competition will also increase innovation. Firms facing competitive rivals innovate more than monopolies.

Links between competition and innovation (whether of new products or novel cost-reducing production processes) have been much debated, at least since **Schumpeter (1942)**, who argued that larger, market-leading firms were more likely to innovate.

Much of this recent analysis, particularly associated with Aghion, Bloom, Blundell, Griffith and Howitt (see for example **Aghion et al, 2005**) has restored **Scherer's (1967)** conception of the relationship as an 'inverted U': moderately competitive markets are likely to be the most innovative, while monopoly or very competitive markets innovate less. Aghion and his colleagues typically use profitability (proxied by the Lerner Index) as a measure of competition (and patents as the measure of innovation), so "very competitive" should be understood to mean industries with a low cost price margin.

Figure 2: Patent citations and product market competition



The figure plots a measure of competition on the x-axis against citation-weighted patents on the y-axis. Each point represents an industry-year. The scatter shows all data points that lie in between the tenth and ninetieth deciles in the citation-weighted patents distribution.

*Source: **Aghion et al (2005)** © Published with the permission of Oxford University Press*

The empirical finding that the rate of innovation rises, peaks, and then falls as an industry becomes more competitive can be understood as the effect of the interaction of competitive intensity with the state of technological progress in the sector. When firms have similar technology (i.e. they are 'neck and neck' at the technological frontier) there is an incentive to innovate to escape competition, that becomes stronger the more competitive the industry becomes. Aghion and his colleagues argue that, at low competition levels, 'laggard' firms have every incentive to catch up with the leaders, so industries with low competition will exhibit this 'neck and neck' property. This explains the 'rising' side of the inverted-U, where more competition leads to more innovation. In contrast, at high levels of competitive intensity, laggard firms have little incentive to innovate, as competition with the existing technological leaders will eliminate the profits of such innovation. Because the technological leaders themselves face no incentive to innovate, when facing only technological laggards as competitors, the industry remains technologically differentiated, between laggards and leaders. This situation becomes more likely and more stable as the intensity of competition increases, so further increases in competitive intensity reduce the overall incentive to innovate. This explains the 'falling' side of the inverted-U, where more competition leads to less innovation.

This is a complex story, but it provides some clear policy messages. Firstly, pro-competitive interventions in highly uncompetitive industries (for example, those with monopolies protected by regulation or abusive deterrence of entry by the incumbent) should result in increased innovation. Most pro-competitive policy interventions – and certainly enforcement actions by competition authorities – could be characterised as dealing with highly uncompetitive industries and monopoly (on the left of the figure above), because the more competitive industries (on the right) would not usually raise competition concerns. Secondly, there is an important interaction between intellectual property rights and competition. Innovation incentives depend on the difference between pre-innovation and post-innovation profits. As long as patent protection for real innovators is effective (as opposed to being ineffective, or abused by non-innovating ‘trolls’), stronger product market competition should result in higher rates of innovation. Finally, note that, in this framework, competition policy is particularly important in industries in which firms are technologically advanced.

Polder and Veldhuizen (2010) report similar results using data from the Netherlands and also find an inverted-U relationship. **Grünewald (2009)**, working on Swedish data, finds that higher levels of competition are associated with faster R&D, except for laggard firms. The results do not form the same U-shape relationship, but they are consistent with the theory that Aghion and his colleagues identified as driving their results.

A similar study, using data from transition economies in Central and Eastern Europe (**Carlin et al 2004**), makes the same point in its title: “A minimum of rivalry”. This study uses a count of competitors rather than the profit margins typically used by Aghion and his colleagues, and finds: “evidence of the importance of a minimum of rivalry in both innovation and growth: the presence of at least a few competitors is effective both directly and through improving the efficiency with which the rents from market power in product markets are utilised to undertake innovation.”

Just as was the case in the productivity literature, the effect of “shocks” can also provide vivid evidence of the effect of competition on innovation. **Bloom, Draca and Van Reenen (2011)** study the effects of Chinese import competition on a panel of up to half a million firms over 1996-2007 across twelve European countries. They conclude that “Chinese import competition (1) led to increased technical change within firms; and (2) reallocated employment between firms towards more technologically advanced firms. These within and between effects were about equal in magnitude, and appear to account for 15% of European technology upgrading over 2000-07”.

Similarly, competition also seems to promote more effective adoption and diffusion of innovation. For example, in a research for the OECD, **Arnold et al (2008)** find that regulatory restrictions to competition have a strong negative effect on Information and Communications Technology (ICT) investment³, noting that “It would seem that firms operating in a relatively liberal regulatory environment are more inclined to incorporate ICT into the production process than firms operating in an environment in which product market regulation is more restrictive.”

³ On the same topic, see also Conway *et al* (2006).

Because more competitive markets result in higher productivity growth, policies that lead to markets operating more competitively, such as enforcement of competition law and removal of regulations that hinder competition, will result in faster economic growth.

Competition policy interventions rarely target productivity growth directly, instead they focus on promoting or preserving competition itself, often measured by lower prices or other consumer benefits. The evidence discussed above strongly suggests, however, that in doing so, successful policy interventions to promote competition contribute to productivity growth and therefore to economic growth overall. If for example competition law enforcement is effective “in its own terms” in making markets more competitive, then the productivity literature suggests it will also promote economic growth.

As the focus of this document is on ‘macro’ outcomes, this factsheet is not the place to review the literature on the effectiveness of competition law enforcement and other pro-competition policies. However, we provide a few references.

The best evidence for the effectiveness of competition law enforcement is that based at the same level as that enforcement itself: specific case-by-case outcomes. Competition authorities and academics have published a large number of ex-post studies of the results of enforcement actions, which were surveyed in [OECD \(2013a\)](#) and in [OECD \(forthcoming\)](#). The studies illustrate the importance of protecting competition through the enforcement of the law (although some find ineffective enforcement, as is only appropriate in an exercise that seeks to improve effectiveness).

There are meta-studies which have sought to estimate the effectiveness of competition enforcement across a large number of cases. Dutz and Vagliasindi (2000) and [Vagliasindi et al \(2006\)](#), using data on a number of transition economies shows that better implementation of competition law leads to greater competition (measured by number of players in the relevant industry). A critical article about US antitrust enforcement by [Crandall and Winston \(2003\)](#), led to discussion and rebuttal articles. The most notable of these is [Baker \(2003\)](#), who illustrates the effectiveness of competition law enforcement, both by considering its successes and by presenting four periods in which US antitrust enforcement was weak, at least in some sectors. For example, many export cartels – exempted for antitrust enforcement – persisted for up to 15 years⁴. Baker also discusses how to quantify the benefits of antitrust enforcement, a task attempted by [Hüschelrath \(2008\)](#) in a paper appropriately titled “Is it worth all the trouble? The costs and benefits of antitrust enforcement”. Hüschelrath’s findings indicate rather marginal benefits, but he acknowledges that the methodologies he uses take no account of the deterrent effects of enforcement (let alone its dynamic benefits, which are the main focus of this factsheet).

The deterrent effects of competition enforcement are likely to be substantial, although it is naturally difficult to find evidence of events that did not happen. However, there is at least evidence that deterrence occurs, especially for cartels. For example, [Connor and Bolotova \(2006\)](#), pp. 1133-1134, in a literature survey and meta-analysis of several hundred cartels across a large number of jurisdictions in the European Union, North America and Asia, find that the stronger the competition regime, the lower the cartel overcharge. The findings are similar to those of the seminal study by [Clarke and Evenett \(2003\)](#), drawing out the differences in overcharges in a global vitamins cartel between countries with and without competition regimes. This study finds that just the overcharges deterred in this cartel are close to the annual total administrative costs of each country’s competitive regime.

⁴ Baker also discusses the suspension of antitrust laws in the Great Depression, discussed below, under policy responses to recession.

In addition to this evidence that competition itself promotes growth, there have been studies directly of the effects of competition law itself, and of product market deregulation. Although it is difficult to distinguish the effects of individual policy changes, there are some studies showing that introducing competition law raises productivity. Conversely, the selective suspension of antitrust laws in the USA during the 1930s seems to have delayed recovery.

In principle, it should be possible to determine the effects of competition law by comparing industries' or countries' performance before and after the introduction of such law, or by comparing countries with and without competition laws. In practice, it can be very difficult reliably to distinguish the effects of competition law enforcement from all the other factors that can influence economic performance. That said, there are a few industry-level studies that look directly at the effect of introducing – or suspending – competition law (and rather more cross-sectional studies of different countries, as we examine in the next section).

Symeonidis (2008) examines the effects of the 1956 Restrictive Practices Act in the UK. This legislation outlawed cartels, which had previously been legal. Symeonidis examines the labour productivity growth of industries that had previously openly organised cartels, compared to those that had not (in effect, the non-cartelised industries form a control group, as they will be affected by everything going on in the economy except the new law). He finds that the removal of cartels resulted in faster labour productivity growth, concluding: "The econometric results from a comparison of the two groups of industries provide strong evidence of a negative effect of collusion on labor productivity growth. There is no evidence of any effect of collusion on wages."

In general, insulating firms from international or domestic competition is a poor policy response to a recession. The history of the US provides the clearest example of this when established anti-trust laws were selectively suspended, under the National Industrial Recovery Act (NIRA) in the 1930s. Companies could be authorised to establish cartels, agreeing with competitors to fix prices, in exchange for agreement with unions to fix wages. Several studies have concluded that this held back recovery.

Romer (1999) concludes: "The NIRA can be best thought of as a force holding back recovery, rather than as one actively depressing output." **Taylor (2002)** finds "the NIRA cartel codes themselves brought a 10% reduction in manufacturing output" in early 1934. **Taylor (2007)** confirms this basic finding, with a more detailed assessment of seven provisions in cartel codes that affected the output of 66 US industries before, during, and after the period when the NIRA was enforced.

Cole and Ohanian (2004), in a particularly influential – but controversial – study argue that this measure alone delayed economic recovery in the US for seven years. This rather dramatic result depends more on the NIRA's effect on wages, than its effect on product prices. In a review of the paper, FTC economist David Glasner⁵ notes: "What stopped April to July recovery almost in its tracks? The answer is almost certainly that FDR forced his misguided National Industrial Recovery Act through Congress in June, and by July its effects were beginning to be felt. Simultaneously forcing up nominal wages in the face of high unemployment (though unemployment started had falling rapidly when recovery started in April) and cartelizing large swaths of the American economy, the NIRA effectively shut down the recovery that was still gaining momentum."

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<http://uneasymoney.com/2011/09/26/misrepresenting-the-recovery-from-the-great-depression/>

Many studies of the effect of competition law use international comparisons of different countries' experiences, to assess whether countries with competition laws (or longer-standing or more effective competition laws) achieve faster economic growth. The task is a difficult one because of the many other factors that affect the overall economic growth rate, including other policies introduced at much the same time (as for example in Eastern Europe's transformation after 1989). Some studies find no effect, but the overwhelming majority of such studies do find a positive effect of competition law on economic growth. Most ascribe this effect to increased productivity, although there may also be an effect on investment, especially in developing countries, perhaps because competition laws boost business confidence and reduce corruption.

At the level of an entire economy, it will be difficult to distinguish the effects of competition policies from other factors that affect growth, yet without such corrections, spurious correlations will arise. Most notably, in recent years high-income countries have grown significantly more slowly than emerging economies. High income economies also typically have well-developed competition regimes, but this does not imply that the regimes causes low growth. Rather, both the growth rate and the competition regime are correlated with the overall level of development. Any analysis, therefore, needs either to correct for this feature, or compare only countries that are very similar. Nonetheless, there have been studies that attempt directly to measure the effect of competition policy.

Gutmann and Voigt (2014) contain a useful review of earlier studies in the area. This paper also contains a good account of the data and methodological difficulties involved in disentangling the effects of competition laws from other factors affecting economic performance. Their analysis covers 179 countries from 1971 to 2012 and attempts to determine whether the presence of competition law (and the time since its introduction) explains growth rates as well as other intermediate indicators, such as FDI and productivity. They find a very strong effect, noting: "If the introduction of a competition law improves the dynamic efficiency of an economy, then its growth rate should pick up as a consequence. [Our results show] this is indeed the case and the annual growth rate increases between 2% and 3%. This is, hence, a very substantial effect." Unusually, like earlier work by Voigt (2009), this study shows no effect on productivity growth. The authors state that they suspect this is partly a measurement problem, as TFP effects will take time to emerge, and are hard to measure. Instead, the boost to growth arises from more investment, possibly resulting from lower perceived corruption levels.

In a study focusing on the political effects of competition law, but which uses a similar methodology, **Petersen (2013)** finds a similar effect, concluding: "The introduction of an antitrust institution has a positive effect on the level of GDP per capita and economic growth after ten years, while its effect on the democracy score of a country is statistically insignificant."

Buccirossi et al (2013) estimate the impact of competition policy on total factor productivity growth for 22 industries in 12 OECD countries over 1995–2005. They find a positive and significant effect of competition policy on productivity who strength in the various countries is measured by a set of indexes. They find that the effect is particularly marked for specific aspects of competition policy related to its institutional set up and antitrust activities and is strengthened by the presence of a good legal system, suggesting complementarities between competition policy and the efficiency of law enforcement institutions.

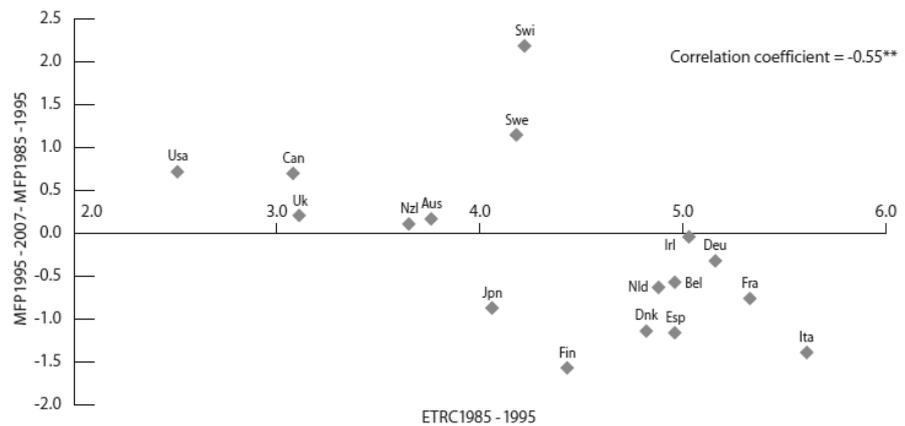
Dutz and Hayri (1999) find, using a cross-section of 52 countries, a positive link between measures of competition law effectiveness and GDP growth. **Clougherty (2010)** uses funding as a measure of a country's commitment to competition policy and finds a relationship with economic growth, concluding: "The coefficient estimate suggests that one standard-deviation (\$58.8 million) would result in increased economic growth by 0.84% points on average."

Borrell and Tolosa (2008) point out that antitrust is often associated with other liberalising policies, and interacts with those policies - especially open trade policies. The authors find: "The impact of antitrust enforcement on total factor productivity is positive and statistically significant, implying that competition policy effectiveness raises productivity. The estimates suggest that increasing the average antitrust effectiveness in one standard deviation would increase average total factor productivity by 28%. The problem with this estimate is that we do not know in how much relates to the competition effect, and how much to the selection effect." The study assesses the combined effect of the two policies, finding that examining competition law alone over-states its effect on productivity growth. However, they also note that competition law and trade openness reinforce one another, hence they should not be seen as alternatives but also as complements.

The evidence base regarding product market deregulation is stronger still, because there have been many different deregulation events, allowing comparison between industries, between countries and over time. Furthermore, regulatory policies specifically designed to introduce and promote competition – especially in network industries – have resulted in productivity gains.

The OECD – see for example [Nicoletti \(2003\)](#) – has been an important source of evidence that product market deregulation can result in increased growth, for example by shifting resources from less efficient to more efficient providers, through the process of competition. Studies based on the OECD’s Product Market Regulation (PMR) indicators provide some evidence of this at national level. For example, [Arnold, Nicoletti and Scarpetta \(2011\)](#) note a statistically significant negative correlation between the level of product market regulation and the change in multi-factor productivity when comparing two time periods. The chart below illustrates this:

Figure 3: Product market regulation and productivity acceleration



The vertical axis shows the difference in multi-factor productivity growth (from the OECD database) comparing the period 1995-2007 with 1985-1995, and the horizontal axis shows the level of product market regulation as measured by the OECD’s PMR indicators in selected sectors in 1985-1995.

Source: [Arnold, Nicoletti and Scarpetta \(2011\)](#)

[Jaumotte and Pain \(2005\)](#), again for the OECD, use panel regressions to investigate determinants of business R&D intensity and patenting for a sample of 20 OECD countries over the period 1982-2001. They find that product market competition, measured by the OECD’s PMR indicators, is a significant positive contributor to R&D.

[Ospina and Schiffbauer \(2010\)](#), in a study of Central and Eastern European and Central Asian ‘transition’ economies, find: “Using firm-level observations from the World Bank Enterprise Survey database, we find a positive and robust causal relationship between our proxies for competition and our measures of productivity. We also find that countries that implemented product-market reforms had a more pronounced increase in competition, and correspondingly, in productivity: the contribution to productivity growth due to competition spurred by product-market reforms is around 12-15%.”

The effect of competition on inequality has been little studied, and is often assumed to be malign as competition creates winners and losers. However, restricting competition causes harm to the many, while the profits generally go to the few.

When monopolies or restrictions on competition raise prices, they cause harm to ordinary people, including the poorest people. Many studies have noted that poorer people seem often to suffer disproportionately from the exercise of market power.

For example, [Hausman and Sidak \(2004\)](#) note that poorer and less educated customers in the US pay more for their mobile telephony services than better educated and more affluent customers, even controlling for the level of usage. The authors also noted that margins for the mobile telephony services studied were rising, causing them to doubt the industry's claims that the market was highly competitive. The authors expected that deregulation allowing entry of the "Regional Bells" into the long-distance market, would reduce this market power, benefiting the poor and less educated.

In a study with the OECD and the Mexican Federal Competition Commission, [Urzua \(2013\)](#) examines the distributional effects of monopoly power. He reports: "the welfare losses due to the exercise of monopoly power are not only significant, but also larger, in relative terms, for the poor. Moreover, the losses are different for the urban and rural sectors, as well as for each of the states of Mexico, being the inhabitants of the poorest ones the most affected by firms with market power." Similarly, [Creedy and Dixon \(1998 and 1999\)](#) find that monopoly harms lower income groups more than higher, in studies on Australia and New Zealand.

[Schivardi and Viviano \(2011\)](#), surveying the literature on retail competition, note: "The available evidence for retail trade indicates that liberalisations are especially beneficial for low-income people: consumers enjoy lower prices ([Griffith and Harmgart, 2008](#)) and employment increases ([Bertrand and Kramarz, 2002](#); [Viviano, 2008](#)). Despite this, free market policies are often opposed by a vast spectrum of political parties, including those more representative of low-income individuals ([Alesina and Giavazzi, 2007](#))."

Effects on those at the other end of the income distribution – the rich - have been studied less. However, [Comanor and Smiley \(1975\)](#) used simple estimates of the prevalence of monopoly profits, together with data on the heritability of wealth, to suggest that in the US, more than half of the wealth of the richest 2.4% of households was ultimately derived from monopoly profits, through inheritance. Essentially, the study uses little more than guesswork (erring on the side of being conservative), but it seeks to make the point that the heritability of wealth implies that even quite small rents accruing to the rich from monopoly gains can profoundly affect wealth (and therefore income) inequality over a long enough period of time.

It would be interesting to study the effects of competition, or competition policy, on well-being measures such as the OECD's Better Life Index⁶. [Stucke \(2013\)](#) argues that competition policy can and should lead to an economy and society that is more effective at promoting well-being and happiness, noting: "Although competition at times can increase misery, the relative unhappiness of citizens in centrally planned economies suggest that the economic freedom and opportunity available in competitive markets are better alternatives. [...] A competitive market structure promotes economic opportunity and personal autonomy - a key predictor of well-being. [...] Thus, a competitive marketplace, in dispersing economic and political power, can foster activities, which are correlated generally with healthier and happier people." As far as we are aware, there are no empirical studies of this suggestion, as yet.

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This index measures well-being in a number of countries. For more information, see www.oecdbetterlifeindex.org.

Similarly, there is often a gap between reality and perceptions when employment concerns are prominent. It is true that the productivity gains caused by competition can result in layoffs, but this is no more likely to add to unemployment in aggregate than any other form of technical progress. Furthermore, restrictions on competition often reduce output and employment.

Competition results in cost savings, and especially in innovation to find new ways of cutting costs. This often includes reducing the size of the workforce. As noted above, the reform of previously regulated sectors to allow competition has often resulted in very large reductions in labour costs, particularly when accompanied by privatisation. For example, labour productivity in the UK electricity generation sector doubled following privatisation and the introduction of competition: output remained essentially the same but employment halved. Bloom *et al* (2011) found that employment fell in the sectors most affected, as did Schmitz's (2005) study of iron ore mines in North America.

However, these changes are no more likely to add to unemployment in aggregate than any other form of technical progress, or any other form of productivity growth. Technical advances in agriculture have led to reductions of over 90% in the workforce employed per unit of output in advanced countries, but no one would seriously identify this as a cause of unemployment today. Restricting competition deliberately to preserve inefficiency just to 'protect jobs' would be equivalent to deliberately suppressing new technologies for the same reason – a policy with obvious failings, especially in the long term.

The overall level of employment in an economy will be affected by many factors, not least the economic cycle and the overall fiscal and monetary stance. By affecting the supply-side efficiency of the economy, however, some economists argue that increased competition in product markets can increase the overall level of employment in the medium to long term.

For example, Griffith *et al* (2007) find that product market liberalisation (through policy shocks such as the EU single market) reduces unemployment. The effect is strongest for countries with strong labour unions, implying that product market competition diminishes the monopolistic power of unions. For example, their results imply that joining the Single Market Programme would reduce unemployment by 1.3%, in an economy in which unions have strong bargaining power. In effect, product market competition acts as a substitute for labour market competition. Fiori *et al* (2012) conduct a similar analysis using regulatory restrictions on product market competition, and reach similar findings, concluding: "When labour market regulation is high [...], the positive effect of deregulation on employment is quite substantial – 1.07% on impact and 3.52% in the long run – and significant at the 1% level. Another way to highlight the different effect of product market deregulation in different labour market settings is to consider that one standard deviation decrease in [the measure of product market regulation] generates a long-run gain in the employment rate of 1.10% in France (a high [labour market regulation] country) and of only 0.6% in Ireland (a low [labour market regulation] country)."

Given the many influences on economy-wide employment, it is helpful also to look at evidence at a sectoral level. The retail sector provides a good example: policies that restrict competition, such as land planning restrictions, or constraints on pricing, are often justified by reference to the need to preserve jobs in smaller retailers that would otherwise be replaced by less labour-intensive hypermarkets (the "Wal-Mart" effect). This can be studied by comparing employment in countries or regions with different regulations, or by looking at the effects of a superstore entering. As with many economic problems, it is important to look at all of the effects it generates, not only the immediate ones. A policy that saves one job will reduce employment if it somehow prevents 1.1 jobs from being created, as preserving inefficient means of production often will.

Bertrand and Krammarz (2001) found that zoning restrictions in France in the 1970s reduced employment in retail, concluding “Our findings indicate that retail employment could have been more than 10% higher today had entry regulation not been introduced. Promoting product market competition may thus be a key reform for countries with poor employment performance.” In the UK, **Sadun (2008)** concludes: “Entry regulations against big-box retailers have been introduced in many countries to protect smaller independent stores. Using a new dataset from the UK, I show that in fact these entry regulations have been associated with greater employment declines in independent stores.” In Italy, **Schivardi and Viviano (2011)** study differences in entry regulations for retailers in different regions, and conclude: “We find that barriers exert a strong influence on performance, increasing profit margins and prices, reducing productivity, ICT adoption, employment and increasing labour costs.”

As for Wal-Mart itself, the effect of its entering a market has been studied intensively. Its entry results in lower prices for consumers. But the effect on local employment is much more nuanced, with some studies finding positive and some negative effects, as local businesses adapt (or fail to) to entry. A balanced account by the Federal Reserve Bank of Minneapolis (**Wirtz, 2008**) reviews this literature, and concludes: “About the most that can be said about Wal-Mart’s effect on jobs is that it is small – even by the standards of counties with modest populations – which itself might be a useful point, given the current rhetoric on both sides.”

Section 3. Overview of main studies providing quantitative assessment of the effects

Statement	Authors	Comment
Effects of competition on productivity and growth		
The most competitive firms experienced productivity growth rates 3.8 - 4.6% higher than the least competitive. "A 25% increase in market share leads to a 1% fall in total factor productivity in the long run."	Nickell (1996)	This classic study has very frequently been cited, and subsequent studies extend the methodology to other countries and more disaggregated data sets.
Total factor productivity in India and China could be 50% higher, without technical change, through greater competition.	Hsieh and Klenow (2009, 2012)	The calculation examines what happens if labour and capital are distributed among firms in the same way they are in the USA, where stronger competition results in winners gaining more.
More competition (e.g. resulting in a 10% reduction in mark-ups) could increase productivity growth in South Africa by 2-2.5% per year.	Aghion et al (2008)	
A study of 22 industries in 12 OECD countries linked the quality of competition policy and productivity. About one fifth of industry productivity growth in a reforming economy (the UK) could be attributed to competition policy improvements.	Buccirossi et al (2013)	The figure is an illustrative one, to make more concrete the effects of the elasticity between TFP and the aggregate Competition Law and Policy Index the authors of the study constructed.
Specific effects of competition law and policy on productivity and growth		
A study of the effects of the UK's 1956 anti-cartel legislation found that collusion was responsible for 20-30% lower labour productivity growth over an 8-year period.	Symeonidis (2008)	The study compares industries affected by anti-cartel legislation in the UK with those unaffected. Labour productivity accelerated in cartel industries.
Increasing competition policy funding by about \$60m would result in increased economic growth of 0.84%.	Clougherty (2010)	Cross-country study of jurisdictions (mainly OECD) applying competition law.
Selective suspension of antitrust laws in the USA in the 1930s reduced manufacturing output by 10%.	Taylor (2002)	This finding is less controversial (and less dependent on labour market effects) than the better known paper by Cole & Ohanian.
Effects of anti-competitive regulation on productivity and growth		
Regulation of inputs (e.g. of professions) found to impose a 0.5% annual productivity growth penalty on downstream industries.	Barone and Cingano (2008)	
A substantial easing (1 standard deviation) in anticompetitive regulation can raise productivity growth rate by over 1%, leading to productivity at least 10% higher in the long run.	Arnold et al (2011)	Finding based on cross-country analysis, using the OECD Product Market Regulation Indicators.
In a comparative study of transition economies, firms facing less competition (20% higher markups) had lower productivity (TFP 1.2% lower). Reforms generated 12-15% increases in TFP, through stronger competition.	Ospina and Schiffbauer (2010)	Data relate to Central and Eastern Europe, and Central Asia.

Statement	Authors	Comment
GDP – aggregate studies		
GDP growth 2% or 3% higher in countries with competition legislation than those without.	Gutman and Voigt (2014)	Cross-country regression analysis. The results do not seem to be driven by productivity, but rather by investment – perhaps reflecting greater confidence in the business environment.
National competition policy added 2.5% to Australian GDP.	Productivity Commission (2005)	
Some case studies		
Labour productivity doubled or tripled in electricity generation, following privatisation.	Jamاسب et al (2004) citing other studies	Private ownership and competition after privatisation – can both affect productivity growth. See Fabrizio (2004) .
US and Canadian iron ore mines doubled labour productivity when liberalisation allowed competition from Brazil.	Schmitz (2005)	
Inequality		
Welfare loss from monopolised products 150% higher in poorest, rural decile, than richest urban decile, in Mexico.	Urzúa (2013)	
Perhaps half of the wealth of the richest households in the USA in the 1970s was derived from monopoly profits.	Comanor and Smiley (1975)	Obviously, a very broad-brush conclusion, but of interest especially in the light of renewed interest in inequalities derived from inherited wealth, following Picketty.
Employment		
A one standard-deviation decrease in product market regulation would generate a long run gain of 1.1% in the employment rate in France.	Fiori et al (2012)	Based on the OECD Product Market Regulation indicators. Effect arises through labour market efficiency.
Zoning regulations in France in the 1970s reduced long-run retail employment by 10%.	Bertrand and Krammarz (2001)	Based on comparative analysis of development of retail sector employment in France and USA.

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