

## Effects of Competition Policy on Macroeconomic Outcomes

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**Abstract** This paper examines existing empirical research regarding the importance of competition and competition policy for variables relevant to macroeconomic outcomes. This research provides evidence on the correlations between competition, competition policy, and macroeconomic outcomes, such as productivity, growth, innovation, employment, and inequality. Competition policy is demonstrated to bring multiple benefits for macroeconomic outcomes in several economic studies. Gains from enhanced competition can essentially be divided into efficiency and redistribution effects. Efficiency gains result from the positive impact of competition on productivity growth, which allows firms and industries to produce more and better products and services at lower cost, whereas redistribution effects are associated with the impact of competition on inequality and employment in the market.

**Keywords:** Competition policy, productivity growth, economic equality, employment

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### I. Introduction

Competition policy governs how businesses interact with both consumers and one another. A country's competition policy is the sum of the competition laws which prescribe anticompetitive behavior, and the effect that public policy may have on competitive processes in the economy. To preserve well-functioning product markets, competition authorities must prevent or correct anticompetitive behavior. Competition policy involves the establishment of the rules of business that level the playing field, promote innovation, safeguard technological neutrality, and correct market failures. Competition policy also represents the attempt to eliminate unnecessary regulations that impose excessive costs on businesses or prevent market entry, as the ultimate end of such policy is to increase social welfare.

In this sense, several economic studies have recognized that competition policy brings multiple benefits for macroeconomic outcomes. Gains from enhanced competition can essentially be divided into efficiency and redistribution effects. Efficiency gains result from the positive impact of competition on productivity growth, which allows firms and industries to produce

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more and better products and services at lower cost, whereas redistribution effects are associated with the impact of competition on inequality and employment in the market.

Economies can achieve efficiency gains from the positive impact of competition on productivity growth, allowing firms and industries to produce a higher rate of improved products and services with decreased expenditure. Firms and industries with greater competition experience faster productivity growth. The competitive state allocates resources to more productive firms, causing superior firms to enter and succeed while inferior firms fail and exit. Competition may also improve firms' management and increase efficiency, as it stimulates innovation and firms' investment, which contributes to higher productivity. Furthermore, stronger competition may not only boost productivity in sectors where the competition occurs but also spill over to other sectors and through the economy more widely. A growing body of studies finds increasing market power and lack of competition to disproportionately harm the poor and narrow labor income shares. The poor, who often have a greater share of staple goods than the rich, suffer more from the lack of competition in staple goods. Finally, some unwarranted concerns have emerged that the productivity gains of competition may result in negative consequences for employment; however, several studies demonstrate that increased competition in product markets can boost the overall level of employment in the mid- to long-term and/or on an aggregate basis.

This paper examines existing research regarding the importance of competition and competition policy for variables relevant to macroeconomic outcomes. This research provides evidence on the correlations between competition, competition policy, and macroeconomic outcomes, such as productivity, growth, innovation, employment, and inequality.

The Organization for Economic Co-operation and Development (OECD, 2014) is the first attempt to summarize the existing evidence on the wider economic effects of competition and competition policy, also providing suggestions and references to aid competition agencies, which are increasingly interested in assessing the effects of policies and the effectiveness of competition interventions. Following the OECD's publication, extensive research has accumulated on the subject. This paper updates and expands on OECD (2014) and gathers new evidence of effectiveness of completion policy on macroeconomic outcomes.

As a literature review, this paper does not contain any new research but compiles important existing material. The remaining sections are divided into three primary macroeconomic outcome variables of productivity growth, equality, and employment.

## II. Effects of Competition Policy on Productivity Growth

### A. Indirect effects of competition policy on productivity via competition

#### 1. Competition boosts economies' productivity

##### 1.1. Firms and industries with greater competition experience faster productivity growth

When consumers can choose and shop around for products and services, firms are compelled to compete, innovate more, and become more productive. Industries experiencing greater competition have accelerated productivity growth, which is confirmed by a wide variety of macroeconomic studies.

A classic reference in this literature is Nickell (1996), demonstrating higher competition to be significantly associated with faster productivity growth. The author analyzes a dataset of 676 UK manufacturing firms from 1972 to 1986 to measure the relationship between product market competition and firms' productivity, finding that the most competitive firms experienced 3.8%-4.6% higher productivity growth than the least competitive. Furthermore, a 25% increase in market share leads to a 1% fall in total factor productivity (TFP) overall. The author concludes: "evidence that competition, as measured by increased numbers of competitors or by lower levels of rents, is associated with a significantly higher rate of TFP growth." Disney, Haskell, and Heden (2003) use a much larger dataset of 143,000 UK manufacturing firms from 1980 to 1992, finding that 50% of UK's labor productivity growth and 80%-90% of TFP growth results from enhanced market competition. Based on the above results, the authors conclude: "market competition significantly raises both the level and growth of productivity."

Further evidence is also provided at the industry level. For example, Griffith, Harrison, and Simpson (2010) examine the effect of the introduction of the Single Market Program (SMP) in Europe in the early 1990s, finding that the SMP increased research and development (R&D) intensity by 1.2% in the UK metal products industry, which was associated with a 0.7% increase in TFP growth. Buccirossi et al. (2013) estimate the impact of competition policy on productivity growth using a sample of 22 industries in 12 OECD countries from 1995 to 2005, determining that the proposed aggregate competition policy indicator (CPI) has a positive and highly significant effect on productivity growth.

Additional empirical studies reveal unambiguous evidence of a strong positive relationship between competition and increased productivity. Ahn (2002) conducts a large-scale survey on this issue, concluding, "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." Crafts (2012) presents an in-depth literature review examining the impact of competition on productivity in the UK, finding that weak competition from the 1930s to the 1970s undermined productivity

growth, but since the 1970s stronger competition has been a key ingredient in ending economic decline. Aghion et al. (2004, 2009) investigate microlevel productivity growth using firm-level and patent panel data for the UK, determining that the wave of reforms in the 1980s introduced greater economic competition. They find that entry from foreign firms leads to greater innovation, faster TFP growth of domestic incumbents, and subsequent aggregate productivity growth. Schmitz (2005) finds that labor productivity in the iron-ore industries of the US and Canada increased by 50% in two years and doubled in five years following Brazilian producers' entry in the early 1980s. Andrews and Cingano (2014) assess the effect of regulatory policies on productivity with a sample of 21 OECD countries, concluding that lowering market regulation raised labor productivity in the EU by about 15% higher, resulting from improved efficiency of resource allocation across firms. Bloom, Draca, and Van Reenen (2016) use China's entry into the WTO in 2001 to examine the impact on the European textile and apparel industries, wherein quotas against China were lifted, determining that the increased competition facilitated by the trade liberalization dramatically raised TFP. The authors demonstrate that Chinese import competition led to increased technical change within firms and reallocation of employment between firms toward more technologically advanced firms. The study estimates these within and between effects to account for at least 14% of European technology gains from 2000 to 2007.

### **1.2. Positive effect of competition on macroeconomic outcomes is confirmed using various empirical studies for multiple countries, including "non-Western" or developing countries**

The positive correlation between competition and productivity growth is demonstrated in studies on multiple countries. In a study covering 179 countries, Gutmann, and Voigt (2014) 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."

In Africa, Sekkat (2009) finds higher markups to have a significant negative impact on productivity growth in Jordan and Morocco, also demonstrating that a decrease in the share of state-owned enterprises in a given industry, whose existence is an obstacle to competition in general, has a significant and positive impact on productivity growth in Egypt. The authors conclude "the greater the degree of competition, the higher the productivity in the three countries." Aghion, Braun, and Fedderke (2008) determine that a 10% reduction in markups would increase 2%-2.5% of manufacturing productivity growth per year in South Africa. The World Bank (2014) estimates that a 5% decrease in price-cost margins would increase ~5% of labor productivity and 4.5% of GDP growth in Tunisia.

Among Asian countries, in Japan, Okada (2005) demonstrates 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." Funakoshi and Motohashi (2009) use a sample of 2,400 Japanese firms, demonstrating a negative relationship between market concentration and productivity growth. In Korea, Kim (2000) estimates that the series of trade liberalizing efforts since the 1966-1968 period increased the TFP growth by ~2% by the 1985-1988 period. Finally, Baek, Kim, and Kwon (2009) determine that the reinforcement of competition after the Asian financial crisis positively and significantly contributed to the TFP growth.

Examining a panel of Turkish firms from 2005 to 2008, the World Bank (2013) finds that a 10% decrease in the average price-cost margins through an increase in competition would lead to a 4.5% increase in the annual rate of productivity growth. Ospina and Schiffbauer (2010) analyze 27 countries in Eastern Europe and Central Asia, finding a positive causal relationship between competition and productivity, stating: "firms with 20% higher markups have, on average, 1.2% lower TFP levels and 8% lower labor productivity."

Studies on Latin America also suggest restrictions on competition to be a primary constraint on productivity growth. Cole et al. (2005) argue that competitive barriers, such as high protectionism (e.g., high tariffs and significant use of quotas) and high entry barriers, are a promising channel for low Latin American TFP. The authors also document microeconomic cases in Latin America in which reductions in competitive barriers increase continental productivity to Western levels. For example, they find that nationalization of the Venezuelan oil industry between the 1950s and the 1970s, which terminated international rights to extract oil and eliminated the efficient international management of the industry, led to a substantial loss of productivity and output. Before 1970, output and productivity rose considerably, growing at rates of ~4.5% and 7.5%, respectively; however, output and productivity began to decline after 1970, and fell sharply just before the nationalization. By the time of the nationalization in the mid-1970s, productivity had returned to its 1964 level, and output had returned to its 1957 level. Restuccia (2013) demonstrates that low GDP per capita in Latin America relative to the US is primarily due to low relative TFP, estimating that only a 1.0 to 1.6 difference in TFP would be needed to explain a one to fourfold difference in GDP per worker between Latin America and the US. The author suggests that barriers to formal market entry, regulation and barriers to competition, trade barriers, and employment protection are the core facilitators of the productivity differences, determining that removing these barriers could lead to a fourfold increase in long-run labor productivity in Latin America relative to the US. This increase in income amounts to 70 years of postwar economic development in the US.

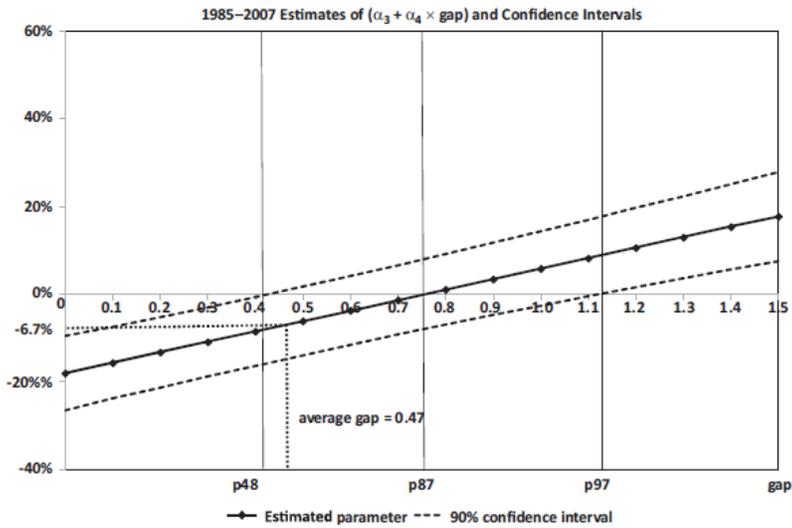
### 1.3. Stronger competition may not only boost productivity growth in sectors where the competition occurs but also spill over to other sectors and more widely through the economy

The effects of stronger competition can generate broader spillover effects across economies. Vigorous competition in upstream sectors can "cascade" to improve the productivity of downstream industries which use intermediate inputs from the upstream industries. As proposed in Bourlès et al. (2013), increased competition in upstream sectors may benefit downstream productivity in several ways. For example, the availability of new services and products due to the entry of new providers may lead to productivity-enhancing changes in downstream sectors. Moreover, reducing market power in upstream sectors may enhance innovation incentives in downstream sectors, if part of the innovation rent was previously appropriated by upstream providers.

Barone and Cingano (2011) demonstrate that regulations reducing competition in upstream services (particularly energy supply and professional services) increases productivity growth in downstream industries that rely heavily on those services. For example, the authors find that the annual productivity growth differential between pulp/paper and fabricated metal products (the two industries at the 75th and 25th percentile of the distribution of service-dependence, respectively) is approximately 0.9% larger in a low service regulation country (Canada) than on with high service regulation (France). Arnold, Javorcik, and Mattoo (2011) identify a similar positive relationship between services sector reform and the performance of domestic firms in downstream manufacturing sectors in the Czech Republic. The authors estimate that the productivity of downstream manufacturing sectors in the Czech Republic will decrease by 7.7% with the service liberalization level of Romania, which has made considerably less progress in liberalizing its services sectors. In India, Arnold et al. (2016) find services sector (banking, telecommunications, insurance, and transportation) reforms to have a significant impact on firms in the downstream manufacturing sector: "The aggregate effect of services liberalization was an increase in productivity of 11.7% for domestic firms and 13.2% for foreign firms for a one-standard-deviation increase in the liberalization index."

Bourlès et al. (2013) analyze panel data on 15 OECD countries and 20 industries from 1985 to 2007, determining anticompetitive upstream regulations to have curbed multifactor productivity (MFP) growth in downstream industries. The authors find that if each country's regulations were aligned to the most procompetitive states observed in the OECD area, yearly gains in MFP growth would be nearly as high as 1% over the medium term. Moreover, they demonstrate that the negative relationship between upstream regulations and downstream productivity is particularly strong for firms that are the most productive in their sector and the technological frontiers. Interestingly, the estimated negative impact has increased over time with expanding globalization and diffusion of ICT (Figure 1). Using panel data of 15 OECD countries and 13 industries from 1987 to 2007, Cette, Lopez, and Mairesse (2017) also find that a significant part of the cascade impact on productivity is primarily transmitted through R&D and ICT channels.

**Figure 1.** Impact of a one-unit increase in the burden of upstream regulations for downstream industries on downstream multifactor productivity growth



(Source) Bourlès et al. (2013)

#### 1.4. Three main mechanisms of competition to increase productivity growth

There are three main mechanisms described in the literature to explain how competition boosts productivity growth.

##### 1.4.1. Competition allocates resources to more productive firms, causing superior firms to enter and succeed while inferior firms fail and exit (between-firms effect)

Research demonstrates that productivity growth is largely driven by reallocation from less to more productive firms. Competition leads to improved allocative efficiency by allowing more efficient firms to enter and gain market share at the expense of less efficient firms (the "between-firms effect").

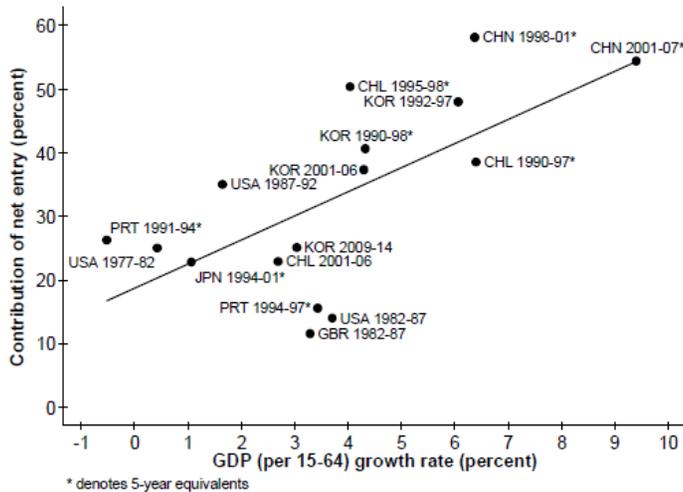
Syverson (2004a, 2004b) analyze the data of ready-mixed concrete firms and other firm-level data from 443 manufacturing industries in the US, determining that more competitive industries exhibit less productivity dispersion and have higher average productivity levels. The author demonstrates that more competitive industries tend to have a smaller tail of less-productive firms because increased substitutability drives less-productive firms out of the market and truncates the productivity distribution from below, resulting in higher minimum and average productivity levels and less productivity dispersion.

In the context of the effect of anticompetitive regulation, the finding that productivity growth is largely driven by reallocation from less to more productive firms is discussed at length in

Arnold, Nicoletti, and Scarpetta (2011). Based on the studies surveyed, the authors suggest that countries and industries with lighter regulatory burdens have experienced higher productivity growth overall. They also find that the reallocation of resources toward the highest-productivity firms is stronger where such burdens are lighter.

Several studies attempt to quantify the between-firms effect. For example, Disney, Haskell, and Heden (2003) find that 50% of UK labor productivity growth and 80%-90% of TFP growth between 1980 and 1992 can be explained by external restructuring effects (i.e., the impact of market entry and exit and interfirm reallocations in market share). Baldwin and Gu (2006) examine Canadian manufacturing industries from 1979 to 1999, demonstrating that about 70% of overall labor productivity growth is related to resource reallocation, by which higher productivity firms gain market share from the less-productive firms. Andrews and Cingano (2014) assess the importance of regulatory policies for productivity via the resource allocation channel with a sample of 21 OECD countries, once again confirming the positive effect of product market reform. The authors conclude that lowering product market regulation (PMR) would raise labor productivity in the EU about 15%, resulting from improved efficiency of resource allocation across firms. They also find that regulations are more disruptive to allocative efficiency and productivity in innovative (patent intensive) sectors.

In "non-Western" countries, Brandt et al. (2012) estimate that firms' entry and exit accounts for 72% of Chinese manufacturing productivity growth from 1998 to 2007. The authors suggest that the contribution of net entry in China is massive, considering that the comparable share for the US from 1977 to 1987 was 26% of productivity growth. Hsieh and Klenow (2009, 2014) suggest that the low productivity of China and India may be due to the allowance of less efficient firms' survival for much longer than in the US. A lack of effective competition is presumably one of main reasons for this, and the effect is considerable. The authors estimate that if China and India had allocated resources among firms as efficiently as the US (i.e., if more productive firms employed more labor and capital, to the degree they do in the US) in the 1990s, manufacturing TFP could have increased by 30%-50% in China and 40%-60% in India. In Chile and Korea, Asturias et al. (2019) find net entry to account for a larger fraction of aggregate manufacturing productivity growth during periods of faster GDP growth. The authors estimate that entry and exit account for less than 25% of aggregate manufacturing productivity growth during periods of slow growth; however, during periods of rapid GDP growth, entry and exit is estimated to account for 37%-58% of aggregate manufacturing productivity growth. They also suggest that the greater contribution of net entry during periods of rapid growth is primarily driven by the change in the relative productivity of entering and exiting plants, rather than differences in their market share (Figure 2).

**Figure 2.** Contribution of net entry and GDP growth

(Source) Asturias et al. (2019)

#### 1.4.2. Competition may improve firms' management and increase productivity efficiency (within-firm effect)

Second, competition boosts firms' productive efficiency through improving management and production processes (the "within-firm effect"). Best management practices spread quickly in highly competitive markets, as the fear of bankruptcy is higher, and incumbents are pushed to improve practices. Moreover, poor management practices are abandoned, as poorer-performing firms are forced to leave the market. Nickell (1996) argues that the productivity-enhancing effects of competition are greater for companies in which shareholdings are dispersed, compared to those that are solely owned and managed, suggesting that product market competition functions to discipline managers when shareholder control is weak.

Several studies demonstrate a positive relationship between product market competition and the quality of firms' management. For example, Schmitz (2005) analyzes the iron-ore industry in the US and Canada. At the end of the 1970s, Great Lakes iron-ore producers had faced no competition from foreign producers in the Great Lakes steel market for nearly a century; however, in the early 1980s, Brazilian producers were offering to deliver iron ore to the Great Lakes market at substantially lower prices than the local iron-ore. In response to this arrival of new competitors, the author finds that Great Lakes iron-ore producers dramatically increased labor productivity and production of tons of iron ore per hour increased by 50% in two years and doubled in five years. The author also shows that most productivity gains were realized because of cost-cutting measures and organizational changes that were costly to incumbent workers and firms. Great Lakes producers realized productivity gains through reduced overstaffing,

optimized production processes to use equipment more hours per day and altered work practices, which increased material and capital productivity.

Some scholars are particularly active in examining the correlations between product market competition and management quality. Bloom and Van Reenen (2007, 2010) present an interview-based crosscountry survey (World Management Survey) of the management practices of almost 6,000 firms, finding a strong positive relationship between the quality of management and competition measures. The authors demonstrate that countries with low productivity growth often have a long "tail" of very poorly managed firms at the bottom of the distribution (as opposed to being inferior all across the distribution), and that market competition helps to expel this "tail" through a combination of firm exits and compelling incumbents' improvement of management practices. Competition is robustly and positively associated with higher management practice scores. The authors conclude, "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)." Van Reenen (2011) presents a literature review on theoretical and empirical perspectives regarding the positive relationships between competition, management quality, and productivity. Bloom et al. (2015) explicitly consider endogeneity, using political competition as an instrumental variable to account for the unusually high number of regional hospitals in some areas of the UK public healthcare system (hospitals are rarely closed down in politically marginal constituencies). The authors find that higher competition results in higher management quality and improved hospital performance, noting, "adding a rival hospital increases management quality by 0.4 standard deviations and increases survival rates from emergency heart attacks by 9.7%." Bloom, Draca, and Van Reenen (2016) examine the impact of increased competition among 12 European countries following China's entry into the WTO in 2001, demonstrating a positive causal impact of competition on management quality, in addition to innovation and productivity.

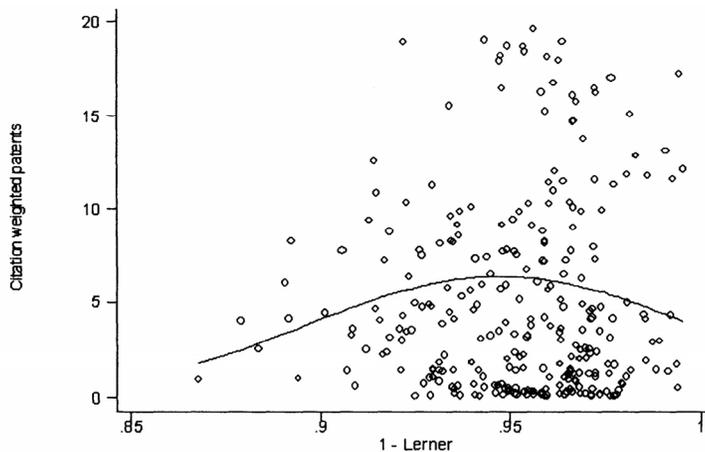
#### **1.4.3. Competition stimulates firms' innovation and investment, which contributes to higher productivity growth (dynamic effect)**

Third evidence indicates that promoting competition stimulates firms' innovation and investment. Griffith, Harrison, and Simpson (2010) examine the effect of the introduction of the SMP in Europe in the early 1990s, finding that the SMP increased R&D intensity in the UK metal products industry by 1.2%, which was associated with a 0.7% increase in TFP growth. Lee (2009) uses World Bank survey data for nine industries across seven countries, demonstrating that firms' R&D response to competitive market pressure primarily depends on the level of technological competence or R&D productivity, wherein intensity of competition may stimulate more capable firms to invest more heavily in R&D, while less capable firms may invest less.

Regarding the general relationship between competition and innovation, which is not always

clear, based on UK data, Aghion et al. (2005, 2009) find evidence of an "inverted-U-shaped" relationship in which moderately competitive markets are likely to be the most innovative, while monopoly or highly competitive markets innovate less. In neck-and-neck industries where incumbents adopt similar technologies and are equally efficient, competition may increase the marginal profit from innovation (the "escape-competition effect"). In contrast, in unlevelled sectors, more competition may reduce innovation because the laggard's incentive for catching up with the leader may decrease (the "Schumpeterian effect"). The authors demonstrate that "when competition is low, a larger equilibrium fraction of sectors involve neck-and-neck competing incumbents, so that overall the escape-competition effect is more likely to dominate the Schumpeterian effect. In contrast, when competition is high, the Schumpeterian effect is more likely to dominate." From a policy perspective, the inverted-U-shaped relationship suggests that procompetition policy interventions boost innovation, as such interventions primarily focus on concentrated markets in which competition does not work well (Figure 3).

**Figure 3.** Product market competition (price-cost margin) and innovation (patent citations)



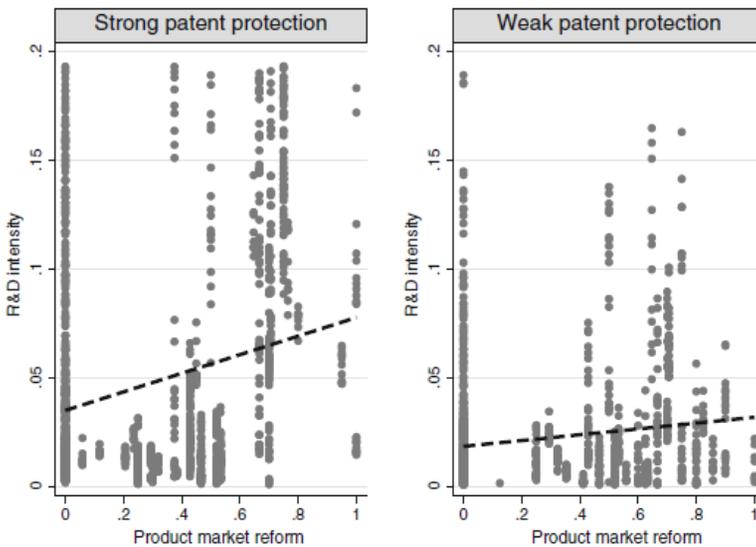
(Source) Aghion et al. (2005)

Subsequent studies in other countries and industries elicit comparable results. For example, Carlin, Schaffer, and Seabright (2004), Polder and Veldhuizen (2012) and Bos, Kolari, and Van Lamoen (2013) present evidence of an inverted-U-shaped relationship between competition and innovation in Central/Eastern Europe, the Netherlands, and the US banking industry, respectively.

The interaction between competition and intellectual property rights (IPRs) is also emphasized in the literature. Correa and Ornaghi (2014) use an analytical tool similar to Aghion et al.'s (2005), applying it to US industry data and revealing a positive monotonic relationship between competition and innovation. The authors suggest that in an economy with strong IPR protections,

competition substantially increases innovation, and productivity growth. Aghion, Howitt and Prantl (2015) also provide compelling evidence that strong patent rights may complement competition-increasing product market reforms that further stimulate innovation. The authors find that product market reform induced by the large-scale internal market reform of the EU in 1992 enhanced innovation for industries in countries with strong patent rights, but not for industries in countries with weaker patent rights (Figure 4).

**Figure 4.** Patent protection, product market competition, and innovation



(Source) Aghion, Howitt, and Prantl (2015)

Fostering competition is also crucial in the digital economy, which allows firms to leverage expanding consumer networks, instantaneously access multiple geographical and product markets, and exploit increasing returns to scale from intangible assets. As suggested in OECD (2018), successful digital transformation requires more firms to adopt contemporary technologies and transform business models. Competition is essential for ensuring this dynamic, as it compels firms to adopt innovative technologies and helps successful firms grow and enhance market share. Andrews, Criscuolo, and Gal (2016) find that productivity divergence between frontier firms (particularly those in the ICT sector) and laggard firms is extremely high in sectors where procompetitive product market reforms or deregulation are least extensive.

Some studies focus on the link between competition and investment, suggesting that the potential for market power and reduced competition may not only create inefficiencies and reduce output but also reduce future growth rates through investment effects. As a firm's market power increases, it can increase its profits by charging higher prices and reducing output. This

gives a firm incentive to reduce demand for capital and reduce investment. The International Monetary Fund (IMF, 2019) finds that a 10% increase in firms' markup is associated with a statistically significant 0.6% decrease in physical capital investment in 27 countries since 2000.

Others focus on the correlation between increased market concentration and relative weakness of corporate investment in the US since the early 2000s, arguing that increased concentration and decreased competition in many industries explains a substantial portion of the decline in investment. For example, Gutiérrez and Philippon (2017a) examine the reasons for the lower-than-expected private fixed investment, controlling for current market conditions, and find that industries with less competition and more concentration (traditional or common ownership) invest less in the US. The authors conclude: "A rise in market power might therefore be responsible for some of the decline in measured TFP growth and labor supply. If our conclusions are correct, they suggest that US policymakers should focus on increasing competition in the market for goods and services." Gutiérrez and Philippon (2017b) demonstrate that industry leaders in the US manufacturing industry invest and innovate more in response to exogenous changes in Chinese competition. Beyond manufacturing, the authors show that excess entry in the late 1990s predicts higher industry investment. Furthermore, Eggertsson, Robbins, and Getz Wold (2018) find that an increase in markups will lead to stagnation in investment, despite historically low interest rates.

## **2. Stronger competition policy leads to increased competition**

### **2.1. Competition policy interventions rarely directly target productivity growth; instead focusing on promoting or preserving competition itself**

Some studies analyze the impact of competition policy on the degree of competition. For example, Dutz and Vagliasindi (2000) examine data from transition economies in Eastern Europe and the former Soviet Union that adopted competition laws by the 1990s, finding a robust positive correlation between effective competition policy implementation and competition intensity, as captured in firms' economy-wide mobility. The authors demonstrate that more effective competition policy implementation leads more efficient private firms to increase their share or enter the market. Krakowski (2005) analyzes the link between the perceived effectiveness of competition policy and the perceived intensity of competition examining World Economic Forum survey data for 101 countries. The author determines that the perceived intensity of local competition is positively affected by the perceived effectiveness of competition policy. Gutmann and Voigt (2014) find the introduction of competition legislation to significantly improve the perceived effectiveness of antimonopoly policy. Gutiérrez and Philippon (2019) suggest that the EU has become relatively more procompetition than the US over the past 15 years, as European PMRs and barriers to entry have decreased, while they have remained stable or increased in the US. The authors argue that European competition institutions (e.g., the Directorate-General for Competition)

are more independent and enforce competition more strongly than any individual country has and countries with ex-ante weaker institutions benefit more from the delegation of competition policy to the EU level.

Other research focuses on the deterrent effects of competition enforcement. For example, Baker (2003) provides evidence that periods of lax antitrust enforcement in the US are followed by increased anticompetitive behavior, and stricter competition enforcement may contribute to greater cartel deterrence. 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, Connor and Bolotova (2006) find that the stronger the competition regime, the lower the cartel overcharge. Chicu, Vickers, and Ziebarth (2013) examine how the National Industrial Recovery Act (NIRA) of 1933, which legalized cartels in participating sectors, affected the cement industry of the US. The authors reveal compelling evidence that NIRA facilitated collusion, noting: "before the NIRA, the costs of a plant's nearest neighbor had a positive effect on a plant's own price, suggesting competition. After the NIRA, this effect is completely eliminated, with no correlation between a plant's own price and its neighbor's cost." More recently, Hyttinen, Steen, and Toivanen (2018) determine that at the end of a period when cartels were not prohibited by competition law in Finland (1951-1990), almost all manufacturing industries became cartelized. The authors conclude: "Our results suggest that deterring harmful cartels by competition policy is indeed of first-order importance [...], in the absence of it, much of manufacturing would be cartelized."

Overall, regarding the effect of competition policy on competition and productivity, the evidence suggests that successful competition policy interventions may promote competition; therefore, it may contribute to the enhancement of productivity growth.

## **B. Direct effects of competition policy on productivity**

### **1. Effects of regulatory competition enforcement on productivity**

Several studies have evaluated the direct relationship between competition policy enforcement and productivity growth. These studies can be categorized into two groups: (i) studies investigating crosscountry comparisons; (ii) studies assuming a more historic perspective, tracing the impact of competition policy changes over time.

#### **1.1. Countries that introduced competition laws or enforced competition law more effectively achieve faster productivity growth (crosscountry comparisons)**

Many studies on the effect of competition law conduct international comparisons of different countries' experiences to assess whether countries which introduced competition laws or enforced competition law more effectively achieve faster productivity growth. For this category of analyses, it should be noted that it is challenging to isolate the impact of competition policy

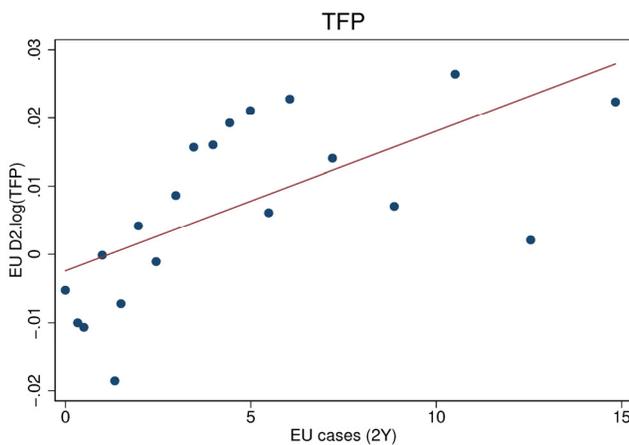
from other factors that might affect productivity. For example, the effectiveness of competition policy might be correlated with the strength of other policy measures introduced at a similar time, yet without controlling for these other factors, there is a risk of overestimating the impact of competition policy. Various econometrics approaches, such as instrumental variables and difference-in-differences estimates are helpful for correcting the above endogeneity problem.

Some research focuses on the correlation between the intensity or effectiveness of competition policy and productivity growth. Clougherty (2010) uses competition authorities' annual budget as a measure of countries' commitment of resources to competition policy, finding that increased funding by one-standard-deviation (\$58.8 million) would result in increased economic growth by 0.84%. Using a sample of 22 industries in 12 OECD countries from 1995 to 2005, Buccirossi et al. (2013) estimate the impact of competition policy on productivity growth. The authors construct the previously introduced aggregate CPI to capture the effectiveness of competition policy in each country, then estimating the relationship between CPI and productivity growth, controlling for factors, which might be correlated with the competition policy (e.g., PMR, liberalization, privatization, and trade openness) using instrumental variables. The findings indicate that aggregate CPI has a positive and highly significant effect on productivity growth. In addition, this effect is strengthened by the presence of an effective legal system, suggesting complementarities between competition policy and the efficiency of law enforcement institutions. Gutiérrez and Philippon (2019) expand on Buccirossi et al. (2013) by studying outcomes of actual enforcement at a more granular industry level, using the US as a control group for EU enforcement activity. By regressing TFP growth in Europe on the strength of competition enforcement (i.e., number of antitrust cases) in the corresponding industry, controlling for changes in TFP and enforcement in the US, the authors demonstrate that stronger enforcement in Europe is correlated with faster TFP growth (Figure 5).

Some research takes an alternative approach to analyse the impact of the introduction of competition laws on productivity. Petersen (2013) analyzes data from 154 countries from 1960 to 2005, applying difference-in-differences estimation to determine that competition law has a positive effect on the level of GDP per capita and economic growth after 10 years, as new institutions take time to run effectively and have a noticeable effect on the overall economy. Similarly, Ma (2011) also focuses on the importance of institutional structure, demonstrating that in less developed countries, the introduction of competition laws appears to have relatively less impact than in more developed countries. The author suggests that this is because institutional frameworks for enforcing competition law in less developed countries are weaker. Examining data from 179 countries from 1971 to 2012 with a difference-in-differences approach, Gutmann and Voigt (2014) attempt to determine whether competition law (and the time since its introduction) explains growth rates and productivity. They reveal a highly significant effect of the presence of competition law on growth, concluding, "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." Notably, like the earlier work of Voigt (2009), this study reveals no effect on productivity growth. The authors indicate that this may be partly a measurement problem, as TFP effects take time to emerge and are hard to measure. Instead, the boost to growth arises from more investment, potentially resulting from lower perceived corruption levels.

**Figure 5.** EU enforcement activity and TFP



(Source) Gutiérrez and Philippon (2019)

Other studies focus on the dynamic effects of competition policy. For example, Marinova, McAleer, and Slottje (2005) find that higher levels of civil antitrust enforcement by the US Department of Justice (as a measure of the seriousness of US antitrust enforcement) leads to a significantly higher number of patent filings, suggesting that effective competition law enforcement boosts innovation. Bütthe and Cheng (2017) reveal a robust, highly significant positive correlation between the length of time which a country has had competition law (after a five-year lag) and innovation (measured by the number of patent applications) in cross sectional and panel analyses for OECD and developing countries from 1965 to 2014.

### 1.2. Historical evidence demonstrates that suspension of competition law harms productivity growth (time-series analyses)

In addition to the above cross sectional evidence from different countries, other studies take a more historic perspective, tracing the impact of competition policy changes over time. For example, the introduction, suspension or reimplementaion of competition law provide useful quasi experiments to analyze the impact of competition policy changes on industries' productivity.

Symeonidis (2008) examines the effects of the 1956 Restrictive Practices Act (RPA) in the UK. This legislation outlawed cartels, which were previously legal, causing intensification of price competition in many industries during the 1960s. The author compares the labor productivity growth of industries that previously cartelized to those that were not cartelized before and after the introduction of the RPA, revealing robust evidence that the removal of cartels resulted in a faster labor productivity growth (i.e., labor productivity increased by about 16% from 1963 to 1973).

In the US, the NIRA of 1933 legalized cartels in participating sectors to boost the national economy following the Great Depression. Firms could be authorized to establish cartels, agreeing with competitors to fix prices, in exchange for agreement with unions to maintain wages and employment. Several studies have concluded that this suspension of competition laws weakened economic recovery in the US. Taylor (2002) finds that the NIRA generated a 10% reduction in manufacturing output in early 1934. Taylor (2007) confirms this basic finding, presenting a more detailed assessment of seven provisions in cartel codes that affected the output of 66 US industries before, during, and after the period of NIRA enforcement. Furthermore, Cole and Ohanian (2004) argue that the legalization of cartels under NIRA delayed economic recovery from the Great Depression in the US for seven years, although the assertion of this extraordinarily large effect is controversial.

Cole and Ohanian (2013) expand the analysis using panel data from 18 countries to examine the correlation between crosscountry differences in the severity of the Depression and in the expansion of cartel policies. The authors find cartel policy shocks to account for the bulk of the Depression in the countries that adopted significant cartel policies, including the considerable economic crises in the US, Germany, Italy, and Australia. Petit, Kemp, and Van Sinderen (2015) assess the impact of cartel formation on productivity in the Netherlands, where cartels were permitted but had to be announced on a public register until 1998. The authors consider data from 27 industries in the Netherlands from 1982 to 1998, determining that the presence of cartels restricts productivity growth. "We can tentatively state that the presence of at least one cartel resulted in an approximate 3% reduction of the TFP growth in the manufacturing industries, in the nonmanufacturing industries this is 2%."

## **2. Effects of competition advocacy on productivity**

Several studies examine the correlations between productivity growth and competition advocacy, including trade liberalization or deregulation, by which competition authorities advise and/or collaborate with other regulators or government agencies. This is an alternative approach that avoids measuring competition, instead examining the effects of policy changes that can be expected to result in a rapid increase in competition (however it is measured).

### 2.1. Trade liberalization enhances market competition and contributes to productivity growth

In general, more openness to trade appears to be associated with faster growth, although many factors other than product market competition may also have an effect. For example, Trefler (2004) estimates these effects in Canadian manufacturing following the US-Canada free trade agreement, which was implemented from 1989, revealing significant increases in productivity among both importers and exporters (i.e., for industries that experienced the deepest Canadian tariff cuts, industry-level labor productivity increased by 15%, and for industries that experienced the largest US tariff cuts, plant-level labor productivity rose by 14%). Schmitz (2005) conducts a case study of US and Canadian iron-ore mines after liberalization led to competition from Brazil, determining that labor productivity in the US and Canada increased by 50% in two years and doubled in five years after Brazilian producers entered the industry in the early 1980s. Sharpe and Currie (2008) present a case study of the Canadian wine industry, which was 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." Aghion et al. (2004, 2009) demonstrate that the entry of foreign firms in the 1980s led to greater innovation and faster productivity growth of domestic incumbent firms, leading to faster aggregate productivity growth in the UK. In Korea, Kim (2000) estimates that the series of trade liberalizing efforts since the 1966-1968 period increased TFP growth by about 2% by the 1985-1988 period.

Some research suggests that there is a substantial degree of resource reallocation across firms within an industry following trade liberalization, and these shifts in resources contribute to productivity growth. Melitz (2003) constructs a model, determining that trade liberalization may result in labor reallocation from low- to high-productivity firms, which would increase average productivity based on selection. Pavcnik (2002) investigates the impacts of Chilean trade liberalization during the late 1970s and early 1980s on firm productivity, finding that aggregate productivity increased by 19% over seven years after trade liberalization; 6.6% due to increased productivity within plants, and 12.7% due to the reallocation of resources to more efficient producers. This suggests that the improvements in aggregate productivity attributed to trade liberalization in Chile resulted from resource reshuffling within the economy. Bloom, Draca, and Van Reenen (2016) examine the impact of China's entry into the WTO in 2001 on innovation of 12 European countries, finding that the penetration of Chinese imports led to increases in firms' R&D, patenting, information technologies, and enhanced productivity. Chinese import competition led to increased technical change within firms and reallocated employment between firms toward more technologically advanced firms. These within and between effects are similar in magnitude, accounting for at least 14% of Europe's technological upgrade from 2000 to 2007.

Other studies suggest that access to new and cheaper imported inputs increases firms' productivity.

For example, Halpern, Koren, and Szeidl (2005) find that imports contribute to 30% of the growth in aggregate TFP in Hungary during the 1990s, suggesting that increased imports from trade liberalization affect firm productivity through expanding input variety and improved quality. Amiti and Konings (2007) use Indonesian manufacturing census data from 1991 to 2001, demonstrating that a 10% fall in input tariffs leads to a productivity gain of 12% for firms that use those imported inputs.

In India, a wide variety of trade reforms occurred in 1991, of which drastic tariff reductions were a key component. Several studies analyze the impact of trade liberalization on productivity. For example, Goldberg et al. (2010) estimate substantial gains from trade through access to new imported inputs, stating, "We find that lower input tariffs account on average for 31% of the new products introduced by domestic firms. This effect is driven to a large extent by increased firm access to new input varieties that were unavailable prior to the trade liberalization. [...] Given that new product additions accounted for about 25% of growth in Indian manufacturing output during our sample, the results suggest that the availability of new imported intermediates played an important role in the growth of Indian manufacturing in the 1990s." Topalova and Khandelwal (2011) find firm-level productivity increase by 8% from 1989 to 1996, demonstrating that output and input tariff liberalization can explain about 21% (1.7/8) and 130% (10.4/8) of the increase in productivity over this period, respectively. The authors assert that tariff reductions in trade protection led to higher levels of productivity through two channels: "First, increases in competition resulting from lower output tariffs caused firms to increase their efficiency. Second, the trade reform lowered the tariffs on inputs, which led to an increase in the number and volume of imported inputs from abroad. Firms were thus able to access more and cheaper imported inputs, which boosted firm-level productivity. Our estimates suggest that the input channel was a larger force in driving the productivity gains compared to the procompetitive channel." More recently, De Loecker et al. (2016) assert that higher declines in marginal firms' costs relative to price declines (i.e., prices fall 18% but marginal costs decline 31% on average after India's 1991 tariff reductions) are the main source for innovation and enhanced productivity, particularly in the introduction of new products.

## **2.2. Compelling evidence demonstrates that deregulation or product market reform boosts productivity growth**

Anticompetitive regulations that hinder entry into and expansion in markets may damage productivity and economic growth. Anticompetitive regulations reduce the competitiveness among incumbents and make the entry of new innovative firms difficult. Conversely, the opening of markets and increased competitive pressure provides both opportunities and incentives for firms to upgrade capital stocks, adopt new technologies and innovate to reach, and possibly push out, frontier production techniques (Arnold, Nicoletti, and Scarpetta, 2011). Ospina and Schiffbauer

(2010) analyze 27 countries in Eastern Europe and Central Asia, demonstrating a positive causal relationship from competition to productivity (i.e., firms with 20% higher markups have 1.2% lower TFP levels and 8% lower labor productivity). Furthermore, the authors show that countries, which implemented product market reforms had a more pronounced increase in competition, and correspondingly, in productivity, revealing that the contribution to productivity growth due to competition spurred by product market reforms is around 12%-15%.

Policies liberalizing industries that were previously regulated monopolies establish the ability to conduct quasi natural experiments on the effects of competition advocacy. Holmes and Schmitz (2010) review literature that examine industries experiencing changes in competitive environments (e.g., water shipping, iron-ore/concrete/textile manufacturing, and retail) concluding, "Nearly all the studies found that increases in competition led to increases in industry productivity. Plants that survived these increases in competition were typically found to have large productivity gains, and these gains often accounted for the majority of overall industry gains."

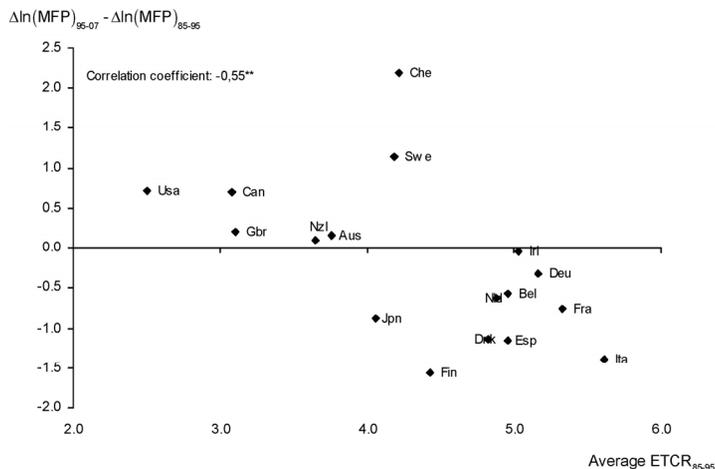
In the electricity sector, Fabrizio, Rose, and Wolfram (2007) use data from the US electric generating plants to assess the effect of shifting regulated monopolies to more market-based environments on technical efficiency. The authors find that publicly-owned plants, whose owners were largely insulated from such reforms, experienced the smallest efficiency gains, while investor-owned plants in states that restructured wholesale electricity markets improved the most (i.e., investor-owned plants in restructured regimes reduced labor use by 6% and nonfuel operating expenses by 12%, relative to publicly-owned plants). Using a sample of 21 OECD countries, Andrews and Cingano (2014) assess the effect of regulatory policies on productivity via the resource allocation channel, once again confirming the positive effect of product market reform. The authors conclude that lowering PMR would raise labor productivity in the EU about 15% higher based on the improved efficiency of resource allocation across firms. Regulations are also found to be more disruptive to allocative efficiency and productivity in innovative (patent intensive) sectors. More generally, Jamasb, Nepal, and Timilsina (2017) review the wide variety of empirical literature on electricity sector reform across a range of countries, concluding that prevailing evidence suggests that reforms have improved efficiency and productivity, although efficiency gains may not always reach end consumers.

Beyond these case studies in specific sectors, recent work, most of which is conducted by the OECD, has taken a broader look at the evidence that more flexible PMR fosters productivity growth. Since 1998, the OECD has provided an economy-wide indicator set of PMR to measure countries' regulatory stance and track the progress of reforms over time.

Nicoletti and Scarpetta (2003) and Arnold, Nicoletti, and Scarpetta (2011) provide evidence that restrictive PMR in OECD countries is associated with lower MFP at firm and industry levels. The authors suggest: "Countries and industries where direct and indirect regulatory burdens are lighter have generally experienced the highest GDP per capita and productivity growth

rates. [...] Evidence at the firm level suggests that, where regulatory burdens are lighter, the reallocation of resources toward the highest-productivity firms is stronger. Moreover, firm-level productivity growth is also curbed by anticompetitive regulations" (Figure 6). Égert (2017a, 2018) finds the above result to hold at the aggregate level for a panel of OECD and non-OECD countries. Bouis, Duval, and Eugster (2016) find that reductions in barriers to entry yield large increases in output and labor productivity in nonmanufacturing industries (network industries). More interestingly, they also find that it takes some time for these gains to materialize, as the effects do not become statistically significant until two to three years following the reform, when prices begin dropping and productivity and output significantly increase. Andrews, Criscuolo, and Gal (2016) find the global productivity slowdown to be correlated to rising labor productivity at the global frontier coupled with an increasing labor productivity divergence between the global frontier and laggard firms. More importantly, the authors also find MFP divergence to be much more extreme in sectors in which procompetitive PMRs or deregulation were least extensive. These results suggest that the observed rise in MFP divergence might be at least partially related to policy weakness stifling diffusion and adoption in OECD economies.

**Figure 6.** Productivity acceleration and product market regulation



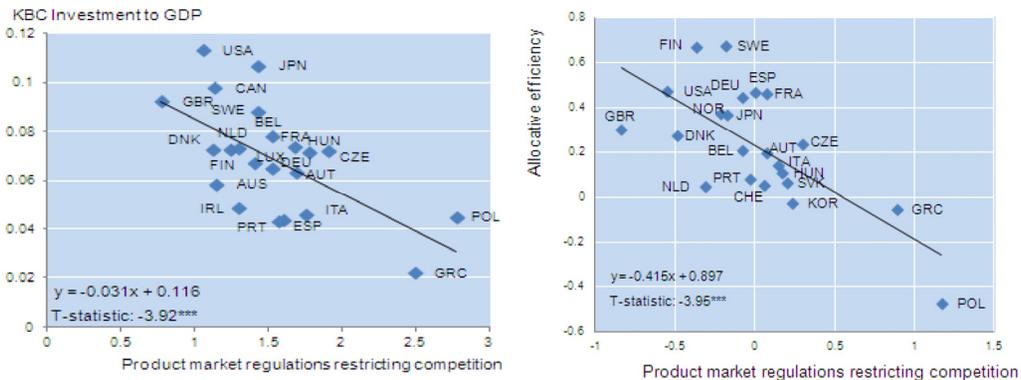
Notes: The vertical axis shows the difference in MFP growth (from the OECD database) comparing the period 1995-2007 with 1985-1995, and the horizontal axis shows the level of product market regulation as measured by the OECD's PMR indicators in electricity, transport, and communication (ETC) industries from 1985 to 1995. ETC regulation covers historical developments in anticompetitive provisions and industry settings in ETC industries. (Source) Arnold, Nicoletti, and Scarpetta (2011)

Apart from the impact on deregulated sectors themselves, PMRs have a positive impact on the performance of downstream sectors that make intensive use of intermediate inputs from deregulated sectors. Arnold et al. (2016) find services sector (banking, telecommunications,

insurance, and transportation) reforms to have a significant impact on firms in the downstream manufacturing sector, noting "The aggregate effect of services liberalization was an increase in productivity of 11.7% for domestic firms and 13.2% for foreign firms for a one-standard-deviation increase in the liberalization index." Gal and Hijzen (2016) further confirm the spillover effect of PMR using crosscountry firm-level data. Cette, Lopez, and Mairesse (2017) investigate the primary channels through which upstream anti-competitive sector regulations impact productivity growth, finding that a large part of the impact on productivity goes through the channel of investment in R&D.

From a dynamic perspective, as demonstrated by Andrews and Criscuolo (2013) and Andrews and Westmore (2014), stricter PMR also has a negative impact on innovation and investment in knowledge-based capital, such as computerized information and IPRs (Figure 7). Westmore (2013) finds procompetition reforms to PMR to be associated with an increase in the number of patents. Andrews, Nicoletti, and Timiliotis (2018) determine that competitive pressure, as measured by lower regulatory barriers (e.g., lower barriers to entry), encourages firms in services sectors (such as retail and road transport) to adopt advanced digital technologies.

**Figure 7.** Product market regulation, knowledge-based capital, and allocative efficiency



Notes: Intangible investment to GDP is measured in 2005. Allocative efficiency measures the contribution of the employment allocation across firms to manufacturing labor productivity in 2005. Product market regulation refers to the overall index from the OECD PMR for 2003.

(Source) Andrews and Criscuolo (2013)

The results above hold in a variety of settings, but specific estimates may differ depending on the country, as countries at differing levels of economic development experience distinct policy impacts. For example, in a large sample including both OECD and non-OECD countries, Égert (2017b) quantifies the impact of structural reforms, including PMR and labor reform. The study finds, "stringent product market regulations will have a three-time larger negative impact on MFP in countries with per capita income lower than about 8 000 USD (in PPP terms)."

### 2.3. Competition policy influences the effectiveness of industrial policies

More interestingly, industrial policies may have a larger impact on productivity growth when focusing on competition. Without industrial policy, innovative firms may choose to operate in different sectors to confront lower competition on the product market, leading to high sectoral concentration and low incentives toward innovation. In such cases, industrial policies that encourage firms to be active in the same sector, such as through subsidies or tax holidays, will decrease concentration in the targeted sector and enhance incentives for firms to innovate. Subsequently complementarity between competition and suitably designed industrial policies in inducing innovation and productivity growth can emerge (Aghion et al., 2015). Aghion et al. (2015) analyze a dataset of all medium and large enterprises in China from 1998 to 2007. The authors find that sectoral industrial policies (subsidies or tax holidays) that are allocated to competitive sectors (as measured by the Lerner Index) or allocated in such a way as to preserve or increase competition (e.g., by inducing entry or encouraging younger enterprises), have a more positive and significant impact on productivity growth.

## III. Effects of Competition Policy on Equality

### A. Market power and inequality

#### 1. Increasing market power disproportionately harms the poor

In recent decades, income inequality has risen in nearly all countries, as shown in Alvaredo et al. (2018). At the same time, market power has also been escalating, both in terms of market concentration (Economist, 2016) and markups (De Loecker and Eeckhout, 2017, 2018).

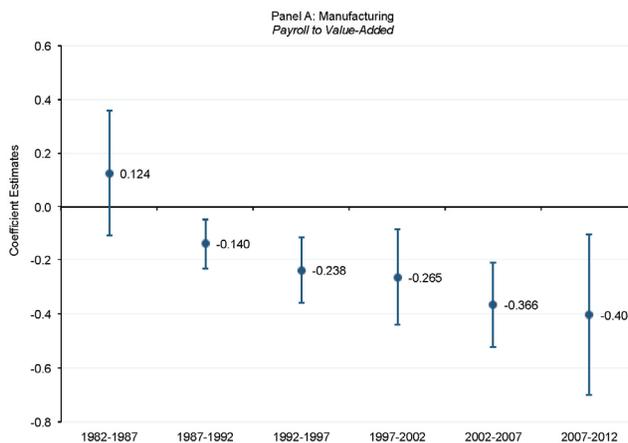
A growing body of literature has confirmed a significant correlation between a lack of competition and inequality, determining that poorer people disproportionately suffer from the exercise of market power. Comanor and Smiley (1975) estimate the effect of monopoly on the distribution of household wealth in the US, suggesting that more than half of the wealth of the richest 2.4% of households (household wealth exceeding \$100,000 in 1962) was ultimately derived from monopoly profits, through inheritance. In a subsequent study, Ennis and Kim (2017) extended Comanor and Smiley's (1975) work to eight OECD countries (Australia, Canada, France, Germany, Japan, Korea, the UK, and the US), finding that market power accounts for 10%-24% of the wealth of the top (richest) income decile. Ennis, Gonzaga, and Pike (2019) conduct a comparative static analysis between two different scenarios; one with existing levels of market power, and another with competition enhanced using data from eight OECD countries (Canada, France, Germany, Japan, Korea, Spain, the UK, and the US). The authors determine that market power increases the wealth of the richest 10% by 12%-21% for a range of reasonable assumptions

about savings behavior, while reducing the income of the poorest 20% by 11% or more.

Several studies focus on the impact of increasing market power on the labor share of income, which has declined consistently across the countries over recent decades. Elsby, Hobijn, and Şahin (2013) provide detailed documentation of the decline in US labor share and Karabarbounis and Neiman (2014) demonstrate an overall global decline in the labor share.

Among many possible explanations for this decline, several studies have confirmed that increased market power and lack of competition have compressed labor income shares. Barkai (2020) finds a negative industry-level relationship between changes in labor share and changes in market concentration in the US from 1985 to 2014. The author concludes: "Those industries that experience larger increases in concentration of sales also experience larger declines in the labor share," interpreting this as evidence that declining competition is at least responsible for the secular decline in labor's share. Autor et al. (2017) observes the negative relationship between labor share and market concentration not only in the US but also internationally in European OECD countries (Figure 8). Moreover, the IMF (2019) estimates that an increase in markups of 10% is associated with a statistically significant 0.3% decrease in the labor share, concluding, "Without any markup increases since 2000, the average labor share across sample of advanced economies might have been at least 0.2% higher today; this compares with an average fall in the labor share of about 2% over the past two decades." Eggertsson, Robbins, and Getz Wold (2018) find that growing market power leads directly to increased pure profits through markups, arguing that higher pure profits tend to increase income and wealth inequality, as

**Figure 8.** Correlation between the changes in labor share and market concentration



Notes: This figure presents the regression coefficients using the payroll to value-added ratio as the labor share and CR20 (the sum of market shares of the biggest 20 firms) as the measure of industry concentration (dots indicate coefficient estimates and lines indicate 95% confidence intervals). We find that the relationship between changes in labor share and market concentration is significantly negative in all periods (except in 1982-1987).

(Source) Autor et al. (2017)

equity holders (who receive the pure profits) tend to be in the upper proportion of the distribution of income and wealth. The increase in monopoly power has likely contributed to these trends in the US over the past three decades.

## **2. Two mechanisms may explain how market power affects inequality**

To explain the mechanisms by which market power can affect income distribution, some studies focus on the varying composition of the 'consumption basket' across the income spectrum. Poor households suffer at a higher rate from the lack of competition in staple goods than rich households. In their consumption baskets, the poor often have a greater share of staple goods, which are hard to substitute due to the low elasticity of demand. In Mexico, Urzúa (2013) finds that while all income groups experience welfare loss from high market power in seven commodity markets (e.g., food, beverages and medicines), losses for the lowest income decile were 19.8% higher in urban areas (22.7% higher in rural areas) than that of the highest income decile. Similarly, Creedy and Dixon (1998) find that the welfare loss associated with monopoly power for 14 commodity groups (including food, beverages and housing costs) is 46% higher for the poorest decile compared to the richest decile in Australia. Creedy and Dixon (2000) also elicit a similar result for New Zealand. In Kenya, Argent and Begazo (2015) find that allowing sugar and maize prices to fall by 20% by relaxing government policies that restrict competition would lead to welfare gains for all income groups. The authors estimate that relaxing trade barriers to allow sugar prices to fall by 20% could reduce poverty by 1.5%. Similarly, adjusting government interventions in the maize market, which have been shown to inflate maize prices by 20%, could reduce poverty by 1.8%. Most notably, gains as a share of income would be 4.4 times higher for the lowest income decile than for the highest.

Recent research recognizes the relative skewness of consumption to shareholding. For instance, Gans et al. (2019) explore the conditions under which market power can transfer wealth from consumers to shareholders, finding that the top 20% in 2016 consumed approximately as much as the bottom 60% but had 15 times as much corporate equity. Based on the results, the authors argue that because ownership is more skewed than consumption, increased markups increase inequality, asserting, "The loss of families' consumer surplus from monopoly prices is compensated by increased returns on their shareholdings. But if wealthier families are more likely to be shareholders and poorer families are more likely to be consumers, then monopoly pricing can have a direct effect in worsening inequality."

## **B. Anticompetitive regulations and inequality**

Anticompetitive regulations are found to harm low-income consumers. Regulatory restrictions to competition can lead to higher prices and harm the poor, who are often net consumers rather

than net producers. Hausman and Sidak (2004) note that poorer and less educated consumers in the US pay more for their mobile telephone services than better educated and more affluent customers, even controlling for the level of usage. They also assert that the margins for the mobile telephone services studied were rising, generating doubt the industry's claims that the market was highly competitive. The authors argue that deregulation allowing the entry of "Regional Bells" in the long-distance market would reduce market power, benefiting the poor and less educated. In OECD countries, Causa, de Serres, and Ruiz (2015) demonstrate that increased procompetitive PMR leads to higher average household disposable income, with higher gains for the poor and lower income inequality.

The retail sector is one of the most active areas of empirical research regarding the relationship between competition and inequality. This research suggests that policies fostering competition have the potential to provide a cost effective and sustainable mechanism for poverty reduction. Schivardi and Viviano (2011) survey the literature on retail competition, concluding that the available evidence for retail trade indicates that liberalization is especially beneficial for low-income people. With more competition, consumers can enjoy lower prices and improved service quality. Griffith and Harmgart (2012) evaluate the impact of restrictive planning regulation on entry into the UK grocery retail industry, finding that more restrictive planning regulation reduced the number of large format supermarkets and led to a loss of up to £10 million per year for consumers. Atkin, Faber, and Gonzalez-Navarro (2018) find that entry of foreign supermarkets in Mexico led to large and significant welfare gains for the average household, predominantly driven by a reduction in the cost of living equal to 6% of initial household income. Busso and Galiani (2019) examine the impact of a randomized increase in the number of markets serving the beneficiaries of a conditional cash transfer (CCT) program in the Dominican Republic. The CCT program provides monetary transfers to poor families, which recipients can only spend by using a debit card that is only accepted within a network of grocery stores affiliated with the program. The authors determine that six months after the intervention, entry into the market led to 2%-6% reductions in prices and a statistically significant improvement in self-reported service quality.

### **C. Competition policy for addressing inequality**

As market power becomes more common and visible, calls for competition policy responses as countermeasures are also rising. Baker and Salop (2016) hypothesize that market power is likely to contribute to inequality by raising the return to capital relative to the rate of economic growth. The authors examine the implications of this assumption on the design of competition policy, proposing a number of specific antitrust and policy approaches and adjustments in legal standards that might be considered by policymakers in response to growing public concern

regarding inequality. For example, Baker and Salop suggest exercising prosecutorial discretion to prioritize cases that benefit the middle class and the less advantaged, designing remedies to benefit less advantaged consumers, increasing agency antitrust budgets, and other reforms. Khan and Vaheesan (2017) argue, "We hold that the failure of antitrust to preserve competitive markets contributes to regressive wealth and income distribution and—similarly—restoring antitrust is likely to have progressive distributive effects. As we have sketched out, oligopolistic market structures and anticompetitive practices in a host of key industries may be transferring billions of dollars upwards—a politically, socially, and economically troubling outcome."

#### **D. Competition policy and democracy**

Competition law regimes may have a positive effect on the quality of democracy, which can also be interpreted as political equality. Competition policy and law enforcement can prevent the concentration of economic power in the hands of only a few. Moreover, economic deconcentration either increases the likelihood that a country will transition to democracy, or it strengthens the stability of an established democracy (Petersen, 2013). From a historical perspective, competition law and policy has invoked the values of democracy over time. For example, the 'war' on Hitler's fascism generated the US merger war law in 1950, and the EU tore down market barriers, established a single market, developing a version of competition law that bows to openness and access following World War II (OECD, 2017). Ma (2016) uses data from 109 countries from 1996 to 2011, analyzing whether and how competition policy affects democracy through equity (improving income distribution) and efficiency (promoting economic development). The author determines that equity rather than efficiency serves as the primary channel through which competition policy influences democracy, although the effect of equity is minimal. Ma suggests that competition policy improves income distribution by protecting consumers and small businesses as the channel through which antitrust safeguards political democracy (although the effect is minimal).

### **IV. Effects of Competition Policy on Employment**

The overall level of employment in an economy is affected by many factors, not the least of which is the economic cycle and overall fiscal and monetary stance. There are some unwarranted concerns that the productivity gains generated by competition may result in negative consequences for employment. Conversely, several studies demonstrate that increased competition in product markets can boost the overall level of employment in the mid- to long-term and/or on aggregate.

Theoretically, as well summarized by the OECD (2015), competition influences employment through both labor demand and supply sides. From the labor demand perspective, more intense

competition lowers prices toward marginal cost, increasing aggregate consumers' output demand and producers' subsequent demand for labor (output expansion effect). From the labor supply side, lower prices raise real wages, causing households to be willing to offer more labor services.

Some studies directly examine how competition policy interventions affect employment. For instance, Dierx et al. (2017) simulate the effect of EU merger control and cartel policy interventions on employment, estimating the net employment effect of the European Commission's merger and cartel decisions, which were taken in 2014 or had been taken in previous years but still had an impact in 2014. Their simulation results show that the European Commission's decisions reduce markup by 0.57% (4.49% reduction in the markup level), which increase employment by around 0.2% in the mid- to long-term, corresponding to the creation of around 450,000 jobs.

### **A. Anticompetitive regulations harm employment**

Several studies show that regulations restricting competition in the product market such as entry barriers hinder employment growth. For example, Schiffbauer et al. (2015) demonstrate that a lack of competition due to privileged treatment of politically connected firms through various entry barriers had a negative impact on job creation in Egypt. The presence of connected firms discourages unconnected firms that have the potential for job creation from entry, as they cannot compete with the connected firms' privileges. The authors determine that aggregate employment growth declines by about 1.4% annually when connected firms enter new, previously unconnected sectors, aggregate employment in these sectors shrinks by 25% over the 10-year period from 1996 to 2006 and employment increases from the entry of connected firms do not outweigh the reduction of employment in unconnected firms and aggregate employment growth in these sectors declines.

Given the many influences on economy-wide employment, it is helpful to consider evidence at a sectoral level. The retail sector is a prominent example, as policies that restrict competition, such as land planning restrictions or constraints on pricing, are often justified by retailers by referencing the need to preserve jobs in smaller retailers that would otherwise be replaced by less labor-intensive hypermarkets (the "Walmart" effect). Evidence from several studies on European countries shows a negative impact of government regulations restricting entry of large retail stores. For example, in France, Bertrand and Kramarz (2002) show that higher barriers to entry are associated with higher prices and weaker job creation, determining that increasing the approval entry rate from 30% to 50% would result in an approximate 7% increase in retail employment. The authors conclude, "The slow employment growth witnessed in the French retail sector over the last two or three decades may therefore not only be the result of labor market rigidities. Instead, barriers to entry and high levels of concentration among large retail chains may also have played a significant role." In Italy, the opening of large outlets is regulated

at the regional level. Viviano (2008) finds that less restrictive regulations on large store entry are associated with fewer small retail owners, but this is compensated for by additional employment of workers in both small and large retail outlets, and moving to a free entry scenario would increase the employment rate by 0.8%. In the UK, Sadun (2015) investigates the employment effects of planning regulations reform in the 1990s, finding entry regulations to be associated with 6%-26% employment declines in independent stores from 1998 to 2004. The author concludes that the creation of entry barriers against large stores actually harmed independent retailers. Skuterud (2005) examined the 1985 change of Canadian legislation that previously prohibited retail shops from opening on Sunday. Limitations on stores' opening during certain periods are another form of indirect entry restriction. The author estimates that this reform led to an employment increase of 3.1%. Burda and Weil (2005) and Bossler and Oberfichtner (2017) also confirm similar positive effects in the US and Germany, respectively.

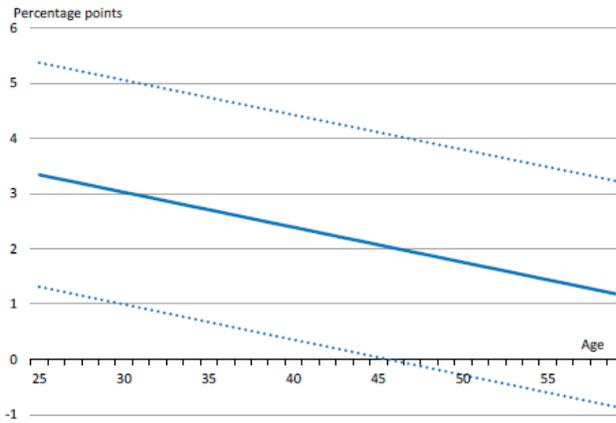
## **B. Product market reforms positively affect employment**

Some studies find evidence that product market reform leads to job creation in the mid- to long-term. For example, Griffith, Harrison, and Macartney (2007) find that product market liberalization, through policy shocks such as the EU single market, reduces unemployment. The effect is strongest for countries with strong labor market institutions that increase worker bargaining power. For example, the study's results imply that in an economy in which unions have strong bargaining power, joining the SMP would reduce unemployment by 1.3%. In effect, product market competition acts as a substitute for labor market competition. Fiori et al. (2012) conduct a similar analysis using regulatory restrictions on product market competition, and reach similar findings, concluding: "When labor 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 labor market settings is to consider that one-standard-deviation decrease in [the measure of PMR] generates a long-run gain in the employment rate of 1.10% in France (a high [labor market regulation] country) and of only 0.6% in Ireland (a low [labor market regulation] country)."

Several recent studies confirm the positive impact of product market reform on employment using data from OECD countries. For example, Gal and Theising (2015) find that more competition-friendly PMRs impact aggregate employment rates positively and significantly. Cournède et al. (2016) go one step further, investigating how PMR reform alters workers' risks of moving out of employment and jobless individuals' chances of becoming employed using microlevel data covering individual employees of a network industry in 26 OECD countries. The authors find that product market reforms boost transitions to employment, particularly for women and

younger workers, but have no systematic effect on exits, concluding that reforms tend to boost aggregate employment in the long run (Figure 9).

**Figure 9.** Employment Probabilities after Product Market Reform



Notes: The solid line indicates the estimated impact of a typical product market reform on transition probabilities for moving from unemployment or economic inactivity into employment, measured using the PMR index. The dotted lines indicate the 90% confidence interval. The effects are estimated with microlevel data covering 26 OECD countries from 1994 to 2012. Overall, the figure demonstrates that product market reforms primarily increase the chances of employment for the young.

(Source) Courmède et al. (2016)

## V. Conclusion

The economic environment, which has been interconnected and digitalized makes the competition policies and interventions of competition authorities more congruent. For example, as previously demonstrated in this review, the introduction of the SMP in Europe in the early 1990s increased R&D intensity and productivity growth. The SMP also enhanced product market liberalization and reduced unemployment in the EU. This is a notable example of the importance of economic integration in a specific region from a perspective of competition policy. Competition authorities are increasingly interested in assessing the effects of competition policies and interventions to advocate for the effectiveness of their work and induce firms' compliance. Competition policy is clearly acknowledged by several economic studies to generate multiple benefits and macroeconomic outcomes, such as productivity growth, reduction of inequality, and increased employment.

First, economies can achieve efficiency gains, which result from the positive impact of competition on productivity growth, allowing firms and industries to produce more and better products and services at lower costs. Firms and industries with higher competition experience

faster productivity growth. Competition allocates resources to more productive firms, which causes superior firms to enter and succeed while inferior firms fail and exit. Competition may also improve firms' management and stimulate innovation and investment, which contributes to higher productivity growth. Furthermore, stronger competition may not only boost productivity growth in sectors where the competition occurs but also spill over to other sectors and throughout the economy more widely. Competition policy interventions rarely directly target productivity growth, instead focusing on the promotion or preservation of the competitive environment itself. Stronger competition policy leads to more competition. Overall, based on the combination of the effect of competition policy on competition and productivity, we can conclude that successful competition policy interventions may promote competition and may contribute to the enhancement of productivity growth.

More interestingly, competition policy may directly affect productivity. Countries that have introduced competition laws or enforced competition law more efficiently achieve faster productivity growth. Historical evidence also demonstrates that suspension of competition law harms productivity growth. Robust evidence supports the fact that competition advocacy, such as trade liberalization or deregulation, enhances market competition, and contributes to productivity growth. Trade barriers or anticompetitive regulations hinder the rivalry among incumbents or the entry of new innovative firms. Conversely, the opening of markets and increased competitive pressure provides both opportunities and incentives for firms to upgrade capital stocks, adopt new technologies and innovate to reach, and possibly push out, frontier production techniques. Moreover, there is complementarity between industrial policies and competition policies, in which industrial policies may have a larger effect if they are focused on competition.

Second, we find that competition policy has considerable importance for advancing equality. A growing body of studies demonstrate that increasing market power disproportionately harms the poor and compresses labor income shares. The poor, who often have a greater share of staple goods than the rich, suffer more from the lack of competition in staple goods. Also, relative skewness of consumption to shareholding (i.e., the rich are more likely to be shareholders and the poor are more likely to be consumers) can worsen inequality. Furthermore, anticompetitive regulations harm low-income consumers. Regulatory restrictions on competition can lead to higher prices and ultimately harm the poor, who are often net consumers rather than net producers. As market power becomes more common and visible, calls for competition policy responses as countermeasures are also increasing. Competition law regimes may also have a positive effect on the quality of democracy, which also can be interpreted as political equality. Competition policy and law enforcement can prevent the concentration of economic power in the hands of only a few.

Third, competition policy can affect employment positively. There are some unwarranted concerns that the productivity gains caused by competition may result in negative consequences

for employment; however, several studies demonstrate that increased competition in product markets can boost the overall level of employment in the mid- to long-term and/or on aggregate. Several studies demonstrate that regulations restricting competition in the product market, such as entry barriers, hinder employment growth. Product market reform to reduce anticompetitive regulations can lead to job creation in the mid- to long-term. Some studies demonstrate a positive impact of competition policy interventions on job creation and employment.

Finally, this paper primarily focuses on positive effects of competition policies, which is a limitation; however, there are some mixed results regarding the correlation between competition policies and macroeconomic outcomes. Of course, a balanced perspective for future researchers and policymakers, presenting research results that have not found competition to be an effective solution, would be a useful and practical future contribution.

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