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Competition, Innovation, and Inclusive Growth

by Philippe Aghion, Reda Cherif, and Fuad Hasanov

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I N T E R N A T I O N A L M O N E T A R Y F U N D

IMF Working Paper

Institute for Capacity Development

Competition, Innovation, and Inclusive Growth

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Authorized for distribution by Valerie Cerra

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Abstract

We provide an overview of the theories and empirical evidence on the complex relationship among innovation, competition, and inclusive growth. Competition and innovation-led growth are critical to drive productivity gains and support broad-based growth. However, new technologies and trends in market concentration are stifling future innovation while contributing to the marked increase in inequality. Beyond consumer welfare in a narrow market, competition policy should adapt to this new reality by considering the spillover and dynamic effects of market power, especially on firm entry, innovation, and inequality. Innovation policies should tackle not only government failures but also market failures.

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I. Introduction

The recent decades have witnessed an erosion of competition in many countries with important implications for inclusive growth. This decline in competition intensity can be seen in the increase of market concentration as well as the ability of firms to influence prices, or market power. It is also seen in the decreasing level of business dynamism, that is, the rate at which new firms enter and old ones exit the market. Evidence shows that this process is taking place in both advanced and developing economies and over a large array of sectors. The economic literature suggests that less competition disproportionately hurts the poor, especially in developing economies, and that it contributes to rising inequalities and less inclusive growth. Moreover, business dynamism is important for innovation and economic growth to lift people out of poverty.

This paper reviews the different perspectives on how competition, innovation, and their interrelation affect inclusive growth in various ways. Achieving sustained broad-based growth, that is, growth that is shared by a majority, is paramount to tackle poverty. While in many cases more competition would help generate better growth outcomes, there are also contexts where limiting competition could be desirable. For instance, resource misallocation among firms as a result of barriers to entry or the ability of underperforming firms to survive can inflict a large cost on the economy in terms of productivity growth. In contrast, some monopoly power, in the form of patents, could be potentially needed to give enough incentives for firms to take the risky investment for innovation, which in turn would lead to growth. Moreover, taxation for redistribution in a country could reduce inequality. However, it could potentially accelerate the brain drain (see Akcigit, Baslandze, and Stantcheva 2016 for the top 1 percent of inventors), especially in developing economies, and limit the country's ability to innovate, compete, and achieve broad-based growth. At the same time, without redistribution, high inequality would make it difficult for potential inventors from the bottom part of the income distribution to undertake such careers, which would lead to entrenched inequalities and less innovation and growth.

There are also tradeoffs between market concentration and efficiency. Large firms, holding a large share of the market, are able to take advantage of economies of scale and access sufficient resources to incur R&D fixed costs. But not all large firms are equal in terms of the provision of employment, good jobs, and their contribution to growth and equity. Moreover, they could also erect barriers to entry to reap their monopoly rents, further stifling competition and inclusive growth.

The relationship between competition and innovation and growth policies to achieve inclusiveness is also multifaceted. The consensus has been that the state should focus on providing an enabling environment, which includes a legal framework, infrastructure, skills and fair competition. However, the existence of externalities may lead to suboptimal outcomes, requiring state intervention to alter the allocation of resources. Some state interventions, such as past import-substitution policies, curtail international and domestic competition to tackle those externalities and may be counterproductive in the medium to long-run. In general, policymakers should be cognizant of the differential impact of state interventions.

The recent rise in market power has renewed policymakers' focus on competition policy. Although competition policies in many countries may not necessarily be weak, they may need to be revamped to address not only consumer welfare but also inclusiveness, monopsony powers, and potential effects on innovation and knowledge diffusion. Examining the impact of the market power and overcharging on the bottom income quintiles may help the poor more. Leveling the playing field for workers and suppliers bargaining with large firms or digital platforms could be beneficial. Antitrust policies dealing with intellectual property rights of Big Tech could also be an important instrument in fighting market power, especially when network effects are present and breaking off large firms is difficult.

In this paper, we explore the debate in the literature on the interaction of innovation and competition with inclusive growth. We suggest that theory and evidence show that innovation, as exemplified by Schumpeterian creative destruction, may lead to higher inequality at the top although it may also help raise wages of workers in innovative firms. Competition, an important ingredient of these growth models, is a key to keeping the corporate power in check, which if left uncontrolled, tends to reduce innovation and broad-based growth and increase inequality.

II. The Rise of Market Power

Competition, market power, and inclusive growth in advanced and developing countries

Competition plays a key role in determining market outcomes, and it affects inclusiveness in multiple ways. It not only matters for driving growth but also can affect the distribution of profits among firms and ultimately the distribution of earnings among their workers. It can also affect the bargaining power of workers in the labor market as well as of firms in the supply chain. It can also affect the relative prices of certain goods hurting disproportionately the poor (e.g., food and communication). Competition can also affect income and productivity growth through its effect on the production structure of the economy as well as incentives or disincentives to invest and innovate (e.g., intellectual property). In addition, as discussed in the previous section, competition is one of the key elements needed to support high sustained broad-based growth, an important precursor for inclusive growth.

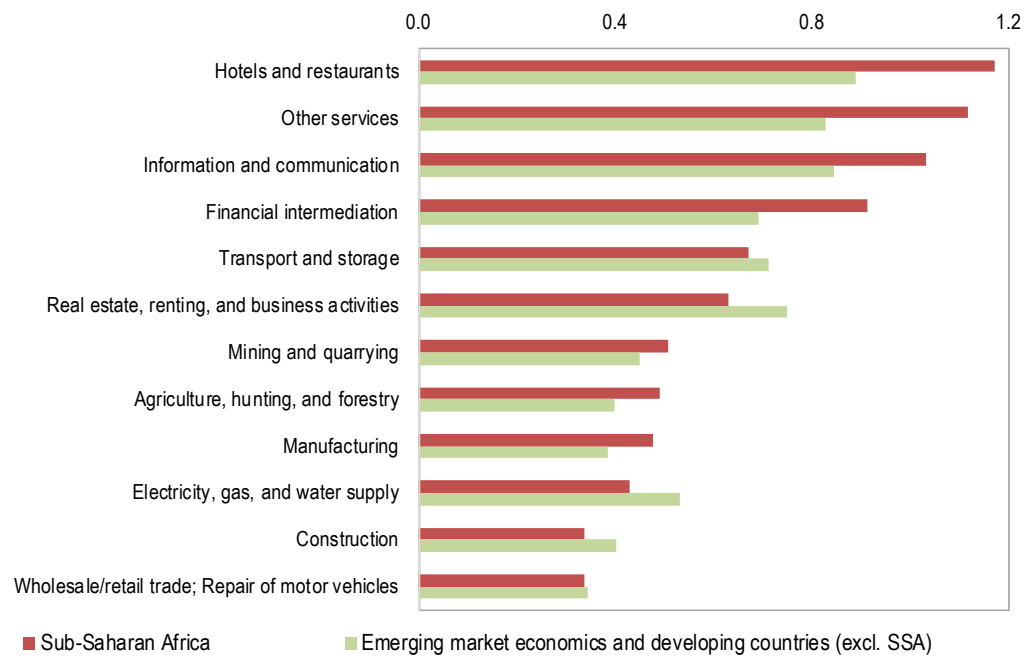
To measure the level of competition in a market, economists rely on the concept of market power, which is understood as the ability of a firm to influence the market for its product. It is usually measured in terms of deviation from the theoretical case of perfect competition where firms are assumed to be price takers. The intensity of competition, and ability of firm to influence the market, is difficult to measure directly. Instead, the literature relies on indirect measures such as concentration indexes (e.g., Herfindahl index of market shares) or price markups. Market concentration is an intuitive measure; however, it is not necessarily indicative of market power (Syverson 2019).² Moreover, in many developing economies a comprehensive census of firms, including their market shares, is difficult to obtain. In recent literature, price markups, the gap between the price charged and an estimate of the marginal cost, are the measure chosen to estimate market power. It is particularly useful for developing

² See OECD (2018) for a discussion of the definitions related to market concentration and market power.

economies as survey information may suffice for the calculations. In practice, it can be proxied by the ratio of sales or revenue to a measure of variable cost, which is closely related to profitability.

Using a large sample of firms from developing economies, IMF (2019a) finds large markups in sub-Saharan Africa compared to other developing economies. Notwithstanding potential measurement issues and bias, it finds that sub-Saharan African economies have greater average markups compared to other developing and emerging economies in most sectors, and the gap is especially big in non-tradable industries (Figure 1). It also finds that average markups in non-tradable sectors in developing countries could be greater than in tradable industries, and in particular manufacturing. Using firm-level data, it shows that greater markups are associated with lower labor share as well as lower investment, productivity growth and exports. These channels all point to an effect that is detrimental to the effort to decrease poverty and inequality.

Figure 1. Firm Markups by Sector: Emerging Markets and Developing Economies



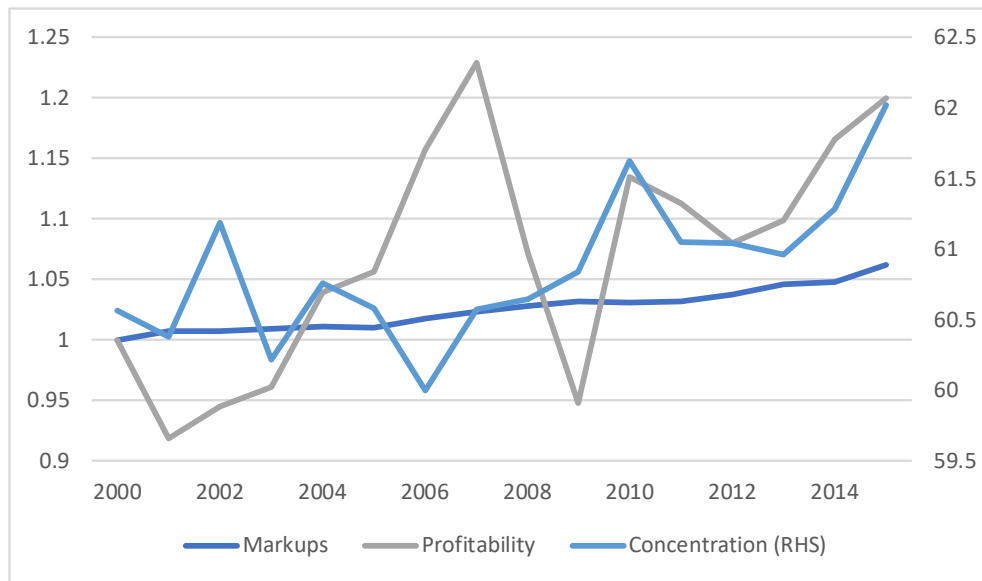
Source: IMF 2019a.

Notes: Markup is defined as the log of the ratio of revenue turnover to costs.

There is also strong evidence of sizable and increasing market power in advanced economies (Figure 2). There is no corresponding rise in market power in emerging economies, although this does not preclude higher market power in these economies than that in advanced countries (IMF 2019b). De Loecker and Eeckhout (2020) document the rise in market power and profitability in the U.S. over the last decades and relate it to salient macroeconomic trends such as the decline in the labor income share and the decrease in labor market dynamics. Philippon (2019) argues that there exist extraordinary monopoly and oligopoly rents that are particularly detrimental to the interest of the poorest. In particular, he compares the U.S. to the EU, which have similar technologies. The dramatic change in communication

costs in France after the entry of one additional operator (Free) in 2011 is a salient example. While costs were lower in the U.S. until 2011, they fell in relative terms by 40 percent within two years in France. Rising costs of communication, which represent a non-negligible share of the consumption basket (about 2 percent in the US average) and is nowadays akin to a necessity, would hurt more the poor. A similar pattern would have an even stronger effect in developing economies.

Figure 2. The Rise of Market Power in Selected Advanced Economies and Emerging Markets



Source: IMF 2019b.

The direct cost of anti-competitive behavior is high. Many studies estimate this cost by implied price overcharge, typically stemming from identified cartels. A common approach to estimating the price overcharge consists in applying a difference-in-difference technique, that is, by comparing prices in a market before and after an infringement was identified (e.g., a cartel) to a “counterfactual” market in a different location or product market where no infringement was identified.³ The estimated price overcharges in advanced economies are found to be large on average, ranging from 15 to about 50 percent. Ivaldi et al. (2017) extends these estimations to 20 developing economies, using a database of over 200 major cartel episodes over 1995–2013. They estimate that the harm to the economy in terms of excess profits resulting from price overcharges could reach about 4 percent of GDP, accounting for the probability of undetected cartels. The cost of cartels could extend to overcharges in intermediate goods, ultimately affecting finished products, as well as procurement of public goods, or it could also affect the economy through a reduction in output (World Bank-OECD 2017). Even without cartels, anti-competitive behavior would result in higher prices and lower production.

³ See World Bank-OECD (2017) for a summary of methods to estimate price overcharges resulting from anti-competitive behavior and for a review of empirical studies.

There is also growing evidence that the lack of competition not only affects more strongly the poorest countries but also hurts the poor more in each country. Higher market power in food, beverages and medicines was shown to be regressive, that is, they hurt more the poorest, as shown using Mexican data (Urzua 2013). Similar results exist in the context of advanced countries (e.g., Creedy and Dixon 1998 and 2000). There is also evidence that prices in sub-Saharan Africa are higher than in other developing regions, controlling for income and other factors. The extra cost of living in this region is negatively correlated with aggregate measures of competition (IMF 2019a). OECD (2017), using a calibrated model on a selected group of advanced countries, finds that market power could be responsible for a sizable increase in the wealth of the richest 10 percent and a large reduction in the income of the poorest 20 percent.

The decline in the labor share has also been interpreted as a sign of rising market power. Labor share has been decreasing in the U.S. and other advanced economies (IMF 2019b). This decline in labor share could be explained to a large extent as a result of the Information Technology (IT) revolution as argued by Aghion and others (2019). This revolution allowed superstar firms to expand into many sectors of the economy. As these firms have higher markups and lower labor shares than non-superstar firms, the decline in aggregate labor share and corresponding increase in aggregate markups reflect a “composition effect”. In other words, it is not the result of a within-firm increase in markup or a decline in labor share. Evidence of the predominance of a “between-firm” (or “composition”) effect over a “within-firm” effect is provided by De Locker and Eeckout (2019) and Baqaee and Farhi (2019). IMF (2019b) shows that the “reallocation” effect is pronounced in the U.S. but less so in other advanced countries. The long-term effect of this increasing hegemony of superstar firms has been to discourage innovation and entry by non-superstar firms, thereby leading to a decrease in aggregate productivity growth, broad-based growth, and business dynamism. This increasing hegemony, in turn, has been facilitated by an insufficient regulation of mergers and acquisitions, in other words by a competition policy, which has not adapted to the digital economy.

Tycoons and Big Firms: The good and the bad

Economic theory does not rule out situations where high concentration, and the associated high returns have benefits for society at large. In situations where there are economies of scale, concentration would lead to an overall increase in productivity. Alternatively, the hope of extracting monopoly rents from a dominant position, thanks to a patent for example, justifies the risk taken by innovators. In turn innovation would help increase productivity. Some argue that the rise of market concentration over the last decades in advanced countries reflects both the innovations and early investment in information technologies and the implied productivity gains (e.g., Bessen 2017, Aghion and others 2019). If this is indeed the case, innovative firms should be investing more, and eventually other firms would use the same innovative processes and infrastructure. In turn, at the aggregate level, productivity and investment rates should be rising.

On a global level, domestic large firms in sophisticated sectors play a critical role in taking advantage of economies of scale and concentrating resources to absorb both frontier

managerial and technological processes, especially when competing on international export markets (see Chandler 1990 and Cherif and Hasanov 2019). The sophisticated sectors are defined as highly R&D intensive such as advanced manufacturing and high-tech services (Cherif and Hasanov 2019). These firms provide directly a large number of good paying jobs, but also support productivity gains and growth through their critical contribution to exports and spillovers (see Freund et al. 2016). Their success does not stem from generating rents from commodities or non-tradables, rather from producing and exporting. High broad-based growth helps achieve improvements in the living standards of workers in the rest of the economy, including non-tradable services. Samsung and Hyundai are very large and profitable firms relative to the Korean market. This success comes as a result of fierce competition on international markets in sophisticated sectors, requiring taking risks and investing substantially in both physical and human capital. They also employ a significant share of skilled and unskilled Korean workers at relatively high wages. More important, their success on international markets, representing more than a third of total exports, results in total productivity gains and rising incomes. This largely contributes to the difference in living standards between, for example, a taxi driver in Korea compared to the same in developing countries, although they provide exactly the same service with the broadly same productivity.

However, as observed by Baker (2019) and others, these developments have failed to show up in the aggregate investment and productivity numbers, at least in the U.S. context, and the above explanation is only part of the story. It is also likely that the same dynamics are at work in many other advanced nations. In addition, a myriad of stylized facts, broadly described by the lack of business dynamism such as a decrease in the rate of creation of new enterprises, point to the other plausible reason for the rise of market concentration—an increase in market power as a result of hidden and explicit barriers to entry. These barriers could also be related to regulations, which could be partially encouraged by the same firms benefitting from them. The typical examples of a barrier to entry would be wireless phone licenses or zoning policies. Zoning policies limit the supply of housing in cities, leading to a rapid increase in the existing real estate assets as well as high returns for the few developers who have access to land (see Furman and Orszag 2015). This has implications on inequality on several levels. It prices out families with modest means, known as gentrification with its many social and psychological negative effects, and prevents others to move from less dynamic to more dynamic cities, where social lifts are more effective (see Hsieh and Moretti 2019).

A large firm dominating a domestic market in a developing economy, thanks to tariffs and other explicit or implicit barriers to entry, would be detrimental to both growth and its inclusiveness. Typically, large firms in low-income countries or resource-dependent ones would dominate a non-tradable service sector, such as telecommunication, construction or banking, without yielding significant employment, spillovers or productivity gains. The additional price they impose, and lower levels of investment, would lead to a bad quality of services as well as higher prices, directly harming the society's welfare. Higher prices could also harm international competitiveness and in turn keep the real exchange rate overvalued, reducing the prospects of improvements in living standards of workers.

An indirect way to study the issue of supernormal returns of large firms and inequality across the developing world is to study high-wealth individuals, who are behind those firms, or tycoons, (see Freund and Oliver 2016). To paraphrase their conclusions, all developing countries have tycoons with powerful connections to the state, but there is a fundamental difference between a tycoon whose wealth is derived from competing on international markets and supplying a good product and a tycoon benefitting from barriers to entry and focusing on the domestic market, for instance, an importer with exclusive rights or domestic producer of non-tradables such as construction (Freund and Oliver 2016). For the former kind of tycoons, international competition would also limit cronyism and encourage offering good salaries to skilled workers to retain them. It would also encourage long term investment in domestic capabilities. For the latter kind of tycoons, the opposite is true.

The rise of Big Tech

The important question is what explains these supernormal returns. On the one hand, as noted earlier, the rise of market power is a likely culprit as shown by different studies on the rise of market power in the last decades (see IMF 2019b). Evidence shows that most firms in the upper tail of the distribution are in the health and information technology sectors although there are also large firms in the retail and energy sectors (e.g. Walmart). This should not come as a surprise given the evidence about the high median wages in the top technology companies such as Google and Facebook, are more than four times the average wage in the same sector in the U.S. (see Autor et al. 2017 and Gutierrez and Philippon 2017). This confirms the largely shared view that the nature of certain sectors implies a “winner-take-all” outcome. This in turn leads to a wide dispersion in wages among firms and workers even within the same sector and at comparable levels of technology and skills.

As large firms today are mostly in information technology sector, one of the key issues of dealing with inequality is to a large extent related to the discussion about the rise of technology giants and to how to deal with them. The increasing global interconnectedness contributed to the rise of Big Tech. Moreover, the presence of scale and uniqueness has also helped create “superstars” in many markets (Krueger 2019). In this regard, the current situation is similar to the rise of the telephone network in the U.S. in the first half of the 20th century. A new technology was invented that led to what was described as a “network effect.” That is, if an additional user joins the network, it benefits all the other users, encouraging newcomers and creating a feedback loop. Eventually, the sector which had several phone networks operating at the same time early on, came to be largely dominated by AT&T, as an early version of today’s “tech giants.”

The rise and dominance of FAANG (Facebook, Amazon, Apple, Netflix, and Google) and other tech giants stem from the same mechanism. A social network such as Facebook displays the typical network effect. Its value is enhanced when an additional user joins, and at the same time entices others to join as well. However, the feedback effect is not only limited to networks of users. It could also extend to platforms linking users and “suppliers” with potentially even stronger “winner-take-all” effect and deeper economic implications. Suppose a platform links two networks: a network of users such as consumers or businesses to a network of suppliers of goods or services. Then, if an additional user joins the platform,

in theory the value of the network for existing users does not necessarily *directly* increase. However, the value of the network of suppliers increases for all suppliers, encouraging more of them to join. In turn, the new suppliers would add to the value of the network of users to all users. This type of feedback effect would explain the dominance of platforms such as Amazon, linking consumers to goods' suppliers, Uber, linking passengers to drivers (service suppliers), or Alibaba, linking businesses in demand of intermediate goods and services to businesses supplying them.

The consequences of Big Tech

The consequences of the rise of the giant platforms are multiple. The exclusive access to a large amount of data about users or suppliers in a network or platform can reinforce the market power of tech giants. The access to a large trove of personal data from a social network can help devise personalized advertisement methods, including in political campaigns, which is difficult to compete with without this access. Self-driving technology or personalized health services are other examples where the exclusive access to users' data can give a critical advantage to a firm and create monopolies. For example, while Tesla has accumulated millions of hours of drivers' data to develop its self-driving technology, other firms must rely on simulations to develop self-driving capabilities. Overall, this raises important questions about privacy, data ownership and portability.

More important, the platforms give rise to a new type of “monopsony” power. A large set of free-lance workers and suppliers must sell their goods and services through one or very few platforms to access their consumers. With a limited bargaining power for the suppliers, such a situation could lead to an increase in overall inequality although the price of the end-product or service could be competitive. For example, if the platform offers a luxury good or a service and it is mostly consumed by the upper middle-class or the rich, then a lower price would help their welfare. Meanwhile, small and medium-size suppliers and free-lance or gig workers, providing the good or service, could see their welfare decrease substantially with low prices as payments for their services would be relatively low as well. If these suppliers are relatively poor or in the lower middle-class, then the result is an increase in inequality. One could argue that the platforms offer an efficiency gain to the economy, but it could be a one-time increase in efficiency followed by monopoly rents. If the platform generates supernormal returns, there could be room to use the efficiency of the platform technology while limiting the erosion of the welfare of suppliers. Ride-sharing services are likely to fall in this category.

One could argue that the issue of Big Tech is mostly relevant to advanced and some emerging economies. However, the dominance of these firms extends beyond borders and encompasses most of developing countries in environments where local institutions have little capacity to negotiate or enforce regulations. Several of these tech giants have annual revenues exceeding the GDP of most low-income countries. Platforms such as ride-sharing services have been cloned in many developing economies, potentially creating local monopolies.

At the same time, there are positive effects of platform economies. Increase in efficiency and decline in search costs, reduction in consumer prices for goods and services, decline in potential costs of doing business, and provision of opportunities for new businesses cannot be underestimated. What becomes clear is that policy intervention should target negative effects rather than use a broad-brush approach.

Big Agriculture and inclusiveness

No other sector exemplifies better the links between efficiency gains and technological advancement, intra- and international market concentration and competition and their effect on inclusive growth than the agroindustry. Indeed, while agricultural production plays a key role in the economies of low-income countries, comprising mostly small-scale farms with little access to capital and inputs, these producers face an unsurmountable challenge to become internationally competitive. In contrast, modern agriculture in advanced and emerging economies has moved toward highly mechanized and large-scale producers, often financed by domestic agricultural development banks, to take advantage of economies of scale. This has generated formidable productivity gains in those countries over the last decades. For example, total factor productivity in the agricultural sector doubled in the U.S. over the last four decades (Wang et al. 2020). In developing countries, these large productivity gains and spillovers and linkages with the rest of the economy could be important for reducing poverty and producing shared prosperity.

Moreover, food producers in many advanced and emerging economies receive substantial production subsidies, and until relatively recently sizable export subsidies. For example, agricultural subsidies represent the biggest share of the budget of the European Union (more than a third in 2020). These policies have a strong rural development and food security rationale and they help the world be more resilient to shocks, but they also have important implications on inequality at both the national and international levels. For example, the provision of production subsidies in proportion to the size of the farm implies that smallest 25 percent of EU farmers receive less than 1.5 percent of total subsidies, while the largest 20 percent receive 80 percent, showing large disparities in the support received.⁴ Moreover, given the large share of agricultural production in employment in low-income countries, usually the largest sector, these countries are not competitive enough and cannot develop their agricultural sectors, negatively affecting inclusive growth. In other words, although advanced economies' subsidies may be aiming at ensuring resilience in food production, they may also be undercutting agricultural production and employment in low-income countries. International coordination is warranted to reconsider food security policies of advanced countries and their implications on inequality and poverty in developing countries, without jeopardizing the resilience of the global food supply.

As an illustration, the rise of market concentration has been stark in the market of agricultural inputs.⁵ In the U.S., the market share of the four largest producers of seeds, fertilizers and

⁴ <https://www.europeandatajournalism.eu/eng/News/Data-news/1.6-million-farmers-receive-almost-85-percent-of-the-EU-s-agricultural-subsidies>.

⁵ <https://www.americanprogress.org/issues/economy/reports/2019/05/07/469385/fair-deal-farmers>

farm pharmaceuticals have increased markedly since the 1990s reaching more than 50 percent. For corn and soy producers, for example, seeds represent a relatively large share of the cost, which means that an increase in price would affect them disproportionately. In this sector, concentration of four firms reached more than 85 percent. Although investment in R&D has led to important innovations in biotechnology, the 6 largest players have been responsible for the vast majority of acquisitions of innovative biotechnology start-ups. As a result of a wave of consolidations and acquisitions, the bulk of important intellectual property rights in this domain is owned by few dominant actors.⁶ There is growing evidence that those dominant actors are erecting steep barriers to entry through strategic licensing and protective patents. This implies less bargaining power for farmers as well as a curtailment of future innovation and competition by smaller firms. These developments have negative implications on firms and their workers along the whole supply chain that compete with giants of the industry.

In terms of inclusiveness in developing countries, the stakes are even higher, especially regarding genetically modified seeds. Although these new technologies would spur productivity gains providing more resistant crops, an extensive market power by a few dominant firms could undermine the returns to farmers, especially small farmers. The US market of soybean and corn gives an idea of the dynamics at play. Although soybeans and corn yield per acre have increased over the period 1985-2011 by about 19 and 30 percent, respectively, the prices of those seeds per acre have increased by 325 and 259 percent, respectively.⁷ The late 1990s saw the rise of “terminator” gene-edited seed which yielded crops unable to produce a second generation of seeds. This is particularly worrying in terms of the potential negative effects on poverty alleviation and development in low-income countries. In sub-Saharan Africa, two-thirds of the population consists of small-holder farmers. These would suffer tremendously if they lose access to replanting while facing the market power of dominant multinationals. National antitrust policies, international coordination, and local initiatives to develop seed industries are urgently needed to tackle these far-reaching challenges.

III. Competition, innovation, and inequality

As discussed earlier, there could be a tradeoff between growth and innovation on the one hand and inequality on the other hand. One of the key ideas in growth theory is based on Schumpeter’s insight of “creative destruction.” According to this view, new entrants in a sector are innovators, which could take the form of a new good, technology or process. These innovators would capture a share of revenues eventually forcing incumbent firms to exit. The endogenous growth theory of Aghion and Howitt (1992) offers a framework in which a

⁶ See Moss, “Testimony Before the U.S. Senate Judiciary Committee, Consolidation and Competition in the U.S. Seed and Agrochemical Industry” and Bryant and others, “Effects of Proposed Mergers and Acquisitions Among Biotechnology Firms on Seed Prices.”

⁷ National Agricultural Statistics Service, “Acreage” (Washington: U.S. Department of Agriculture, 1996), available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/j098zb09z/7w62fb474/zw12z7657/Acre-06-28-1996.pdf>; National Agricultural Statistics Service, “Acreage” (Washington: U.S. Department of Agriculture, 2012), available at <https://downloads.usda.library.cornell.edu/usda-esmis/files/j098zb09z/6395w898j/db78tf232/Acre-06-29-2012.pdf>.

higher rate of entry and exit would lead to higher growth highlighting the crucial role of innovation in sustaining growth. A standard interpretation of this theory indicates that there is a link between innovation and intellectual property rights protection, which in turn curtails competition. Indeed, in standard models, the incentive to innovate stems from the perspective of extracting rents from a monopoly power, typically thanks to a patent or industrial secret. An increase in competition, for example by shortening a patent's life, would put a lid on these future rents, which could discourage innovation and growth. This is directly related to inclusive growth. A more stringent intellectual property right regime to spur innovation and growth, stifling competition to ensure more monopoly power, could in fact lead to more income concentration and inequality.

However, several firm-level empirical studies suggest a somewhat different picture. For example, Blundell, Griffith, Van Reenen (1999) and Nickell and Van Reenen (2002) show that sectoral productivity growth increases with the level of competition. Moreover, Aghion and others (2005) and IMF (2019b) have shown that the relationship between competition, measured by the rates of entry and exit, and innovation, measured by the number of patents, follows an inverted-U relationship. In other words, at low levels of competition, increasing competition would lead to more innovation and the opposite would happen at very high levels of competition.

These results could be reconciled with economic theory once the heterogeneity of firms in terms of productivity is introduced. As shown by Aghion and others (2005), the distinction between frontier firms and laggards firms leads to a stark difference in terms of their respective reaction to heightened competition. The laggard firms, which are already far from the frontier, are discouraged from investing in innovation with more competition as it is harder to catch up. In contrast, best performers would increase their investment in innovation to keep their position close to the frontier. The models' prediction is confirmed by a study using UK firms (Aghion et al. 2009). They show that the relationship between the rate of entry by foreign firms, a proxy for competition, and innovation, measured by patents, differs for frontier firms and laggard ones. More competition would lead to more innovation among frontier firms and to less innovation among laggards, as predicted by the theory. Thus, to support innovation while minimizing concentration and potential negative implications on inclusive growth, both too little and too much competition may be counterproductive.

In addition, Aghion and coauthors (2016), using the Schumpeterian endogenous growth model, argue that although innovation by incumbents and entrants increases top income inequality, it does not increase the Gini coefficient while innovation by entrants increases social mobility. Higher innovation increases the entrepreneurial share of income, and new firms and employees not only provide more opportunities to be future business owners but also create role models to follow. They confirm in the cross-state and commuting zone data in the U.S. that innovation is positively related with top income inequality (1 percent) but has negative or no relationship with the broad measure of inequality like the Gini coefficient. More important, the authors find that creative destruction, or innovation by entrants, makes growth more inclusive and increases social mobility.

There is evidence pointing to the fact that inventors represent a sizable share of top income earners, and the rise in inequality observed over the last decades reflects the rapidly rising returns on innovation (Aghion et al. 2019). Therefore, studying the factors affecting inventors, such as parental income or taxation is key to understanding the dynamics of inequality and social mobility.

Income inequality among families could negatively affect innovation and in turn stifle social mobility. Studies show that there is a positive relationship between parental income and the chance of children becoming innovators (Bell et al. 2019 and Akcigit and others 2018). These studies find a J-curve relationship such that the probability of a child becoming an inventor is mostly flat for parental income below the 20th percentile then it rises rapidly. More detailed analyses have shown that intrinsic abilities, such as math scores, do matter. But at the same time, for equivalent intrinsic abilities, parental income has a sizable influence on the chances of becoming an inventor.

Redistribution using taxation and transfers is a key tool in tackling inequality but increasing top personal income tax rates could potentially undermine the incentive to innovate although further research is needed. One plausible channel would be through the link between taxation and the “brain drain.” Innovators and skilled workers, who depend mostly on their human capital as opposed to physical capital, are likely to be highly mobile and particularly sensitive to changes in the tax regime. This hypothesis is studied by Akcigit, Baslandze, and Stantcheva (2016). They construct an index to compare inventors in terms of the importance of their invention based on future citations. More citations indicate a greater value of a patent. They find that there is a negative relationship between the marginal tax rate of the highest income bracket and the fraction of “superstar” inventors, the top 1 percent according to their index, who remain in their country. This correlation disappears for the other inventors. This result was confirmed using quasi-natural experiments. For example, the dissolution of the Soviet Union in 1991 led to a massive migration of inventors and data show that they were more likely to immigrate to countries where the tax rate was lower. Moreover, Akcigit and others (2018) use a comprehensive dataset of U.S. patents, citations and inventors since 1920 to track the effects of variation in income and corporate tax rate among U.S. states and through time. They find that, everything else being equal, a greater tax rate decreases the number of patents, citations as well as inventors. At the same time, higher personal income taxes could support various redistribution programs and keep inequality and poverty lower, helping generate more superstar inventors.

But why would this have a meaningful effect on innovation if it concerns a minority of inventors? It is plausible that innovation follows the type of granularity observed in many fields where “superstars” dominate, including sports, music and cities (Krueger 2019 and Gabaix 2009). Indeed, a minority of inventors are behind patents that are focal in the sense that they generate a lot of dynamic spillovers to the rest of the economy. The issue of the tradeoff between taxation and attracting innovators could be similar to the relationship between tax incentives and foreign direct investment (FDI). High personal income tax may or may not matter much, but a harmful inter and (intra) national race to the bottom would be detrimental to all.

IV. Competition and growth policies for inclusive growth

To promote inclusive growth, that is increasing broad-based growth and lowering inequality, considering innovation and competition is paramount. In the following section, we discuss salient competition and growth policies and highlight key elements needed for those policies to promote inclusive growth.

Competition policies to promote inclusiveness

To tackle anti-competitive behavior and spur competition, World Bank-OECD (2017), adapting Kitzmuller and Martinez Licetti (2012), offers a comprehensive policy framework along two broad avenues. First, reforms should aim at tackling both regulations and government actions that represent implicit barriers to entry or are conducive to vested interests and collusion (e.g., licenses, tariffs, and access to public goods). Second, setting up the needed institutions with sufficient autonomy, resources, and authority to enforce rules and regulations is necessary.⁸ One priority would be to improve the detection of anti-competitive behavior of local and international operators. Studies show that a non-negligible share of cartels are not identified in advanced countries every year, which makes the issue even more pressing in developing countries (in Europe, for example, more than 10 percent according to Combe, Monnier and Legal, 2008, compared to about 25 percent in the context of developing countries in Ivaldi et al., 2017, using the same methodology). Another important role of competition authorities consists in the control of anti-competitive mergers to prevent the direct rise in market power or, indirectly, through increased collusions.

Given the limited resources of competition authorities, product markets affecting particularly the poor could be prioritized (IMF 2019a and World Bank-OECD 2017). For example, food and beverages represent a large share of the consumption basket of low-income households, especially in developing countries, that is typically 30-40 percent. The price of inputs that are key to the production of small firms, such as fertilizers for farmers, would also have a disproportionate effect on the poor. Moreover, these sectors have usually features that are conducive to anti-competitive behavior such as import barriers, concentration of importers, low price elasticity, and barriers to entry (see World Bank 2016).

It is also necessary to take into account the broader context of competition policies, including the international environment. For example, tariff reductions on staple food that is highly subsidized in advanced countries could wipe out large numbers of small producers, ultimately leading to unemployment and even more pressure on wages in the absence of dynamic sectors. Moreover, a small share in the consumption basket could be a misleading indicator of potential welfare gains. For example, medicines have typically a low share among low-income households but the introduction of regulation encouraging the entry of generic drugs could massively decrease their price with potentially large effects on health outcomes (see Tenn and Wendling 2014). Finally, instead of focusing on sectors representing a large share of consumption among low-income households, it could be more effective to

⁸ See IMF (2019a) for a discussion in the context of sub-Saharan Africa.

identify the anti-competitive behaviors (e.g., in energy sector or the imports of machinery in manufacturing) that limit the growth of dynamic sectors that have high paying jobs.

Since the 1980s, most developing countries have followed comprehensive “liberalization” policies to let markets emerge, mostly by tackling price controls, lowering tariffs, dismantling SOEs, and deregulating capital and financial markets. In parallel, there has also been progress in the adoption of competition laws and the establishment of competition agencies, especially in the 2000s. However, the intensity of competition in many developing countries remains significantly lower than in emerging and developed economies (IMF 2019a).

A major obstacle faces developing economies in ensuring competition while liberalizing. Beyond the legal framework, the institutions in charge of competition need to be well funded, staffed with competent and non-corrupt civil servants, and bestowed with full autonomy. These conditions are drastic for countries that suffer from weak institutions and lack of resources and capabilities in the first place. Privatization without proper competition regulation and oversight could be counterproductive in critical natural monopoly sectors such as power utilities if it leads to under-investment and over-charging. As argued by Armstrong and Sappington (2006), one must distinguish between liberalization policies that “generally are procompetitive from corresponding anticompetitive liberalization policies.” Moreover, with the advent of Big Tech, competition agencies should be better equipped to be able to regulate the digital economy while preserving efficiency gains.

As for advanced economies, many have argued that there was a shift in the 1980s toward a different understanding of undue market power in the U.S., focusing on consumer welfare and prices (Phillips Sawyer 2019). If companies charge low prices, or even provide free services, it cannot be argued that a monopoly is harming consumer welfare. This is in contrast with the older view, or the Harvard interpretation, that competition was a goal aiming at minimizing undue concentration of political power, among others. There is evidence that over this period anticompetitive practices and non-competitive market structures have contributed to the dominance of large firms in key industries of the U.S. economy. This dominance was also translated into political influence, further entrenching their position (Khan and Vaheesan 2017). The recent trend indicates that there could be a need to recalibrate antitrust regulation. Some argue that the latter should adopt tackling inequality as an explicit aim instead of the narrow understanding of consumer welfare based on prices in a single sector (Baker and Salop 2015). However, it is not clear how to impose more competition in sectors exhibiting network externalities.

Beyond strengthening competition laws and competition agencies in charge of applying them, there is also a need to formulate a new paradigm to incorporate specifically inequality in the competition framework. In most economies, it means more funds and incentives to prosecute anti-trust cases even when they involve local or foreign firms with powerful backing.

The information technology and artificial intelligence revolutions may not only have positive impact but also produce large negative effects on the economy, and there is a need for

competition policy to tackle them. Indeed, these technological developments may contribute to a rise in aggregate rents, the fall in aggregate labor share, and the fall in growth and business dynamism. Gilbert (2020) argues that in the U.S., competition policy should tackle this issue as it did not prevent the hegemony of superstar firms. Going forward, it should move away from a “static” view of competition policy, largely focused on market definition and market power to a more “dynamic” view focused on spurring innovation and encouraging the entry of new firms.

Gilbert (2020) also argues that instead of overhauling anti-trust legislation, it should be adapted to spur “dynamic competition,” and market definition should not be based on existing markets. Moreover, when assessing a merger or acquisition, the potential effects on innovation, firm entry, and on other markets should also be considered.

The case of AT&T, which established Bell Labs in the early century to conduct its R&D in communication technology to showcase its contribution to society and avoid antitrust actions illustrates the importance of antitrust policy to spur technology diffusion. In 1958, the U.S. government took an antitrust decision giving Bell Labs’ existing patents for free to all national companies and imposed a small license fee for future ones. Facklet et al. (2017) showed that this decision had a sizable effect on innovation in the U.S. It is remarkable that Bell Labs contributed directly to the invention of many far-reaching technologies such as radar, transistors, and satellite technologies, and its mathematicians and statisticians contributed with important theories such as information theory and quality control. The antitrust policy of the time helped through the implicit pressure to engage in significant R&D at Bell Labs. The decision of 1958 accelerated the diffusion of the technologies created to the rest of the economy, contributing to the creation of new sophisticated sectors and good-paying jobs.

In general, going beyond pricing, the issue of bigness is important to tackle and has been a central issue already by the turn of the 20th century as argued by Lamoureux (2019) with cases such as Standard Oil. Indeed, policymakers managed a balancing act to protect society against the dangers of bigness without punishing firms that grew large because they were innovative. The key to success of the antitrust regime of the time was to focus on large firms’ conduct toward competitors and banning practices that were anticompetitive or exclusionary. In this regard, a stakeholder approach to corporations, beyond a narrow shareholder view, may also produce fairer outcomes.

Growth policies to alleviate poverty and the role of competition

There is a positive correlation between long-term growth and poverty alleviation. More specifically, Lant Pritchett argues, based on cross-country patterns, that “broad-based growth, defined as the process that raises median income, is far and away the most important source of poverty reduction.”⁹ The sharp decline in poverty rates in China (about 800 million people escaped poverty) amid the two decades of break-neck growth is the starkest illustration. As discussed, innovation-based growth based on Schumpeterian creative destruction is key to productivity gains and sustained growth. The question is how to achieve broad-based, high

⁹ See <https://econofact.org/poverty-reduction-and-economic-growth>.

and sustained growth which means to spur the emergence of good paying jobs. This is perhaps one of the most difficult and debated questions in economics.

The standard view shared by most economists over the last few decades is that “horizontal policies”, that is improvements in education, the quality of institutions, infrastructure, business environment, and regulations are key. Many of these policies tackle what is known as “government failures” as described in Rodrik (2005). In other words, state intervention should limit itself to providing public goods and the provision of a good environment while crucially ensuring an adequate level of competition. In this context, firms would have the incentive to invest and deploy efforts to be competitive through improvements in productivity and innovation to offer new and better-quality goods among others.

However, growth can be harmed by anti-competitive behaviors or distortive policies which can take different and subtle forms and are not always easy to gauge. Among these, imposing barriers to entry or helping non-performing firms remain in business, could have a substantial negative effect. Hsieh and Klenow (2009) emphasize the importance of input reallocation effects. They show that aggregate productivity differentials can be explained by differences in terms of the distribution of firms’ productivity. This means that relatively less productive firms have access to a considerable share of the resources. They argue that it is harder for a more productive firm to grow but also easier for a less productive firm to survive in India than in the U.S. for example. In the same vein, Aghion (2016) suggests that there is more business dynamism in the U.S. than India, that is more firms enter and exit, which would explain input misallocation and differences in income per capita.

Compared to the U.S., potential constraints in developing economies such as India include more rigid capital markets and labor/product markets, the lower supply of skills, the poorer quality of infrastructure, and the lower quality of institutions to protect property rights and to enforce contracts. However, even if markets are perfectly competitive and an adequate environment is ensured, the economy may still not reach its full potential. This is because of “market failures,” which typically happen in the presence of externalities. They are at play when firms and workers do not fully internalize the effects of their decisions on the broader economy and their dynamic implications. Typically, they are learning externalities, coordination failures, or information asymmetries (Rodrik 2005).

As argued by many, (e.g., Arrow 1962) and Matsuyama 1992) some activities entail higher productivity gains, or more learning potential, for an economy compared to other traditional activities such as non-tradable services or agriculture. Firms may not be fully aware of these productivity gains, leading to lower output in high-productivity sectors and lower relative incomes over time. The coordination failure is based on the idea that a critical size of the modern sector is needed for a firm to enter it. It would be profitable for a firm to invest in a modern sector only if there are enough firms investing simultaneously in other modern sectors. If many firms invest together in modern sectors, described as the “big push,” economy reaches a higher level of productivity and development (Rosenstein-Rodan 1943, Murphy et al. 1989). Lastly, information asymmetries exist if there is imperfect information about new markets and products, and firms underinvest as a result (Hausman and Rodrik

2003). This is clearly seen in firms trying to export and penetrate new geographical markets with their products.

In theory, tackling these externalities would necessitate a state intervention, broadly defined as industrial policy. However, the scope, the tools and whether it could in practice be superior to a more “laissez-faire” approach, leaving the outcome to unfettered competition, is the object of an ongoing debate. At the heart of the debate lies the definition of what constitutes a “modern” sector, which is conducive to productivity gains and spillovers to the rest of the economy. While it is typically associated with manufacturing (Matsuyama 1992 and Krugman 1987) or related to the concept of sophistication (Hausman, Hwang and Rodrik 2007 and Cherif and Hasanov 2019), others argue that service sectors could also play a role (IMF 2018). More important for inclusive growth, if a sector is to be targeted, it should help achieve broad-based growth to contribute to poverty alleviation. In practice it means that it should also generate (directly or indirectly) enough employment, and the level of skills to fill those jobs should be realistically met over the medium term.

The other key question relates to how state intervention to tackle externalities could curtail or distort competition. Indeed, state interventions of the past typically followed the model of import-substitution policies. The main idea was to protect domestic producers from international competition by imposing barriers to trade, such as high tariffs. In many cases, the curtailment of competition went further and encompassed the domestic market as countries relied on one or very few “champions” to achieve import-substitution goals. The many past failed cases in Latin America and the Middle East imply that such policies may be counterproductive in general (Cherif and Hasanov 2019). The comparison of Malaysia’s foray into automotive industry in the 1970s with its champion Proton to the success of Korea’s Hyundai is a case in point (Cherif and Hasanov 2019b). After decades of support and protection from domestic and international competition, Proton depended on imports of critical inputs, including the engine. The high tariffs to protect it also meant that consumers had to pay higher prices for lower quality products. In comparison, although Hyundai benefitted from state support as well, it was also forced early on to compete both on the domestic and international markets. It could be argued that competition provided Hyundai with an incentive to innovate and take advantage of economies of scale.

Moreover, support for firms could be pursued without necessarily implying less competition. Aghion and others (2015) develop a simple model showing that targeted subsidies can be used to induce several firms to operate in the same sector, and that the more competitive the sector is, the more it will induce firms to innovate in order to “escape competition” (Aghion et. al. 2005). Of course, a lot depends upon the design of industrial policy. Such policy should target sectors, not particular firms (Aghion 2016). Using Chinese firm-level panel data, Aghion and others (2015) look at the interaction between state subsidies to a sector and the level of product market competition in that sector. They show that TFP, TFP growth, and product innovation (defined as the ratio between output value generated by new products to total output value) are all positively correlated with the interaction between state aid to the sector and market competition in the sector. In other words, the more competitive the recipient sector is, the more positive the effects of targeted state subsidies to that sector are. In fact, for sectors with low degree of competition the effects are negative, whereas the

effects become positive in sectors with sufficiently high degree of competition. Finally, the interaction between state aid and product market competition in the sector is more positive when state aid is less concentrated.

Yet, there are externalities that can be tackled without curtailing competition with the potential to have a sizable contribution to broad-based growth and poverty alleviation. These are typically related to informational asymmetries. Bloom and Van Reenen (2010), for example, show that interventions to improve management practices in Indian small firms can significantly improve productivity. So did the productivity missions of the Marshall Plan in Europe after the WWII (Giorcelli 2019). In the same vein, Atkin et al. (2017) showed that Egyptian rug producers can be helped to access export markets by tackling informational asymmetries and coordination failures. In other words, they showed that interventions such as export promotion agencies can help SMEs advertise their products in foreign markets and act as a communication channel between them and customers. They also showed that export activities helped small producers improve their quality and value added which confirms the importance of export orientation. This focus on SMEs can help increase productivity and tackle inequality at the same time.

The trade-off between the benefits and costs of state intervention suggests that the way the state intervenes in the economy is crucial. This intervention needs to be cognizant of exacerbating government failures such as rent-seeking and corruption. Moreover, even if these interventions are successful in the sense that they create competitive industries and contribute to growth, they should avoid creating “islands” of relatively advanced sectors. If these sectors are disconnected from the rest of the economy, broad-based growth may not be sustained, and it would exacerbate inequality. For example, thanks to interventions and targeted policies, Costa Rica managed to foster a high-tech sector in electronics and health instruments (Spar 1998). Although it led to higher growth and declining poverty as well as productivity improvements in agricultural sectors, high inequality persisted while growth policies for inclusiveness were missing (Ferreira, Fuentes, and Ferreira 2018).

V. Conclusion

The broad implication of this chapter is that competition and innovation influence inclusive growth through different channels. Policies for inclusiveness should consider these channels and the implied tradeoffs. More important, policies should keep in mind the dynamic effects on growth, especially the incentives on innovation and the ability of firms to harness economies of scale. In theory, encouraging more innovation tends to increase inequality at the top while improving wages of the workers in productive firms and improving social mobility. In addition, policies to support innovation could also improve business dynamism and reduce market power that would be overall beneficial for inclusive growth. We further argue there is a role for a new competition policy both to encourage competition and innovation and tackle inequality.

First, in this new competition policy, there is a need for a reappraisal of the laws and regulations such that the effect on current and future inequality is explicitly considered. In practice, this would mean studying the tradeoff between consumer welfare in the relevant

market, the wider effect on inequality (e.g., ride-sharing), and the implications of the dominance of a firm in the future on related sectors (e.g., data access and use). It would also mean weighing the effects of policies on transaction costs and future innovation. Moreover, discretion could be given to competition agencies to prioritize sectors and goods affecting poor and middle-class families (Baker and Salop 2015).

Second, policies to encourage technology diffusion should be considered as part of the competition framework. Given the major role played by supernormal returns, and the associated inequality in wage income, a special attention to these firms is needed. As noted earlier, it is difficult to determine to what extent these firms either hold a superior technology, operate in a sector with network effects and scale economies naturally leading to a monopoly, or are benefitting from hidden barriers to entry. An alternative policy would encourage the big firms to set-up independent industrial research labs, allowing all firms to access the technologies produced in exchange for a relatively cheap license fee or for free. The associated technology creation and diffusion could help revive business dynamism and in turn mitigate the rise of inequality.

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