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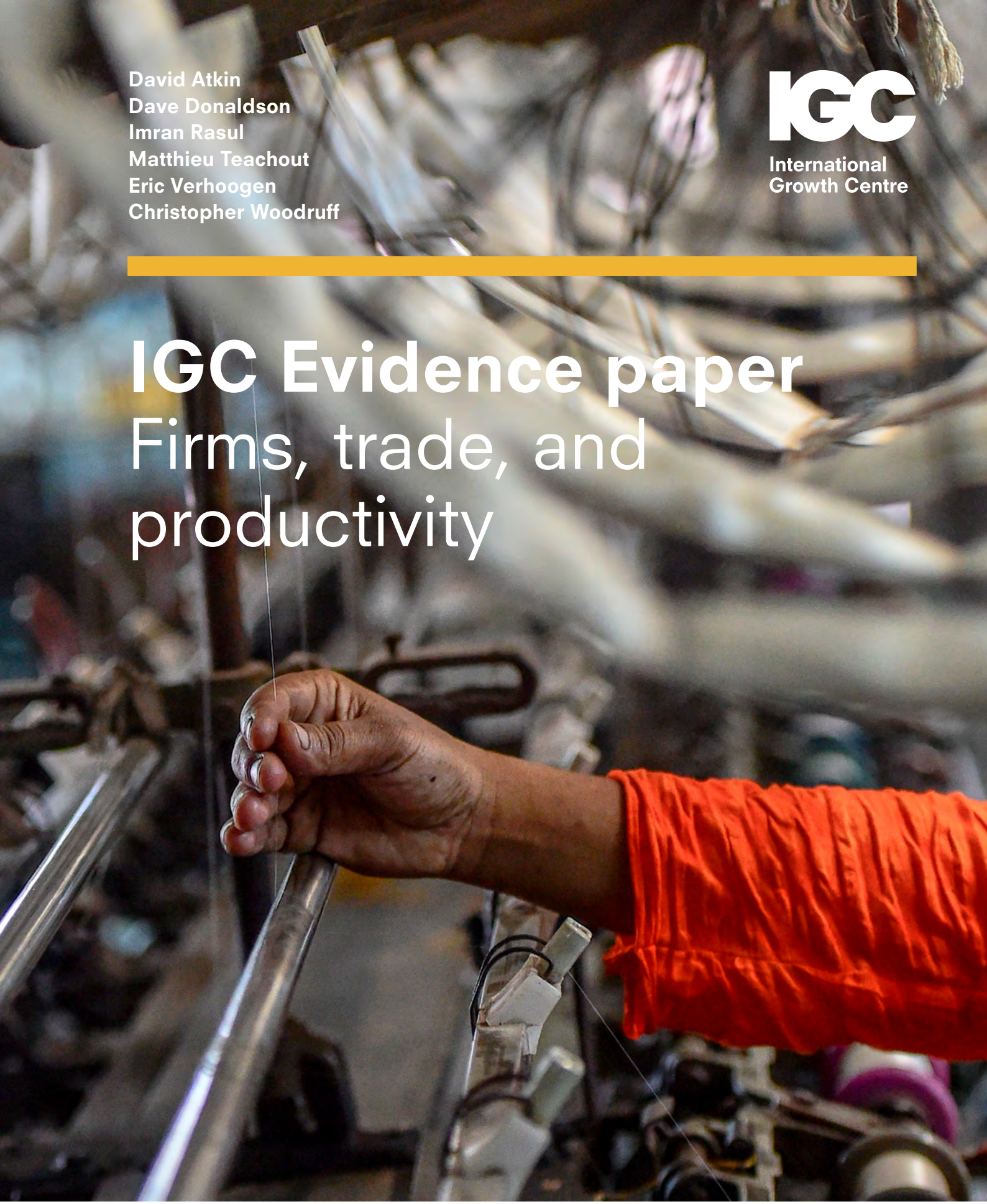
IGC Evidence paper
Firms, trade, and productivity



EVIDENCE PAPER
FIRMS / SEPTEMBER 2021

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1 Introduction

Productivity growth is the driving force behind economic development. A large development accounting literature has shown that much of the difference in income per capita across countries can be explained by differences in total factor productivity (TFP) (see, e.g., Hall and Jones 1999, Caselli 2005). On top of its "direct" effect on output, TFP growth can have positive feedback effects on human and physical capital accumulation (Hsieh and Klenow, 2010). Thus, one of the central questions for research on growth and economic development is: What can be done to boost productivity?

Although productivity growth is a macroeconomic phenomenon, it results from a large number of micro-level changes, including the reduction of critical distortions that appear more prevalent in developing countries. In this paper, we review the existing evidence on these transformations and highlight priorities for future research. We find it useful to think about the necessary changes as arising from three types of transformations: in the capabilities of firms, the functioning of markets, and the interaction of firms with world markets.

Firstly, there are widespread differences across and within countries in the capabilities of individual firms. Developing countries are typically characterised by a large number of small, unproductive firms and a small number of very few large, highly efficient, and disruptive companies (Hsieh and Olken 2014, Eslava et al. 2019). Although there is abundant evidence that shows differences in capabilities explain an important part of the differences in productivity across both firms and countries, there is little evidence on why exactly these differences arise, and even less on interventions that could solve the problem.

Developing countries are typically characterised by a large number of small, unproductive firms and a small number of very few large, highly efficient, and disruptive companies.

We begin in Section 2.a by exploring the role of management practices and technology in firm productivity differences, two factors "internal" to firms. A substantial literature shows that differences in management practices explain an important part of overall differences in productivity across firms and across countries. However, few interventions designed to increase firm performance through upgrading knowledge of management practices have proven effective. Interventions may work better if targeted to high-ability entrepreneurs, implying the need for new tools to identify and select such entrepreneurs. New forms of technology that would bring firms closer to the efficiency frontier are generally poorly adopted in developing countries. We review the evidence as to why this is and explore possible interventions that would improve their adoption.

There are also large differences in access to critical inputs across countries. We examine these "external" factors—including labour, capital, material inputs, or other inputs such as electricity—in Section 2.b. There appears to be significant constraints in the access to skilled workers and capital, and again, solving this problem looks complex. In developing countries, programmes to upgrade worker skills tend not to be effective, and programmes to make capital available have, at best, mixed results. We highlight potential avenues for further research on policy interventions to reduce these input constraints.

Second, there appears to be significant distortions in the way that markets operate in developing countries, as examined in Section 2.c. We first focus on the allocation of factors of production across firms—that is, making sure that the existing stock of inputs is allocated to the right firms. Numerous studies argue that there is significantly more dispersion in the value of marginal products of inputs across firms in developing countries than in high-income countries, which can help explain low levels of aggregate productivity. However, there is less evidence on why these distortions happen and their relative quantitative importance. Misallocation can also take the form of output market distortions and frictions such as trade and search costs that prevent firms from accessing domestic and world markets.

Competitive forces may also be weaker in developing countries. For example, there is emerging evidence that agricultural value chains in many countries are controlled by a small number of firms with significant market power. Yet, very few low-income countries have antitrust strategies, and scarcely any sub-Saharan country has a competition authority.

Industrial policy can also play a role in alleviating market failures and promoting positive externalities. Again, there is very limited evidence on the magnitude of market failures and externalities that industrial policy could help solve, or on the sectors in which these failures are more likely to be present. Further research is needed to identify these externalities and design appropriate policies, taking low implementation capacity into account.

A final set of policies that could raise productivity are related to firms' interactions with world markets. We first explore the potential for international trade to exacerbate or alleviate the distortions discussed above. These include production externalities, firm-level and size-dependent distortions, and potential thick-market adjustment frictions in factor markets. Research on these questions is still in its nascent phase. Second, we explore the various externalities that can be generated through trade or connections with multinational corporations. While an emerging literature argues that spillover effects could be important, more evidence is needed on the contexts and mechanisms under which they arise, in order to inform policymakers on the type of interventions needed to promote them. Third, we discuss state-provided services designed to promote trade. These include building the infrastructure necessary to conduct trading activities in a cost-efficient way and pursuing export promotion policies where it makes sense to do so. Finally, we review the evidence on how international trade affects the distribution of income across the economy. A large number of

studies have documented that trade liberalisation increases inequality, at least in the short run, and we discuss opportunities for inclusion in export-led growth.

A cross-cutting theme that comes out of the literature review below is the importance for future research to measure the size of externalities and market failures that are present in developing countries' markets. The nature of these externalities and market failures is manifold, and to inform policy, there is a need to understand for which firms and which sectors they are the strongest.

The second wide issue arising from this paper is the emerging importance of understanding value chains and production networks at both the domestic and global level. New business-to-business relationships have been shown to create both opportunities and challenges for firms in developing countries. An increased focus on administrative data, such as value-added tax (VAT) records, tax records, supplier/client lists, and matched customs data, will be essential to supporting the research agenda in this area.

Three other distinctive aspects of this review deserve mention. The first is that we seek not only to highlight the gaps in our knowledge of firms and markets in developing countries, but also to identify the research needed to inform more effective policy design. While understanding the problems is the first step toward finding appropriate solutions, we argue that more research is needed in several areas to determine which of the set of possible interventions could be effective in this context (and which could not).

Approximately 50% of the value-add in both sub-Saharan Africa and South Asia comes from the tertiary sector; services have the potential to be one of the pillars of growth strategies in developing countries.

The second is our focus on making growth inclusive. Most of the poor are informally employed in low-productivity and low-paying jobs. Increasing the productivity of the firms that employ them (Section 2.a), giving them the skills to be more productive agents (Section 2.b.1), facilitating their transition to more productive sectors (Section 2.c.1), and enabling the gains from trade to be shared more widely (Section 3.d) are all crucial elements of inclusive growth. However, there is heterogeneity in the size of firms and variation in ownership structures in developing countries, and the magnitude of the distortions or markets failures is likely to be significantly different across firm types. Similarly, age, gender and ethnicity can act as significant barriers and so affect the set of opportunities individuals face as entrepreneurs, managers and employees.

Finally, while the language used in the paper often refers to the manufacturing sector and the production of tradable goods, many of the issues discussed also relate to the primary and tertiary sectors of the economy. Approximately 50 percent of the value-add in both sub-Saharan Africa and South Asia comes from the tertiary sector; services have the potential to be one of the pillars of growth strategies in developing countries. Yet, research on services is rare and we encourage further research in this sector. Productivity

growth in agriculture remains a central issue and could be transformative for other sectors as well (see the discussion on structural transformation above). We focus specifically on how farmers are connected to markets and value chains, and the role of intermediaries and agro-businesses.

Indian weaver Sunki Vani prepares silk threads prior to weaving a saree on a handloom in India. Photo by NOAH SEELAM/AFP/Getty Images

2 Increasing productivity in developing countries

In this section, we explore three possible channels through which developing countries' productivity could be increased. The first is to increase productivity within firms by attracting more capable entrepreneurs or facilitating the emergence of disruptive businesses. The second is to provide better primary factors of production (labour and capital) or reduce barriers between existing firms and factors of production. The last is to improve the functioning of markets by removing sources of factor misallocation across firms, increasing market access, mitigating the absence of competition, and supporting sectors that generate positive externalities for the wider economy.

A Improving productivity within firms

1. Management practices and entrepreneur selection

There is now overwhelming evidence that management practices matter in explaining firm performance across countries and over time (Bloom and Van Reenen 2010, Bloom et al. 2012, Bloom et al. 2016, McKenzie and Woodruff 2017). The consequence for policy in developing countries is to understand how entrepreneurs' business knowledge and management practices can be improved in order to help people and their businesses grow.

Many solutions could be put forward. We explore here training programmes, consulting services, and coaching and mentoring. Before reviewing the literature on each of these below, it is worth noting that there are numerous studies on this issue, each one focusing on the impact of one specific intervention, usually on one type of firm (small, medium or large companies) and a single sector. Capturing all of this heterogeneity in this review would be challenging and so we draw relatively broad lessons from this literature. One possible avenue of research is to aggregate knowledge around this issue and generate predictions on the type of programme and context in which these types of interventions are likely to be most effective.

The first type of programme we explore is "training" entrepreneurs, teaching them a set of methods to improve their managerial capacity and business performance (see Fiala 2014, McKenzie and Woodruff 2014, and Grimm and Paffhausen 2015 for a review). However, several randomised experiments delivering management training programmes to entrepreneurs have shown very small effects on business performance. While these types of trainings tend

to have an impact on the creation of new businesses or the survival rate of existing firms (Higuchi et al. 2017), in the short run, they have mixed effects on adoption of best business practices at best. Additionally, they do not lead to significant positive effects on profits, sales, or employment for most firms (McKenzie and Woodruff 2014). A more recent set of experiments have found positive effects on the adoption of better management practices and subsequent increases in employment (Brooks et al. 2018, Higuchi et al. 2019, Martinez et al. 2018, Anderson et al. 2018). Moreover, several studies have found positive and significant effects on business performance when studying such programmes over the medium term (2-3 years) or increasing sample size (Higuchi et al. 2019, McKenzie and Puerto 2017, Valdivia 2015). In sum, there is little evidence on why training programmes deliver in certain instances but not in others. It is even less clear whether their economic benefits are worth the cost for a government looking to implement them at scale.

Most of these studies are based on randomised control trials that use a relatively small sample size and can typically only measure outcomes in the short run. Using a very different approach, Giorcelli (2019) documents that a technical assistance programme in the US in the 1950s had a significant and long-lasting impact on the productivity of participating Italian firms and that this effect was stronger for firms that received both management and technology transfers.

There is little evidence on why training programmes deliver in certain instances but not in others. It is even less clear whether their economic benefits are worth the cost for a government looking to implement them at scale.

A potential explanation for these disappointing observed effects may be that management practices training alone is not enough. Other barriers to growth, such as credit constraints, may prevent entrepreneurs from translating their learned skills into higher business performance. Several recent experiments have offered entrepreneurs a combination of business training programmes and cash grants (see, e.g., Berge et al. 2014 and Karlan et al. 2015). Again in this case, however, the programmes have had mixed positive effects on the adoption of business practices and have not lead to significant effects on sales or profits.

There are three other factors that could explain the poor performance of business trainings and should be the subject of further research. The cost of these programmes per entrepreneur is typically around USD 200. As such, the programmes may not be of a high enough quality to generate significant changes in business practices of manager training, especially if we assume that higher quality and more expensive programmes are likely to have a higher impact on sales, profits, and employment. A competing explanation is that in most studies, business training programmes were offered for free to treated entrepreneurs. For that reason, entrepreneurs' motivation may be too low to allow them to fully grasp the contents of the class. Having entrepreneurs pay at least a fraction

of the programme's cost may be a way to increase adoption of better business practices and should be tested experimentally. Finally, business training programmes that gather entrepreneurs from a wide range of sectors or cover a wide range of topics in a limited period may prioritise general management skills over sector- or function-specific skills (e.g., marketing, finance, human resources, etc.). A series of recent papers have attempted to offer more focused training programmes (Anderson et al. 2018) or show that the way trainings are delivered matters (Drexler et al. 2014, Campos et al. 2017).

These results on the generality vs. specificity of training programmes provides a motivation for a second solution to improving productivity within the firm: consulting services. Management consulting services are, by nature, firm specific. A team of highly skilled advisors analyses a firm's operations and makes recommendations on where improvements could be made. Bloom et al. (2013) and Bruhn et al. (2018) offer free consulting firm services to large and small firms, respectively, and both find positive outcomes on firm performance. In Bloom et al. (2013), treated firms saw their profits increase by an average of USD 300,000 after one year of consultation, corresponding to a 130 percent rate of return. Eight years after the programme was delivered, treated firms were still implementing better management practices and performing better than the control group.

This evidence raises an important follow-up question. Since consulting services or even some training programmes generate a positive return on investment, why aren't firms willing to pay for these services themselves? A number of potential reasons should be examined in future research. First, firms may be unaware of the positive returns that these programmes generate. A similar explanation, compatible with the mixed evidence on the impact of training programmes, could be that the market for management support is subject to adverse selection: Firms are unable to identify providers offering sufficiently high-quality services. Second, management consulting typically requires that firms share internal data, production processes and information about their clients for efficiency's sake, and companies may not trust many of the potential providers in that regard. Third, consulting services are usually very expensive, and firms may not have the liquidity or sufficient access to credit to pay for them.

Iacovone et al. (2019) provides an alternative setting to solve this last issue. They provide consulting to small groups of firms in Colombia at approximately one third the cost of one-on-one consulting. In terms of impact, this alternative approach performed better than individual consulting. It is not clear, however, whether these positive results came from the consulting services themselves or the fact that the programme allowed the group-treated firms to interact with one another, an intervention that has shown encouraging results in other settings.

Focusing on this approach, coaching, mentoring, and peer interaction programmes could be an alternative solution to helping small businesses grow. Cai and Szeidl (2017) and Fafchamps and Quinn (2018) bring entrepreneurs together to generate networking opportunities among business owners.

Fafchamps and Quinn (2018) show that linking firms or providing them information on one another have a positive effect on knowledge of some business practices. Cai and Szeidl (2017) show that entrepreneurs who participated in randomly formed business associations see an improvement in their knowledge of management practices but also an increase in revenues and profits through acquired knowledge about business-relevant information (e.g., on suppliers or clients). This last intervention is particularly promising, as its impact is similar in magnitude to the very expensive consulting services offered in Bloom et al. (2013) but obtained at a much lower cost. Finally, one-on-one mentorship programmes for microenterprise owners (Brooks et al. 2018) generated a positive effect on profits, though this effect faded away as the relationships dissolved.

As the review presented above shows, the literature on ways to improve management practices of business owners is already very large. Nonetheless, it leaves a number of questions to be addressed on business training programmes.

First, the mixed effects observed in training programmes need to be rationalised. Why do they work in certain instances but not in others? Are there ways to deliver these trainings in a more effective and cost-efficient way? Should the materials covered be wide or very specific? Plausibly, the appropriate training may depend on the context. Personal initiative training (e.g., Campos et al. 2017) may be more effective for subsistence entrepreneurs than for owners of medium-sized businesses, for instance. By contrast, individual consulting may be more cost effective for larger firms.

Second, while mentorship and business associations have shown promising results, the external validity of these results still needs to be explored. Are these programmes more likely to succeed in specific sectors or environments? Cai and Szeidl (2017) show that in their setting in Nanchang, China, learning was more likely to happen between firms that were not competing in the same sectors. Does the size of the effects justify that these interventions be implemented at scale?

Third, there is very limited evidence on the general equilibrium effects of business training, consulting services, or mentorship programmes. Any programme that generates a competitive advantage for some set of firms is likely to generate negative spillovers for other firms, as demand is unlikely to be highly elastic (except when it comes to highly tradable goods). These programmes are rarely implemented on a large scale, and the identification challenges that come with large-scale, non-random treatment of firms reduces researchers' incentives to focus on this question. However, this question cannot be ignored; if these programmes have the potential to be cost efficient, governments may and should want to implement them at scale.

Fourth, while Bloom et al. (2013) argue very convincingly that certain management practices are intrinsically better across environments, other practices may be preferable in some settings and not in others, depending on culture and traditions. Gaining understanding on the boundary between management practices that are inherently better and those that may only prove effective within specific environments is another interesting potential avenue for research.

Finally, to return to the first point made in this section, the fact that the use of best management practices is positively correlated with firm performance may be driven by variation in other factors, such as entrepreneurial ability, with high ability being a requirement to implement best practices. Evidence from the business training programmes highlighted above—where despite adoption of best management practices, businesses failed to increase sales or profits—suggest that this alternative interpretation for the observed patterns may be important. As such, business training programmes or management consulting services may be more efficient if offered only to high-ability entrepreneurs. To be able to target programmes in this way, of course, one needs to be able to identify and select such business owners.

Business training programmes or management consulting services may be more efficient if offered only to high-ability entrepreneurs.

A great deal can be learned from the literature on business plan competitions (Fafchamps and Woodruff 2017, Fafchamps and Quinn 2017, McKenzie 2017) and accelerator programmes (Gonzalez-Uribe and Leatherbee 2018), whose main purpose is to identify high-potential entrepreneurs before offering them services. The evidence on this issue so far shows that identifying such entrepreneurs is, to say the least, a challenging endeavour.

Kahneman and Klein (2009) show that expert predictions on business performance are more accurate if they have extensive experience making similar judgments and access to feedback on the accuracy of their predictions. McKenzie and Sansone (2017) show that man-made predictions about the performance of a business plan are uncorrelated with actual business performance. However, modern machine learning methods using administrative data do not offer noticeable improvements, as even the best models do not have strong predictive power.

A promising alternative could be to delegate the identification to peers within the entrepreneurs' communities. Rigol et al. (2017) shows that randomly distributed cash grants to entrepreneurs generate higher returns to capital for entrepreneurs ranked highly by their peers. In other words, community rankings perform better than machine learning predictions. However, one of the policy implementation challenges posed by this strategy is that peer ranking is likely to be much more costly than machine learning techniques.

Whether panels are composed of experts or members of the community, the role of discrimination biases in these selection processes is worth exploring. For example, gender-prescribed roles and social norms may prevent high ability entrepreneurs from being selected and meeting their potential.

Identifying high-potential entrepreneurs in a cost-efficient way is a challenge that requires more research. Other predictive techniques could be studied, such as psychological testing of entrepreneurs (Dlugosch et al. 2018). It is important to remember that developing methods to select entrepreneurs

have been used mainly to provide them financial support, but there are other barriers besides access to capital that might prevent businesses from growing; we will discuss this further in Section 2.b. However, developing tools to identify high-potential entrepreneurs for a cost-efficient provision of other services would be an interesting area for further research.

Next steps and research priorities

- What type of entrepreneurship training programmes are cost efficient? Why don't firms pay for these programmes themselves?
- In which contexts are mentorship and peer interaction programmes effective? What mechanisms enable them to work?
- What are the general equilibrium effects of entrepreneurship programmes?
- Should entrepreneurs be selected into training programmes? Should governments identify and support gazelles?
- Do gender-prescribed roles and social norms prevent high ability entrepreneurs from being selected in support programmes?
- What is the role of incubators? Do they promote disruptive entry?

2. Technology adoption and innovation

Another important dimension of productivity improvement within firms is the adoption of new technologies and innovation, both around process (finding better ways to produce existing products) and product (creating new products). Firms in low-income countries sometimes patent inventions created through research and development (R&D), but the vast majority of innovative activities is oriented toward adopting existing technology, rather than pushing the world technological frontier forward.

In theory, firms in developing countries should enjoy what Gerschenkron (1961) calls the "advantages of backwardness"—in particular, the fact that many new technologies and products have already been invented in high income countries. But many countries have had difficulty capitalising on these advantages, and the process of technology diffusion may take decades to materialise (Comin and Hobijn 2010). What is getting in the way? Why do firms have trouble catching up to the world technological frontier? And what policy interventions can help them do so?

Technology can be embedded in inputs, machinery, and equipment, or simply in production know-how. The general topic of *access* to inputs and capital—which firms do not have control over—will be the subject of a distinct Section in 2.b.2. First, we focus more on why firms may or may not adopt more advanced inputs or machinery.

Barriers to technology adoption

The main challenge in studying the adoption of more advanced practices is defining variables and metrics that describe the use of technology. This may be why the literature on this issue has mainly focused on agriculture. Yields are a straightforward measure of fields' performance over time. Similarly, it is easy to track the use of high-yielding variety (HYV) seeds or fertilisers, at least in a binary way or through surveys. By contrast, direct measures of the use of technology by manufacturing firms are rare. A metric of how technology-intensive a production process is or a vertical classification of machinery are hard to define, especially across sectors.

The rationale behind studying the barriers to technology take-up in agricultural markets relies on the hypothesis that the returns to technology use in developing countries are high, but a number of factors prevent farmers from adopting. However, documenting high positive returns for a specific technology is difficult. First, farmers' profits can be difficult to appraise; estimates typically rely on survey recall data, which is imperfect by nature. Second, the costs of adopting a technology are challenging to evaluate, as they typically comprise more than the financial costs of buying inputs or machinery (e.g., commuting to market to purchase them). Third, a number of identification challenges arise when estimating the marginal return of a technology (see Foster and Rosenzweig 2010 for a thorough discussion on this issue). For example, farmers may respond to adopting a new input by re-optimising other inputs (Beaman et al. 2013), which makes it hard to isolate the effect of the introduction of the new technology. Duflo et al. (2008) find evidence that small quantities of fertiliser generate important output gains but are not able to draw conclusions about the profitability of the investment given the lack of cost data. Suri (2011) develops a structural methodology to measure profits and finds heterogeneous returns across farmers, with those facing the highest gross returns also confronting the highest costs of acquisition due to poor infrastructure.

A large literature documents that farmers lack the knowledge about technologies available elsewhere. This shortage of information can take the form of not being aware of the existence or economic returns of a particular input or machinery, or not knowing how to use the technology (Foster and Rosenzweig 1995, Hanna et al. 2014). This observation has led to the development of studies on the channels through which technology diffuses across social networks or through neighbours (Munshi 2004, Conley and Udry 2010, Bandiera and Rasul 2008, Duflo and Suri 2010).

A second potential constraint to technology diffusion in agriculture is access to credit (Gine and Klonner 2005, Miyata and Sawada 2007). Farmers may be aware of new technology that would generate positive returns but lack the liquidity necessary to acquire it. We further discuss the issue of access to capital in Section 2.b.2.

Risk aversion and a lack of insurance markets can also contribute to low technology adoption in developing countries (Islam et al. 2018). New seed varieties may be more sensitive to weather conditions and so generate a higher volatility in yields, despite greater returns on average. Acquiring new technology also requires a high investment up front, prior to the realisation of uncertainty (Dercon and Christiaensen 2011). Moser and Barrett (2006) show that farmers with a more stable source of income in Madagascar are more likely to adopt a high-yielding rice production method.

Additionally, of course, these three constraints to technology adoption may interact. The lack of yield insurance mechanisms may worsen credit constraints. Similarly, lack of access to information poses an additional uninsurable risk for farmers (Magruder 2018).

In the manufacturing sector, the literature on technology adoption and diffusion is thinner. Atkin et al. (2017) introduce a new waste-reducing technology for cutting soccer balls in Pakistan. Despite the high potential returns, only a handful of firms initially embrace the technology. The authors document another potential constraint to technology adoption: organisational barriers. In this case, the performance incentives set by the firms for the cutters (that is, the workers whose primary task is to pre-cut the soccer ball pieces) aim at increased speed, with no reward for reducing waste. As such, the initial slowdown in production that would follow the adoption of the new technology discourages cutters from using it. De Rochambeau (2017) documents how intrinsic motivation and employer-employee relationships prevent the adoption of a monitoring technology for truck drivers in Liberia. Hardy and McCasland (2019) randomly introduce a new weaving technique across the network of garment producers in Ghana and subsequently place orders for which the technology is needed. Technology diffusion is negatively correlated with competition at baseline. Firms who receive training on the technique and an order are more willing to teach other firms about the technology than firms who only receive the technique.

Technology upgrading may also generate important benefits when improving the productivity of support functions inside the firm. Dalton et al. (2019) conduct an experiment where restaurants and pharmacies in Kenya are randomly given an opportunity to sign up for a new mobile payment technology. More than a year after the intervention, treated firms had better access to finance through the mobile loan network, and had not reduced their demand for loans granted by other financial institutions. They also experience less variability in their sales over a full year of operations.

Overall, existing evidence points to significant barriers to technology diffusion in developing countries. While information, credit and insurance are well-documented sources of low adoption rates in agriculture, more research is needed to understand the main obstacles to upgrading technology, particularly in the manufacturing sector. In large industrial firms, organisational barriers and competition can also act as significant barriers, but little is known about the relative importance of each factor. This question remains particularly relevant for policymakers

who are looking for priority interventions that could bring their country closer to the world's technological frontier. We now turn to possible interventions to increase technological diffusion in low-income countries.

Existing evidence points to significant barriers to technology diffusion in developing countries.

Policy interventions

Increasing technology adoption in low-income countries is a challenging task, but there are a number of potential interventions to consider and evaluate.

First, governments could provide financial support to businesses to acquire more technology-intensive equipment. Increasing access to capital could be done through indirect interventions such as loan guarantees (Arraiz et al. 2014) or tax rebates that incentivise upgrading. An alternative could be the direct provision of funding for acquiring new technologies, such as cash or grants (De Mel et al. 2008), credit (Gine and Yang 2009, Crépon et al. 2015), insurance (Mobarak and Rosenzweig 2012) or in-kind transfers of equipment (Atkin et al. 2017, de Rochambeau 2017, Kelley et al. 2018, Fafchamps et al. 2014). Now, credit, cash, or insurance provisions might not necessarily incentivise firms to innovate and might instead lead them to spend elsewhere, particularly if a lack of information about available technology is the main constraint they face. However, these methods are more flexible than direct machinery or input donations, which may not be perfectly suited for firms' specific needs.

Carter et al. (2013) report low take-up for vouchers providing a 73% discount on HYV seeds and fertilisers. Karlan et al. (2011) and Beaman et al. (2014) document a 35% and 12% increase in the use of chemical inputs, respectively, from their interventions offering farmers the chemicals at a discounted rate. While there is an extensive literature on reducing credit constraints at the firm level (see Section 2.b.2), there is much less evidence on how reducing these frictions impacts technology upgrading specifically.

Second, more direct interventions to incentivise technology upgrading could be tested. These include information provision—which, in the case of agriculture, is generally referred to as extension services (Cunguara and Moder 2011, Ali and Rahut 2013, Kondylis et al. 2017, Beaman et al. 2018)—or consultancy services and trainings (see the previous section for an extensive discussion on this point). Communication infrastructure can also facilitate technology diffusion. Gupta et al. (2019) show that rural Indian communities that received mobile phone network access early on due to geographical constraints were also more likely to adopt HYV seeds and fertilisers. They provide evidence that farmers made phone calls to a major call centre to get advice on the use of specific seed varieties and fertilisers. Finally, accelerator or incubator programmes—which are common for start-ups in developed countries—could also promote innovation in low-income countries. However, there is limited evidence on the impact of these services. Indeed, Gonzalez-Uribe and Leatherbee (2017)'s analysis suggest that all of the positive effects of accelerator programmes could be attributed to the ability of the entrepre-

neurs selected into these programmes. By contrast, Roberts et al. (2017) report that entrepreneurs value the network incubator programmes typically provide, a fact that resonates with the results from Cai and Szeidl (2017), discussed above.

Third, governments set laws which can create an enabling environment for upgrading. These regulations can take the form of allowing a wider set of labour contracts that facilitate technology adoption inside the firm (Atkin et al. 2017) or reforming lending policies (Banerjee and Duflo 2004). The state's management of the macro-economy can also influence technology diffusion (Crouzet et al. 2018).

Next steps and research priorities

- Uncovering evidence on the type of barriers to technology adoption. Are there specific sectors or firm types for which they are stronger?
- Which policy interventions are most effective in reducing barriers to technology adoption?
    - Financial support
    - Information provision
    - Regulations that foster technology advancement

B Improving productivity through the creation and accumulation of higher quality factors of production

Firms produce output by employing labour, investing in machinery and other capital, and buying materials and other inputs (such as electricity). Technology, another input—which is either embedded in capital or material inputs or in the form of a production process—determines their productivity. This section discusses the extent to which firms in developing countries are constrained by their access to specific factors of production.

Studying the availability of inputs to production is particularly important for policy. Governments are often in a position to remove these constraints by liberalising imports of higher quality inputs or high-performing machinery or by designing more appropriate labour training programmes to upgrade the skills of the labour force.

1. Labour

There is a small but growing evidence base on whether firms in developing countries are constrained in accessing labour. Two recent papers provide bounds for the evidence on this question.Hardy and McCasland (2017) study whether search and matching frictions restrain firms from hiring the optimal number

of workers. They conduct an experiment where unemployed young people are randomly placed as apprentices within small firms in Ghana. Apprentices' cost of voluntary participation served as a screening device for firms. Firms given apprentices by the programme typically hired and retained them for at least six months, which suggests that firms face binding search costs. Moreover, revenues and profits of treated firms increased by seven to ten percent per assigned apprentice, providing evidence that the marginal product of labour is positive and significant in these small enterprises, at least in the short run.

By contrast, in a field experiment in Sri Lanka, De Mel et al. (2019) find that providing wage subsidies to microenterprises does not generate a lasting impact on employment, profits, or sales, despite a significant positive response to the incentives in the short run.

In larger firms, Blattman and Dercon (2018) and Menzel and Woodruff (2019) document high turnover rates among unskilled workers. This suggests that larger and more productive manufacturing firms are not constrained by their access to unskilled labour, given that they constantly hire new workers to replace those who leave. Menzel and Woodruff (2019) show that the least skilled workers are likely to gain initial promotions by moving across firms, but that promotions among more highly skilled workers are almost entirely within-factory. This pattern illustrates that the Bangladeshi factories they study understand how to retain workers but choose to do so only on the more skilled end of the spectrum, perhaps because the cost of finding highly skilled workers is greater than finding low-skilled ones.

Vocational training programmes provide a formal certificate for the skills acquired. As a result, the labour market mobility of vocational trainees is higher in the longer term, allowing them to jump back onto the job ladder more quickly.

On top of simply higher search costs for skilled workers, there may be a lack of supply of skilled workers in developing countries. Thus, a broader research agenda could include an exploration of how workers can be better equipped with essential skills that benefit host firms. This issue is also related to the design of more efficient education systems in developing countries—systems that meet the needs of firms and the economy as a whole. While the entire education ecosystem is important, in this section we focus primarily on *professional* education (such as vocational training, apprenticeships, and on-the-job training), which can enable workers to develop skill sets applicable to firms.

Card et al. (2011) conduct a job-training programme experiment in the Dominican Republic. The programme targeted toward low-income youth with less than secondary education, combined training on basic skills (to strengthen the participants' self-esteem) and vocational skills (to match the needs of local employers). The authors find that the programme had a significant impact on employment outcomes for women. By contrast, Attanasio et al. (2011) find a positive and significant impact on employment and earnings among wom-

en who were offered a subsidised vocational training programme in Colombia. The same outcomes were not significantly impacted for men. In follow-up work, the authors find that these impacts persist over the long run.

Subsidised apprenticeships could also be an effective way to upgrade the skills of a young and inexperienced labour force. On top of raising a worker's productivity, apprenticeships can offer them the opportunity to acquire early labour market experience, and participation signals information about their skills to future prospective employers (Pallais 2014). On firms' side, subsidising apprenticeships could ease the credit constraints that prevent companies from hiring and training workers on their own. However, it is worth noting that even when fully subsidised, apprenticeships involve significant time costs for managers and other employees engaged in training apprentices.

Alfonsi et al. (2019) compare the relative performance of vocational training versus apprenticeship for unemployed youth in Uganda. They find that both vocational training and apprenticeship programmes, which were provided over a six-month period, lead to significant upticks in skills and improvements in employment rates and other labour market outcomes. However, vocational training outcomes are almost twice as large as those for apprenticeships. The difference is that vocational training programmes provide a formal certificate for the skills acquired. As a result, the labour market mobility of vocational trainees is higher in the longer term, allowing them to jump back onto the job ladder more quickly if they fall into unemployment relative to those workers that have experience as apprentices but no credibly certified skills.

If vocational trainings exhibit a positive return on investment for youth, why don't more people sign up for such programmes on their own? A first and natural explanation is that the youth are credit constrained and cannot afford these human capital investments. A second explanation, explored in Jensen (2010), is that the perceived returns to vocational training programmes are lower than their actual returns. A final reason could be adverse selection in the market for vocational training. As Alfonsi et al. (2019) note, their programmes may have had such an impact because they selected high-quality providers from the crowded market for vocational training in Uganda. Thus, simply lifting the credit constraint faced by the youth by providing, e.g., cash transfers that match the value of the training may not generate the same impact in the long run if young workers are unable to rank potential providers correctly. Understanding this degree of information asymmetry in the market for vocational training can be a key part of a future research agenda.

More generally, while the literature on vocational training programmes and apprenticeships is well established, large knowledge gaps remain in several areas. First, while the focus of this literature is generally on improving labour market outcomes for unemployed youth, there is little evidence as to what type of programmes benefit *firms* the most; Hardy and McCasland (2017) and De Mel et al. (2019), presented above, are exceptions. In particular, understanding firms' demand for skill upgrading programmes is an important area for further research (Macchiavello et al, 2015). Second, the focus of training programmes and its impact on their effi-

ciency is an area that needs more research. Should vocational training programmes be sector-specific rather than job-type specific? Or should they aim at improving soft skills rather than hard skills (Adhvaryu et al. 2018)? Should they target just unemployed youth, women who are at disadvantage in labour markets, or only individuals with secondary education? Finally, just as with entrepreneur training programmes, there is little evidence on the general equilibrium effect of these programmes. These, again, are likely to be important considerations for governments considering implementing subsidised vocational training programmes at scale.

While vocational training programmes and apprenticeships typically consider how people entering the labour force could be equipped with a better set of skills, Lakagos et al. (2018) show how the growth rate of wages over a worker's life cycle is lower in developing countries. A simple explanation for this observation, motivated by the facts described in the previous sections, is that firms in developing countries—perhaps because of their poor knowledge of management practices—are less productive and hence do not transfer skills effectively to their employees. An alternative explanation is that conditional on host firms' productivity, workers may be acquiring skills on the job at a slower rate in low-income countries than in high-income countries, which in turn lowers the productivity of host firms. Lower quality schooling, if it does not provide the right set of tools to acquire skills on the job, could be the responsible underlying factor. Discrimination on the job could also explain this pattern as individuals who get promoted or get access to training may not be the most capable. Macchiavello et al. (2015) document that while the majority of workers in garment factories in Bangladesh are female, very few of them are line supervisors. Following a supervisor training programme, workers initially tend to judge female workers as being less effective, which in turn decreases performance of the production line; but after four months of exposure, the gap closes. Finally, employee-employer matching frictions could be higher in developing countries, and hence the slow rate of learning on the job could simply reflect the poor quality of matches. We return to this issue in Section 2.c.1.

Next steps and research priorities

- What is the magnitude of search frictions for skilled workers?
- What programmes can upgrade the skills of the workforce effectively?
- Why don't more people sign up for vocational training programmes? Is there adverse selection in this market?
- Why is wage growth smaller in developing countries? Does discrimination prevent the most capable individuals in a firm from being promoted?

2. Capital, material inputs, and electricity

The literature on how access to capital or other inputs affects firm performance is large and just as for the literature on entrepreneurship training programmes, it covers a wide range of interventions, each targeted on a specific type of firm. Given the brief review of this literature, we do not attempt an exhaustive review of this literature.

Capital

Access to finance has long been viewed as a particularly severe constraint to firm growth in developing countries. A large body of evidence indeed suggests that the marginal return to capital is large for microenterprises in developing countries (De Mel et al. 2008, De Mel et al. 2009, Fafchamps et al. 2014, McKenzie and Woodruff 2008). However, *how* credit constraints can be lifted or access to capital can be improved for small firms, in a way that generates employment, profits, and growth, is still an important area of research.

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A number of papers have found that cash or in-kind grants offered to self-employed entrepreneurs can generate large returns in the short run (De Mel et al. 2008, Fafchamps et al. 2014, McKenzie and Woodruff 2008). The evidence on the longer-term effect of capital is more mixed, with De Mel et al. (2012) finding continued high returns and Blattman et al. (2019) finding that initial high returns dissipate after nine years.

By contrast, traditional microcredit typically does not have transformative effects on recipients (Meager 2018). This is first because the demand for microcredit, when offered to a representative population of eligible borrowers, is generally modest or at least lower than expected (Angelucci et al. 2015, Banerjee et al. 2015, Crépon et al. 2015). Second, increases in profits for treated entrepreneurs are typically not significant (see Loiseau and Walsh 2015 for a review) and sometimes even led to a decrease in household consumption (Tarozzi et al. 2015).

A potential explanation for these conflicting results may be that business owners adopt riskier but higher-return projects when they receive a cash grant, but they take on safer and lower-return investments when given a loan (Fischer 2013). As such, the terms of the loan contract can have important consequences on the impact of a given loan size on business outcomes (Field et al. 2013).

A new area of research has emerged on this issue over the last few years, shifting the attention from loans to equity. Lenders may not be particularly attracted to loans, as they take a loss when a project fails but do not capture the upside when investments are more successful than expected. Micro-equity contracts could be a solution for this, but they pose a number of implementation challenges, given poor accounting and auditing standards in low-income countries (de Mel et

al. 2019). A number of experiments aimed as using micro-equity to lift credit constraints are underway in Kenya, Indonesia, and Pakistan, and their results should shed light on whether micro-equity could be a reliable solution for improving entrepreneurs' access to capital in developing countries.

Reducing transaction and monitoring costs could also potentially increase access to finance, but from the supply side. The process of identifying and vetting applicants is particularly costly, and delegating these tasks to the community could significantly reduce the cost of granting a loan (Rigol et al. 2018). Similarly, a simplified or automatic decision process using credit scores could increase the profitability of lending (Paravisini et al. 2015). Digital information, such as phone data, could also be used to decrease the cost of assessing an individual's creditworthiness. Several experiments testing how these technological improvements affect firms' access to credit are currently underway.

The literature on credit constraints for larger firms is more limited. Banerjee and Duflo (2014) uses a change in policy that affects the threshold at which Indian firms are eligible for a directed credit. They show that newly eligible firms expanded production, which provides evidence that these firms were credit constrained prior to the reform. Another notable exception is Macchiavello and Blouin (2019) who study strategic default for very large working capital loans for coffee mills.

In sum, the literature on access to finance is very well developed for small firms, but it is lacking for medium to large firms. This is particularly important, as the impact of an increase in the supply of micro credit for small businesses would arguably deliver very different results than increased access to capital for larger firms. Given the growing involvement of development finance institutions in financing directly or indirectly large businesses in developing countries, in particular through private equity, we believe this area deserves particular attention.

A possible area of further research for small firms could be how to design new and innovative contracts to address the challenges presented by identifying, vetting, and monitoring small firms in developing countries. A model for angel investors and venture capital, which play an important role in funding innovation and market disruption in high-income countries, could also be adapted for developing countries. Additionally, even for small firms, existing studies may not sufficiently differentiate how specific markers such as gender and ethnicity affect the magnitude of credit constraints.

Finally, while the discussion above has focused on credit constraints as firms' main issue around accessing capital, the ways in which businesses can get better access to higher quality and more technologically intensive machinery is an area that requires more evidence.

Inputs

Firms may also have limited access to specific inputs that are necessary to upgrade their outputs. Global value chains have become important over the last few decades (World Development Report 2020), and a large fraction of firms' inputs or potential inputs may now derive from imports.

For example, a large body of research studies the effect of major trade liberalisations in the late 1990s and 2000s. The liberalisations removed barriers to imports imposed by import substitution policies between the 1950s and 1980s.

While India's trade reforms in the 1990s primarily reduced tariffs on imported inputs, it also led to a huge spike in varieties that were not imported pre-reform. Goldberg et al. (2010) shows that this reform increased the range of products manufactured domestically. In many industries and countries, domestic inputs are only imperfect substitutes for imported inputs (Halpern et al. 2015). In turn, if some inputs can only be imported at a high cost, domestic firms may use domestic inputs more intensively, at the expense of a wider product scope or quality upgrading. Kugler and Verhoogen (2012) theorise and document the importance of input quality in producing output quality. VAT and transaction-level customs data could deepen our understanding of these phenomena. In a recent paper, Bas and Paunov (2019) directly observe inputs and outputs at the firm level and confirm that cuts in import tariffs lead Ecuadorian firms to use a wider range of inputs and expand product scope.

A model for angel investors and venture capital, which play an important role in funding innovation and market disruption in high-income countries, could also be adapted for developing countries.

A large literature has also shown that lower import tariffs increase firm performance. Amiti and Konings (2007) in Indonesia, and Topalova and Khandelwal (2011) in India, show that those firms more exposed to input tariff cuts exhibited greater productivity growth. De Loecker et al. (2016) shows that lower tariffs in India led to a decrease in output prices, but that these price drops were small relative to the decline in marginal costs, a fact they attribute to firms increasing their mark-ups. Mirroring these results for lower tariffs, Gopinath and Neiman (2014) demonstrate that the 2000 peso depreciation, which effectively increased the cost of imported inputs, generated large productivity losses, reduced firms' scale, and raised output prices.

Despite this mounting evidence that lower tariffs increase firm performance, many governments in developing countries may be reluctant to eliminate tariffs, as tariff duties might make up a substantial share of their revenue. As such, an interesting area of future research could be how to minimise distortions from tariff duties. Given a country's output product scope and trade performance, are there a set of products for which import tariffs may have a lower impact? In a recent paper, Liu (2019) argues that governments should target distortions in upstream sectors, which can deliver larger improvements in aggregate productivity than addressing distortions in downstream markets. We return to this issue in Section 3.

Electricity

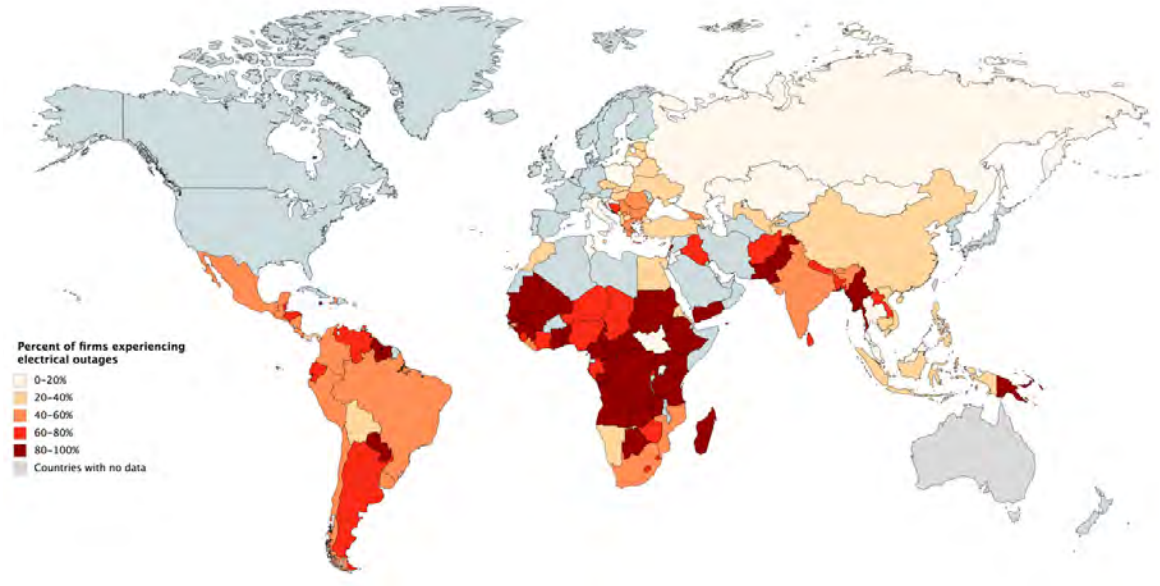


Figure 1: Percentage of firms experiencing electrical outages (Source: World Bank Enterprise Survey)

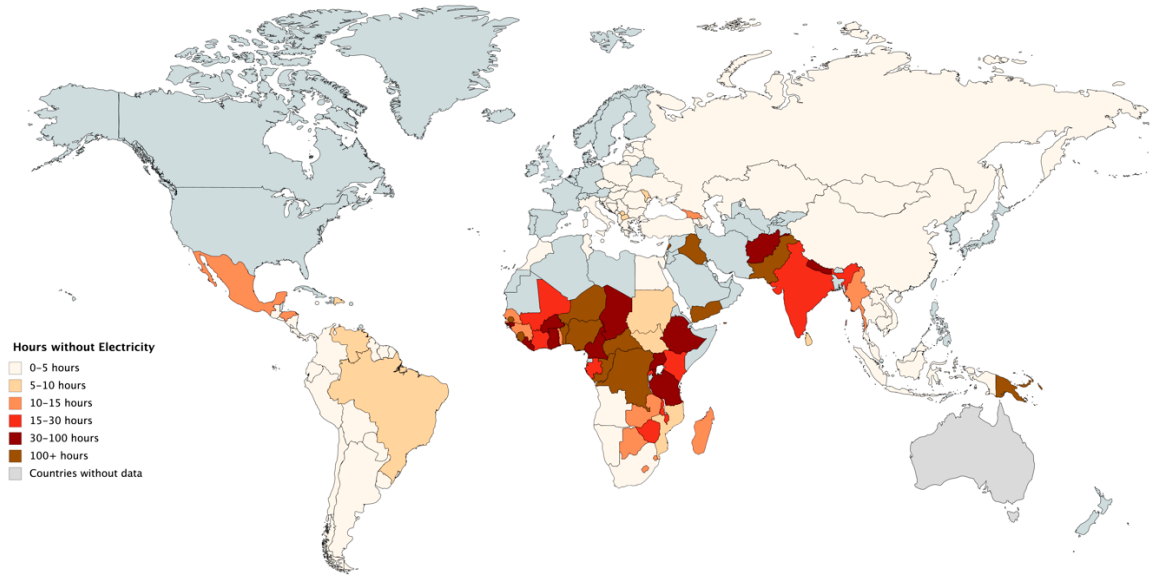


Figure 2: Average number of hours per month without electricity (Source: World Bank Enterprise Survey)

Energy and access to a reliable source of electricity is also key for firms in low-income countries. The World Bank Enterprise Survey reveals that 75 and 66 percent of firms in sub-Saharan Africa and South Asia, respectively, experience power cuts. The average number of hours without electricity per month is

66 hours in sub-Saharan Africa and 46 hours in South Asia. These outages are often cited by entrepreneurs as the most important constraint to their growth.

Yet, there is little evidence on how blackouts really impact firm productivity, production, and employment. The effect of electricity shortages could vary across firm size. Large firms may have the potential to source electricity from generators or re-optimise production with other inputs, whereas small firms are likely to just stop production. Hardy and McCasland (2019) indeed show that blackouts are particularly costly for single-person firms, with each cut corresponding to a 10% drop in weekly revenues. Allcott et al. (2016) document important economies of scale in self-generation of electricity, which in turn creates a distortion in firm-size distribution, giving large firms an advantage. By contrast, Fisher-Vander et al. (2015) find that Chinese firms do not shift to generators in response to electricity scarcity. Instead, they substitute material inputs for energy by buying energy-intensive inputs from other manufacturers. While re-optimisation strategies reduce the impact of power cuts, shortages could remain costly to firms. Using variation provided by an electricity rationing programme in Ghana, Abeberese et al. (2019) estimate that electricity outages in Ghana are equivalent to a 10 percent loss in productivity.

The World Bank Enterprise Survey reveals that 75 and 66 percent of firms in sub-Saharan Africa and South Asia, respectively, experience power cuts. The average number of hours without electricity per month is 66 hours in sub-Saharan Africa and 46 hours in South Asia.

While shortages can impact production, electricity prices also matter in determining the composition of inputs used and the sectoral structure of the economy (Abeberese 2017). Finding the right balance between stabilising electricity supply through optimal pricing and allowing electricity-intensive sectors to develop is a difficult task for governments.

Finally, in the rural developing world, the main constraint is not power cuts but simply electricity access (Dinkelman 2011). To assess the impact of grid connection on economic outcomes in agriculture, researchers will likely need to find geographical instruments that explain the timing of electrification in rural areas but remain uncorrelated with spatial economic development.

In sum, there is a large literature on how input constraints reduce productivity in developing countries. There is less evidence, however, on the relative quantitative importance of each factor. This is particularly relevant for policymakers who need to prioritise their actions around removing constraints where they are impacting firm growth the most. Similarly, evaluating the effect of specific policies aimed at reducing barriers in access to inputs remains an important area of research.

Next steps and research priorities

- Investigating the magnitude of credit constraints for large firms. How can development finance institutions design innovative contracts for large businesses in developing countries?
- What is the impact of removing credit constraints for larger firms, in particular in upstream and downstream sectors?
- Can new forms of capital (micro-equity, angel investors, VC) provide a solution for access to finance in developing countries?
- How can input market distortions from tariff duties be minimised?
- What is the impact of electricity access and energy costs on firm performance?
- What is the relative quantitative importance of low access to each input factor in reducing firm productivity?

C Improving the allocation of factors by improving the functioning of markets

While improving access to material inputs, capital, and equipped labour is essential for per-capita output growth at the aggregate level, making sure that the existing stock of inputs is allocated to the right firms is also critical. Ultimately, the goal for developing countries is to increase aggregate total factor productivity (TFP), which is affected both by the distribution of firm productivity and the allocation of resources across establishments. An efficient, or distortion-free, allocation would be one in which the marginal value product of inputs is equalised across production units. In this section, we discuss a number of potential sources of such misallocation.

1. Factor misallocation

Recent work has attempted to quantify the extent of dispersion in the marginal value products of inputs across firms, as well as the resulting consequences of that dispersion for aggregate productivity (see, e.g., Hopenhayn and Rogerson 1993, Banerjee and Duflo 2005, Guner et al. 2008 Hsieh and Klenow 2009 and 2014, and Restuccia and Rogerson 2008). The underlying distortions can take the form of specific policies that favour small firms at the expense of larger and more productive firms (e.g., taxes and regulations) or restrict labour mobility across firms or sectors (e.g., firing costs). Additionally, informal firms typically don't have to bear the costs of certain regulations that large compliant firms must abide by. Political connections, friend networks, family relationships, or social status can also favour certain firms at the expense of others (Banerjee and Munshi 2005, Hnatkovska et al. 2012). Market

power in output or input markets, as well as non-market power resulting from the poor enforcement of property rights or inefficient institutions (Brandt et al. 2017, Chen et al. 2017), can also create sizable distortions.

In a seminal paper, Hsieh and Klenow (2009) argue that resource misallocation may be stronger in developing countries. They estimate considerable gaps in the marginal products of labour and capital and claim that misallocation can explain approximately a third of the TFP differences between China or India and the US. Removing these distortions could, in principle, lead to high gains in per capita output due to resource reallocation. Between 1998 and 2005, the authors document a decrease in misallocation in China following the implementation of various policies aimed at reducing distortions. This paper and the vast literature that followed (e.g., Buera et al. 2011, Bartelsman et al. 2013, Busso et al. 2013, Kalemli-Ozcan and Sørensen 2016) do not attempt to identify the origin of distortions, but instead focus on providing a framework and tools to quantify the consequences of the distortions that do appear to exist.

Other recent work has, however, questioned the empirical basis for this consensus. For example, Haltiwanger et al. (2018) suggest that model misspecification can lead to sizable biases in the measurement of misallocation wedges. Using a new framework, they argue that most of the variation observed in Hsieh and Klenow (2009) could be attributed to demand shifts. Rotemberg and White (2017) point to differential amounts of measurement error across countries as another factor that possibly contributes to the literature overstating misallocation's role in explaining the relative extent of international aggregate productivity differences.

The broad view emerging from this literature thus far is that misallocation distortions are large and tend to be tilted in the direction of a tax on large, productive firms—or equivalently, a subsidy to small businesses (see Hopenhayn 2014 for a review). Although these recent developments are helpful in quantifying the role of misallocation in productivity growth, they do not clarify the origins of the distortions for policymakers, nor the type of specific and targeted interventions that could address them.

To this end, several papers explore the misallocation consequences of specific policies in developing countries. For example, Garcia-Santana and Pijoan-Mas (2014) study the impact of small-scale reservations in India. Adamopoulos and Restuccia (2019) measure the impact of a land-holdings ceiling reform in the Philippines. However, the majority of these studies find that the policies have only a small impact on aggregate productivity, which contrasts with the more agnostic and reduced-form approach taken by Hsieh and Klenow (2009) and follow-up papers. One possible interpretation is that the agnostic approach overestimates the influence of resource misallocation. Yet, the list of plausible sources of misallocation is long; each may have a small contribution, and many are likely to be country or sector specific.

Researchers could make progress in this literature by taking a more middle-ground approach, using a broad classification of sources of misallocation (e.g., policy versus market power versus political connections, or capital versus labour) and attempting to quantify the importance of these different categories of distortions.

Echoing some of the discussion previewed in Sections 2.b.1 and 2.b.2, we explore further potential capital- and labour-related misallocation factors below.

Capital misallocation may come from preferential access to credit or firm-size-dependent constraints that disproportionately discriminate against small firms. However, existing evidence points to the idea that large firms are at a disadvantage, as they face a higher marginal product of capital. This suggests that these distortions may not be responsible for the misallocation of capital. Instead, other policy-imposed constraints—such as taxes, regulations, or other social norms—may prevent capital from being reallocated to more productive firms. We encourage further research in this area.

On the input side, Nishida et al. (2017) argue that current approaches for quantifying the relative importance of reallocation and internal productivity in aggregate TFP growth tend to underplay the importance of materials misallocation. The role of material input misallocation has not been the topic of many studies in the literature and should be the focus of more research.

While improving access to material inputs, capital, and equipped labour is essential for per-capita output growth at the aggregate level, making sure that the existing stock of inputs is allocated to the right firms is also critical.

Dalton et al.(2019) conducted an experiment on mobile payment technology in Keya. More than a year after the intervention, treated firms had better access to finance through the mobile loan network.

On the labour side, firing costs may prevent firms from adjusting labour supply in response to shocks. Many governments around the world impose restrictions on worker layoffs, at least for firms above a certain size. Similarly, the role of hiring and matching frictions also deserves more attention (see Betcherman et al. 2004 for a review). Gender or ethnicity-based discrimination may lead to an inefficient allocation of labour across firms and sectors. Many countries provide resources that allow job-seekers to better signal their skills or directly help firms match with the unemployed workforce. Such policy interventions include job fairs (Abebe et al. 2016a, Beam 2016), transport subsidies (Franklin 2015), or skill certification programmes (Bassi and Nansamba 2019). Abebe et al. (2019) show that credit and time constraints are stronger for higher ability applicants for jobs in Ethiopia and as such a small monetary incentive for making a job application increases the quality of the pool of applicants in a way that is similar to doubling the offered wage. Very few studies attempt to measure the impact of these interventions on firm productivity. As such, taking the perspective of firms rather than workers in analysing the impact of labour market policies is a promising avenue for research. As such, this topic relates to this subject of access to labour in Section 2.b.1, and it may be difficult to separate the issue of labour misallocation from the issue of search costs for firms.

Labour may also be misallocated across sectors. In many developing countries, the government and NGOs offer better employment opportunities than the private sector (Finan et al. 2017). Even Ethiopia, which is arguably one of the only African countries that has been through significant structural transformation over the past decade, has over 50 percent of its skilled labour force working in the public sector. While wages in the public sector or international organisations are high, the marginal product of labour in these sectors may be lower than in firms. High wages may instead reflect the optimal screening strategy of these organisations (Macchiavello 2008) or provide incentives against corruption. The private sector faces a wide variety of shocks - such as greater risk of job loss or reallocation - that could affect workers' flow of income, and which may be the reason why more stable employment opportunities are preferable.

Moreover, within the private sector, costly mobility barriers may prevent labour from being allocated to the most productive sectors in the economy (Gollin et al. 2014). When sectoral movement requires geographical movement, high transport costs may act as a barrier to productivity growth (Morten and Oliveira 2019). Bryan and Morten (2019) estimate that reducing migration costs to the US level in Indonesia would spur a 7 percent increase in aggregate productivity. Lagakos et al. (2019) show substantial welfare effects of promoting rural-urban migration. Using data on migration from the MNREGS programme in India, Imbert and Papp (2019) argue that hard living and working conditions in cities, rather than transport, make up the largest fraction of the costs of migration. Finally, the lack of opportunities for later-life job training may prevent workers from understanding the growth possibilities in other sectors.

The allocation of labour across sectors traditionally relates to the topic of structural transformation and the potential gains of pulling workers out of subsistence agriculture into plausibly more productive urban sectors (Gollin et al. 2002). In high-income countries, the share of labour in agriculture is lower than in developing countries. Additionally, data from national accounts indicates that the productivity gap between low- and high-income countries is wider in agriculture than in other sectors (Caselli 2005), in part due to farm-size distortions (Adamopoulos and Restuccia 2014). Using microdata, Gollin et al. (2014) confirm a large within-country productivity gap between farming and other sectors. By contrast, Hicks et al. (2017) document how controlling for individual characteristics in Kenya illustrates that 80 percent of the productivity gap can be attributed to selection: The most productive workers migrate to cities to work, while the least productive remain in agriculture. Labour movement between agriculture and manufacturing can also take place at a much higher frequency, with workers switching constantly from one to the other depending on earnings opportunities (Zane 2018).

Many countries in sub-Saharan Africa and South Asia have experienced very low growth in manufacturing in recent years.

The traditional view of structural change is that productivity growth in the manufacturing sector drives the shift of the labour force out of agricultural activities and into industrial jobs. However, many countries in sub-Saharan Africa and South Asia have experienced very low growth in manufacturing in recent years. Relative to high-income countries when they were at similar levels of development, developing countries today have lower shares of manufacturing output but higher shares of services. As such, structural transformation may involve more than simply moving labour from agriculture to manufacturing. Services, or other more generally productive sectors in cities, also seem an adapted target that could promote aggregate productivity growth. To facilitate these structural changes, the state will likely need to provide complementary services to labour mobility (see Bandiera et al. 2019). Understanding how governments can foster structural transformation remains a key question for economic development.

Finally, while this section focuses on the static misallocation of factors of production, firm dynamics should not be ignored. Hsieh and Klenow (2014) show that firms in developing countries typically grow slower and reach a plateau after twenty years of operations. Eslava et al. (2019) argue that this pattern could be explained by the high survival rate of underperforming firms but also by the lack of firms experiencing exceptional growth. While the issue of competition likely plays a role in explaining how low-productivity firms sustain themselves, understanding why disruptive entry is less common in developing countries remains a puzzle that should be further explored.

Next steps and research priorities

- What factors are responsible for the misallocation of factors of production across firms? Quantifying the relative importance of each factor, particularly the importance of specific policies and regulations.
- Do matching frictions and firing costs prevent the optimal allocation of labour across firms?
- What barriers constrain the optimal allocation of labour across sectors? How can structural transformation be promoted?
- Why is there less disruptive entry in developing countries?

2. Role of firm-level demand and access to markets

The main barriers to firm growth presented thus far have been on the supply side—either through internal capacity and capability, access to factors of production, or misallocation of these same factors across firms. However, firms may face constraints on the demand side as well. The enterprise maps of John Sutton (2010; 2012; 2014) suggest that the capability of firms may be derived from their ability to understand local demand as the majority of the top firms in Ethiopia, Ghana and Mozambique started as traders and importers. The existence of frictions on the demand-side also relates to the misallocation section above. In their seminal paper, Hsieh and Klenow (2009) introduce a wedge on inputs and on the demand side, both of which are responsible for the misallocation of factors of production across firms.

The existence of frictions on the demand-side would have important consequences for policy making. While the majority of aforementioned programmes aimed at improving firm performance were focused on the supply side, demand-driven support of small and medium firms may be just as necessary to stimulate sustained business growth (Tendler and Amorim 1996). Moreover, the observed poor performance of supply-side programmes (such as management training) on sales and profits discussed in Section 2.a.1 could be explained by firms' inability to fully grasp the benefits of these programmes if they remain constrained on the demand side. As such, combining supply-driven and demand-side interventions may be the optimal design for promoting growth among small businesses.

Such interventions are only justified if firms' limited demand is the result of market failures. We review existing evidence on these potential distortions below.

First, poor infrastructure and high trade costs in developing countries can significantly lower the demand that firms face. This may particularly be critical for farmers, whose production location is by nature far—in distance and in cost—from cities and the markets they (could) serve (Atkin and Donaldson 2015). A number

of papers have recently documented the positive impact of improvements in physical infrastructure (Brooks and Donovan 2017, Casaburi et al. 2013, Donaldson 2018, Ghani et al. 2014) or better access to digital marketing tools (Couture et al. 2018) on economic activity. By contrast, Allen and Atkin (2016) find that a reduction in trade costs may come with downsides as well. Better access to global markets reduces the negative correlation between yields and local prices, providing a form of insurance to small-scale agricultural producers.

Second, searches for potential buyers may be subject to significant information barriers that prevent firms from knowing about market conditions elsewhere or even knowing that it is feasible for them to sell to distant markets. For example, these frictions could take the form of farmers not knowing about prices in other locations (Allen 2014) or consumers not knowing about the range of products available outside of local markets (Jensen and Miller 2018). Here again, access to technology can help firms alleviate this constraint (Jensen 2007).

Third, contractual frictions, partly driven by poor contract enforcement in low-income countries, can significantly reduce opportunities for deals between buyers and sellers. Firms typically resort to relational contracts to solve these challenges, but these take time to form (McMillan and Woodruff 1999). Moreover, in an environment where quality is not contractible, reputation plays an important role. A firm surrounded by low-quality producers, then, faces challenges in signalling the quality of its own products to potential buyers (Bai et al. 2017). Thus, it also takes time for buyers to learn about the quality of a given supplier's products (Macchiavello 2010). Consistent with this theory, Macchiavello and Morjaria (2015) use evidence from the Kenyan rose market to show that compliance increases with the length of the relationship, but that once the relationship is established, suppliers care less about damaging their reputation. Similarly, trust plays an important role in business relationships, and attributes other than just performance, quality, or price—such as ethnicity—may be important factors determining the allocation of demand across firms (Schoar et al. 2008). For example, Bai (2018) explores the use of laser-cut labels to solve the asymmetry of information in the quality of watermelons in China but shows that the benefits of using the technology do not outweigh the costs for producers; regardless of the use quality stickers, customers are more likely to work with vendors they already trust. Hansman et al. (2019) show how vertical integration can solve quality-based contractual frictions with suppliers. As many of studies cited above highlight, the existence of reputational and contracting frictions open the scope for a wide range of policy interventions.

Fourth, firms may lack the marketing capacity necessary to increase sales. The market for acquiring such skills may be subject to some of the same failures as the market for consulting services discussed earlier. Managers' perceptions of the returns of marketing training programmes could be lower than their actual returns. Alternatively, firms may be unable to identify the quality of potential providers for these trainings or may face credit constraints that prevent them from making an investment in these skills. Anderson et al. (2014) document a signifi-

cant impact of marketing training on sales and profits for small business owners in South Africa.

The benefits of increased market access, at the firm level, appear to be clear, even though it is usually not clear whether the benefit represents a true market failure or not. Addressing the frictions that small businesses face in growing demand for their products can significantly improve performance. Moreover, firms in developing countries—and even more so in remote areas—potentially face more of the frictions noted above than firms close to large cities or in high-income countries. As such, concentrating more effort on increasing market access for businesses could level the playing field and would likely increase competition and generate significant efficiency gains at the macro level.

While there is growing evidence that the sources of potential distortions listed above exist and are quantitatively important, there is limited evidence on how they can be reduced. However, a number of recent papers show that one-off interventions could have long-lasting effects on firm-level demand. Ferraz et al. (2015) show that demand shocks impact firm dynamics. Companies that win government procurement contracts in Brazil grow by 2.2% in total size, and these effects persist for several years beyond the execution of the government contract. Atkin et al. (2017), in work discussed further in Section 3 of this paper, randomly allocate foreign demand to rug producers in Egypt. They show that a single reduction in matching frictions between foreign buyers and local suppliers produces long-lasting effects on producers' profits and productivity. Bernstein et al. (2018) also document significant increases in entrepreneurship in response to local demand shocks.

Other mechanisms have been proposed to improve market access for firms. One suggested mechanism is the introduction of a market-maker agency—which, by centralising and providing information on all suppliers in the economy and their products or the requirements for serving specific markets, can significantly reduce matching frictions (Steenbergen and Sutton 2017, Spray and Steenbergen 2018). Arraiz et al. (2012) evaluate CORFO, a supplier development programme in Chile aimed at matching small suppliers with larger firms and find that recipient firms benefited from the initiative. The programme not only raised sales and employment of small and medium-sized suppliers, but it also increased the sales of buyer firms and increased their likelihood of becoming exporters.

A number of important questions remain to be explored in this literature. Despite the evidence on the four potential sources of distortion presented above—and in part because most of that evidence comes from (sectoral) case studies—there is limited research on which sectors, countries, or markets are most likely to be subject to these inefficiencies. Infrastructure is costly to build; mechanisms to make information about firms more transparent require coordination; and reducing contractual frictions demands significant effort. Thus, it is critical that policy makers in developing countries understand better where lifting firms' barriers to market access is likely to generate the highest returns before planning their next steps.

Moreover, there is no clear evidence as to whether the inefficiencies in demand presented above impact all firms the same or differently. If some firms face more significant barriers to market access than others, it would have important consequences for competition and aggregate productivity. Hardy and Kagy (2019) document that women entrepreneurs in Ghana are relatively more demand constrained than their male counterparts. Roberts et al. (2017) document substantial variation in firm-level demand among Chinese footwear manufacturing firms. Understanding the factors that may create variation in firm-level demand conditional on product characteristics would be an interesting avenue for future research.

Researchers will need to collect more data on supplier-buyer relationships to move forward on these issues. Most of the data used in this literature was obtained either through surveys or administrative records but typically limited to specific industries. Administrative data, such as VAT or mirrored customs records, is now becoming available for many low-income economies. Such data will allow researchers to better understand which suppliers match with which buyers—and more generally, the quantitative importance of demand constraints for business owners in developing countries.

Next steps and research priorities

- Are there market failures that reduce market access for firms? Are there sectors where they are more prevalent?
- What is the magnitude of search frictions between exporters and foreign buyers?
- How can contractual frictions be reduced? What mechanisms improve (collective) reputation?
- Do firms in developing countries lack marketing capacity?

3 Intermediation and competition along value chains

Value chains, particularly in agriculture, are often at the centre of policymakers' concerns. How can farmers get higher incomes while consumers pay low prices for commodities? Trade integration has made value chains mainstream, but also more sophisticated. They typically affect a wide range of actors from multiple countries and often involve interactions between different sectors. However, in many cases, at specific levels of value chains, a handful of players dominate. Particularly in agricultural markets, a few big companies with significant monopsony or oligopsony power buy their product from a large number of small farmers. Oxfam (2012) documents that 90% of global grain trade is controlled by four major trading companies. Similarly, the World Bank (WDR 2012) estimates that the concentration ratio of the top four trading companies is about 40 percent for cocoa and coffee in 2012. In parallel,

the share of the retail price going to producing countries is only 10 percent for coffee and 28 percent for cocoa.

A large economic literature confirms that downstream price increases or positive shifts in world demand are not passed on to farmers. For example, McMillan et al. (2003) show that economic liberalisation did not lead to significant benefits for cashew farmers in Mozambique. Similarly, Fafchamps and Hill (2008) document low pass-through from international prices to Ugandan coffee farmers. Part of this difference could be attributed to high trade costs in developing countries, given their poor infrastructure. We discuss this hypothesis further in Section 3.c.1. An alternative explanation is that intermediaries in value chains charge high mark-ups. Arndt et al. (2000) measure a domestic margin of 111% on basic food crops and 300% on cassava in Mozambique. Atkin and Donaldson (2016) develop a methodology to separate trade costs from mark-ups and use barcode-equivalent price data from Ethiopia and Nigeria to show evidence for high mark-ups in the trading sector, particularly in remote locations. There may be a rationale however, as to why these margins are so high, which does not necessarily involve low levels of competition or even collusion. For example, Casburi and Reed (2019) document that traders pass value to farmers not only through output prices but also by providing credit. Accounting for these two channels, they find limited evidence for market power.

Competition patterns could arguably be very different in small domestic markets as opposed to international value chains. Looking at pass-through from costs to markets in Kenya, Bergquist (2017) shows that only 20% of an experimentally induced drop in buying price is passed on to consumers.

While some of the studies cited above tend to paint a picture of intermediaries taking a large part of the surplus with little effort, a few papers document the importance of middlemen in facilitating trade. Blum et al. (2009) show that intermediaries are essential in connecting an economy to international markets (between 25 and 45 percent of all imports and 10 to 15 percent of all exports in Chile). They suggest intermediaries must contribute in some way to reducing trade costs, otherwise buyers and sellers would begin to bypass them over time. Farmers or small businesses in manufacturing typically do not have the capacity to reach out to buyers and sell on world markets themselves. Consistent with that hypothesis, Ahn et al. (2011) show that intermediaries help small firms in China overcome the fixed costs of exporting, while large firms engage in export activities directly. Middlemen may also serve as a reputation intermediary to overcome the asymmetry of information on product quality or other contractual frictions discussed in the previous section (Bardhan et al. 2013).

The issue of imperfect competition in value chains is not necessarily limited to intermediaries and traders. While farmers often rely on traders to sell their crops in raw form, they may also depend on agribusinesses to export their products with some value added. Dhingra and Tenreyro (2017) es-

timate that when selling to monopsonistic agribusinesses, farmers benefit less from increases in world prices than when they sell to small traders. However, a smaller number of agribusinesses could actually benefit farmers through another channel: In an environment with poor contract enforcement, competition may increase farmers' willingness to renege on relational contracts to pursue relationships with buyers willing to pay more. Macchiavello and Morjaria (2019) offer support for this conjecture in the Rwanda coffee chain, demonstrating that a higher number of coffee mills downstream makes farmers worse off. In a recent paper, Macchiavello and Miquel-Florensa (2019) show that a Sustainable Quality Program implemented on behalf of a large international company buying 80 percent of the high-quality coffee in Colombia had a positive impact on farmers.

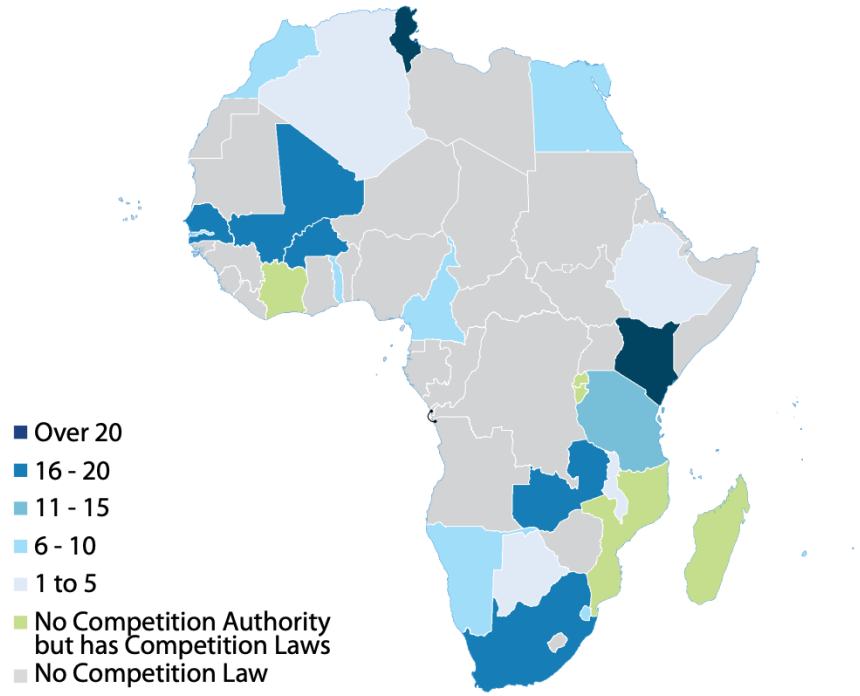
Beyond agriculture, a series of other papers have documented the benefits of competition on productivity. In a study of footwear manufacturers in China, Qian (2008) shows that when the government reduced its efforts to protect intellectual property rights, implicitly leading to the entry of counterfeiters, incumbent manufacturers upgraded the quality of their products through innovation. The threat of entry in the rail mill industry in India also generated productivity gains in a large state-owned enterprise (Das et al. 2013).

Entry itself can generate important aggregate productivity growth. Growth can happen in the sector in which entry occurs when newcomers are more productive than incumbents. Higher competition can also impact productivity upstream. Javorcik and Li (2013) and Iacovone et al. (2015) show that entry of foreign direct investment in the retail sector pressures suppliers to improve along several dimensions and leads to substantial reallocation across firms. Ghani and Reed (2019) show that increased competition in the market for ice spills over to the fish industry downstream, with lower prices being passed on to customers in both industries (see also Holmes and Schmitz 2010 for a review on the issue of competition and productivity).

Competition, or the lack thereof, also impacts consumers or industries downstream through prices (Lira et al. 2007, Cunha et al. 2018, Busso and Galiani 2019). The retail sector in particular appears to be less competitive in developing countries than in high-income countries. Atkin et al. (2018) show that consumer welfare increases twice as much when foreign stores open in Mexico than when Walmart enters a city in the US (Hausman and Leibtag 2007). This lack of competition among retailers and wholesalers may be the reason that the prices of some commodities are so high in developing countries. For example, cement—an essential input for infrastructure and housing—is 183 percent more expensive in Africa than in the rest of the world (World Bank 2016). The World Economic Forum's Global Competitiveness Report (2019) places virtually all sub-Saharan African countries in the bottom third of its competition index ranking. A final explanation for why competition appears to be lower in low-income countries relates to political economy.

Firms connected to power may be able to restrict entry in the sectors they operate in, and as such, have significant market power (Kochanova et al. 2018)

In sum, a substantial amount of research suggests that competitive forces may be weaker in developing countries. In some limited instances, a smaller number of actors can reduce search frictions, incentives to renege on relational contracts, or the wasteful duplication of entry costs. However, in most cases, it seems likely that a lack of competition is welfare reducing for consumers on the margin. Yet, very few developing countries, in particular in sub-Saharan Africa, have a competition law or policy, and only a handful have a competition authority (see Figure 3 below).



NOTES:
1. In Côte d'Ivoire, the authority is functional but its mandate is limited.
2. The number of years equals the difference between 2015 and the year when the authority started operations.
3. The COMESA Competition Commission has been operational since January 2014, and the WAEMU commission has been operational since 2003. CEMAC, EAC, and ECOWAS do not have functional competition authorities.

SOURCE: ACF-WBG 2015.

Figure 3: Number of years with an operational competition authority (Source: "World Bank Group; African Competition Forum. 2016. Breaking Down Barriers : Unlocking Africa's Potential through Vigorous Competition Policy. World Bank, Nairobi, Kenya. https://openknowledge.worldbank.org/handle/10986/24688).

We see four avenues for further research that could inform competition policy in low-income countries.

The first one involves developing methodological tools to measure mark-ups. This is important because it is difficult to infer much about market power solely from prices or market shares. One potential approach is to develop structural models to estimate mark-ups (as in De Loecker et al. 2016) or use detailed survey data (as in Atkin et al. 2015). Measuring mark-ups precisely typically requires matching specific input use with specific output transactions (see e.g. Cajal Grossi et al. 2019)

The second aims at understanding the effect of low competition on the structure of value chains and consumer welfare. In which sectors is competition "good" or "bad"? In that agenda, perhaps the first item would be to more clearly define what low competition means. Is this the result of high entry costs or contractual frictions that lead to a low number of players in equilibrium? Or is a low level of competition the result of collusion?

The third is to more clearly document how market power at multiple stages of the value chain interact. For example, the evidence from Macchiavello and Miquel-Florensa (2019) in the coffee sector in Colombia, indicates that the contract between a large and dominant foreign buyer and the exporter "alleviates" market failures along the domestic chain. Similarly, Macchiavello and Blouin (2019) suggests that future contracts with foreign buyers relaxes exporters' credit constraints and allow them to pay higher prices to farmers. Understanding how market power and frictions interact across stages of chains is important. A large literature in industrial organisation on vertical contracting already exists but has not yet been applied to (agricultural) value chains in developing countries.

The fourth centres on measuring the impact of various competition-increasing government interventions. The experimental evidence in Bergquist (2017), while not necessarily representative of feasible policy interventions, suggests that promoting entry may not necessarily increase competition. By contrast, increasing entry in procurement markets where secret bids are submitted and so collusion cannot be sustained, should clearly reduce prices (Banerjee et al. 2019).

Another feasible intervention to increase the share of world prices going to farmers could be programmes like Fair Trade (see Dragunasu et al. 2014 for a review of this issue). However, more information needs to be uncovered on how to design such programmes. Dragusanu and Nunn (2017) estimate the impact of Fair Trade on coffee producers in Costa Rica. Despite positive benefits on prices and revenues, these gains are not evenly distributed, with farm owners and skilled workers benefiting the most, at the expense of intermediaries and unskilled workers. Finally, trade openness might also be a form of competition policy; we discuss further its impact on distortions in Section 3.a.2.

Next steps and research priorities

- What is the role of intermediaries in agricultural value chains?
- Do agribusinesses reduce market failures in value chains? How does reducing frictions for agribusinesses affect farmers upstream?
- How do frictions and market power interact at different levels of the value chain?
- Analysing the magnitude of competition forces in developing countries: Which sectors are the least competitive? Is there evidence of collusion? Measuring and documenting the patterns of markups across industries and firms.
- What government interventions are effective at increasing competition?

4. External economies, spillovers, and industrial policy

We have thus far discussed the market failures perhaps best thought of as working at the level of individual firms—such that one firm ends up using resources more efficiently on the margin than some other firms, leading to a reduction in aggregate output. A wider notion of externalities concerns cross-firm externalities, such as external economies of scale, agglomeration economies and wider technological or human capital spillovers, all of which provide a justification for government interventions.

Many governments in developing countries adopt policies that promote specific economic sectors (e.g., manufacturing within special economic zones) or particular economic activities (e.g., export facilitation services). They do so to encourage structural change, a strategy referred to as *industrial policy*.

Before moving forward, it is important to note that industrial policy does not have to be focused on "industrial" sectors. Government intervention in tourism or IT services are just as much industrial policy as subsidies to the manufacturing sector. As such, *productive development policies*, a term put forward by the Inter-American Development Bank (2014), may be more relevant. Nonetheless, we still use the term *industrial policy* in this paper, as it is more widely used in academic circles.

The theoretical rationale for industrial policy is clear. In the presence of positive externalities, firms' individually optimal choices will lead them to undertake the activity that generates the externalities at levels below what would be optimal for the society as a whole. There is a natural role for government intervention in such cases, in order to induce firms to undertake more of the positive-externality-generating activity. These externalities can take various forms. Standard candidates for positive externalities are external economies of scale, a mechanism by which sectoral growth lowers an individual firm's long-run cost curve, or cluster and agglomeration effects (Rosenthal and Strange 2005), whereby the proximity of firms allows for productivity gains. Labour market frictions that prevent workers from transitioning from low- to

high-productivity sectors are also thought to play an important role in slowing down structural transformation in low-income countries. Agglomeration economies which are the most likely driver of urban density (see IGC Evidence paper on cities) are another leading candidate.

Hausmann and Rodrik (2003) describe another market failure that industrial policy can address. Information that a given product can be produced profitably in a given place may spill over quickly to nearby firms, who can then start producing as well. Such competition from imitation makes the private returns from entrepreneurship in new and modern sectors lower than its social value. This may be particularly important in developing countries, where the existing number of goods produced is small and so the number of products to be "tested" is large.

Despite the numerous theoretical descriptions of market failures in developing countries, it is very difficult in practice to measure the size of these externalities. This is probably why, for so long, the consensus in leading policy institutions (the "Washington Consensus") was that the best industrial policy was actually no intervention. The idea was that the intention behind industrial policy was to pick winners, and that doing so appropriately was too challenging in developing country contexts. Easterly et al. (2009) show that a country's distribution of exports follows a power law. Thus, the likelihood of subsidising an export hit is low. Moreover, Freund and Pierola (2012) show that a country's comparative advantage is typically driven by a handful of firms, so identifying high-potential firms in high-potential sectors is likely to be even more difficult. Another concern around the legitimacy of industrial policy came from political economy factors, which are pervasive in many low-income countries. In areas with little enforcement, subsidies can quickly become a means of transferring rents to powerful and well-connected firms. The failure of import substitution policies in Latin America also contributed to industrial policy's bad reputation.

The theoretical rationale for industrial policy is clear. In the presence of positive externalities, firms' individually optimal choices will lead them to undertake the activity that generates the externalities at levels below what would be optimal for the society as a whole.

However, recent developments have shifted attention back onto industrial policy. For example, Hausman et al. (2007)'s finding that countries grow faster when they export products that are also exported by high income countries has become particularly influential among policymakers. Similarly, the service sector's potential for growth strategies—particularly in Africa—has been the subject of recent studies (see, e.g., Newfarmer et al., 2019). Moreover, in spite of the debate on the risks of industrial policy, almost all governments conduct some form of such policies in practice. In doing so, policymakers critically need the support of research to provide a framework and guidelines on

how to think about these issues. Thus, future research should focus more on *how* industrial policy should be done, rather than on *whether* it is well founded. The paragraphs below review the existing literature on industrial policy.

Country or sectoral case studies can generate important lessons for industrial policy. For developing countries or countries on the path to development, such examples include: Amsden (1989) in South Korea; Wade (1995) in Southeast Asia; Evans (1990) on the computer industry in Brazil, India, and Korea; and Luzio and Greenstein (1995) on microcomputers in Brazil. As the returns to such work are higher if it describes a successful event, these studies are usually supportive of a positive impact of industrial policy. However, this type of analysis can be difficult, as many factors affect growth, and it is difficult to convincingly isolate the effect of a particular industrial policy.

A number of cross-country or cross-sector analyses have found little evidence for the efficiency of industrial policies such as trade protection (Krueger and Tuncer 1982, Clemens and Williamson 2001, O'Rourke 2000) or tax incentives (Lee 1996). These exercises generally conclude that there is little correlation between industrial policy and growth. Beason and Weinstein (1996) propose a rationale for these mixed results in Japan. They find that targeted sectors are typically low-growth sectors with decreasing returns to scale. It is possible that because of political pressures, many governments around the world support sectors that are struggling economically, rather than designing and implementing a strategy to promote positive externalities (Grossman and Helpman 1994, Goldberg and Maggi 1999). Likewise, patterns of trade protection could be driven mostly by government revenue considerations rather than the infant industry hypothesis (Broda et al. 2008). Rodrik (2007) puts forward another explanation: If governments target sectors where market failures are the strongest, but they can only partially address them, it is not surprising that these sectors grow less.

For all these reasons, and because intervention across sectors cannot be randomised, implementing a clear identification strategy to measure the impact of industrial policy on development is challenging. This is perhaps why there were a flurry of studies on the issue in the 1990s or early 2000s, but very little research on industrial policy has been carried out since. A few exceptions stand out (see Lane 2019a for a thorough review of recent developments in this literature).

Juhasz (2018), a paper further discussed in Section 3.1.1, finds evidence for the infant industry hypothesis using a natural experiment, generated by the Napoleonic wars in the early 1800s, that blocked trade from Britain to certain ports in France. Regions in which the cost of importing cotton yarn from Britain rose were more likely to adopt mechanised cotton spinning and significantly increased production capacity. She provides suggestive evidence that this involuntarily

Identifying the sectors that are the most likely to be the subject of positive externalities is probably the main challenge of industrial policy.

acquired comparative advantage lasted for more than 60 years after the blockade ended. A number of other historical case studies exploit natural experiments to show evidence for the infant industry hypothesis (Harris et al. 2015, Hanlon 2019) or the effectiveness of industrial promotion policies on human capital accumulation (Mitrunen 2019).

Aghion et al. (2015), Martin et al. (2017), and Rotemberg (2017) measure the impact of recent industrial policies in China and India on firm sales, productivity, and employment by exploiting within-country variation in policy intensity. However, while assessing the effect of specific policies on targeted firms or sectors is interesting, these studies are usually unable to clearly document whether these interventions were targeting a specific well-grounded externality or whether they created significant distortions in other sectors of the economy.

As opposed to tariff policy, the magnitude of government subsidies are particularly difficult to measure. Kaloupstidi (2018) develops a methodology to quantify government subsidies in the shipbuilding industry in China. She estimates that the intervention effectively reduced costs by 13-20%. In a follow-up paper, Barwick et al. (2019) quantify the positive effects of the policy on investment and entry, which led to China's dominance in the industry. Yet, since the policy was not meant to address a specific market failure but rather to position the country in a strategic industry, the subsidies had a negative impact on welfare due to the sizable distortions they created.

Lane (2019b) quantifies the effect of the "big push" policy in the 1970s in Korea. He documents important spillovers to non-targeted sectors through the input-output network, suggesting evidence for non-pecuniary externalities that justify the intervention. Liu (2019) argues that governments should prioritise addressing distortions in upstream markets. The intuition follows from the theory of second best: Market failures channel through value chains, so upstream sectors are the source of the largest distortions. He finds evidence that China and South Korea indeed targeted upstream sectors in their industrial policies.

Identifying the sectors that are the most likely to be the subject of positive externalities is probably the main challenge of industrial policy. Bartelme et al. (2019) develop a methodology to estimate the magnitude of economies of scale across sectors using easily available trade flow data. They find substantial scale elasticities in every manufacturing sector, and ones that do indeed differ in their extent across such sectors, as is necessary for within-manufacturing industrial policy (i.e., policy that affects some manufacturing sectors over others) to have any impact. However, their results suggest that the gains from optimal interventions targeting these externality sectors would be small: Only 1% of GDP on average, even when implemented by a hypothetical government with omniscience, benevolence, a full set of policies to control terms-of-trade and internal distributional effects, and under no threat of foreign retaliation. This result arises because a country that intends to reap substantial gains from industrial policy needs to

find not just a sector with large (relative) positive externalities, but also one that can be expanded without running into diminishing world demand for its product.

On the policy side, decision makers probably need to take a pragmatic approach when it comes to industrial policy. The IADB (2014) proposes a three step plan: 1) identify sectors subject to externalities; 2) design a policy that addresses the market failure specifically; and 3) make sure the state has the institutional capacity to implement the policy. The translation of that approach to a research agenda would be to study three questions: *why* (do industrial policy), *what* (to do), and *how* (to do it).

On the first two points, the IADB recommends a public-private collaboration to identify the most important constraints that firms face and the policies that can best address these issues (see Ghezzi 2017 for an example of how this was implemented in Peru). Harrison and Rodriguez-Clare (2010) make a similar suggestion. They argue that "soft" policies, involving strong collaboration between the government and private-sector organisations, are preferable to "hard" interventions, which may end up being a bigger source of distortions than the ones they are trying to address. The optimal design of industrial policy with the constraints imposed by state capabilities is an area where evidence is critically lacking.

Given the success of the East Asian economies with export-led development strategies and reductions in trade costs (lower tariffs and trade facilitation services), such policies warrant particular attention and a sustained research effort in the future.

In summary, we believe that given the importance industrial policy has for policymakers in developing countries, it should be the subject of much more research. Perhaps a starting point could be to document the current patterns of industrial policy across countries. Which sectors are being promoted and through what interventions? Which externalities are thought to be more important for policymakers? Do the interventions designed actually match the underlying objectives of the state?

The most promising branches of research on this issue that are critically needed to inform policy makers on the use of industrial policy in developing countries is measuring the size of externalities. The existence and the magnitude of externalities form the basis of government intervention for industrial policy. In which sectors and for which firms are these externalities the largest? What is the exact nature of these externalities?

The interaction between industrial policy, state capacity, and the political economy also deserves more attention. Industrial policy is usually complex and requires the interaction and coordination of various ministries and government agencies. A study that attempts to measure how public sector coordination affects the performance of industrial policy would provide valuable insight on this issue.

Next steps and research priorities

- Measuring the size of externalities. Where—for which firms and which sectors—are they the strongest?
- What policies are appropriate to address these externalities?
- How should industry policy be designed in an environment with low state capacity and low coordination across government bodies?

3 International trade

We now turn to the topic of international trade and research that can shed light on how policymakers in developing countries can sculpt trade policy to foster growth and reduce poverty. Given the success of the East Asian economies with export-led development strategies and reductions in trade costs (lower tariffs and trade facilitation services), such policies warrant particular attention and a sustained research effort in the future, as we shall discuss.

We split our discussion into four parts. The first resonates with the above discussion of distortions in a closed economy but asks how we might expect those distortions to be affected—either positively or negatively—through the presence of or transition to trade openness. Put simply, exposure to trade may resolve or exacerbate distortions, or change the cost of domestic market failures. The second part discusses general international externalities, in which trade and other forms of openness act as a conduit for spillovers. Our third topic does not relate to externalities per se, but instead to services that states tend to provide (such as transportation infrastructure) that interact with trading. Opening to trade often requires that the state directly addresses distortions that reduce trade potential. Understanding the returns to these services is just as central to an evaluation of the costs and benefits of trade openness as the previous arena of externalities. Finally, the fourth component of our discussion concerns the way trade can redistribute income within the domestic economy – either mitigating or exacerbating existing inequality – and the political features that come with it. Even in a hypothetical economic environment with no market failures and no publicly provided services, there is still great policy interest in the pros and cons of trade openness due to its distributional consequences and the extent to which other policy instruments exist to facilitate redistribution.

A Existing distortions affected by trade openness

The previous sections have discussed extensively the existence of market failures and externalities in developing countries, and why they may be more widespread than in high-income countries. When it comes to openness to trade, therefore, the question is simply whether trading will magnify or mitigate existing distortions in the economy. We review the existing evidence on this question in the next three subsections.

1. Production externalities

Section 2.3.d considered in length the various production externalities that may be present in developing countries and that legitimise state intervention. Industrial policy can allocate factors of production optimally across sectors and firms, but a wide range of trade-induced reallocations may also affect that process. Some may do so in an indirect way, such as free-trade-induced sectoral specialisation or a series of events affecting a trade partner, while others are up to country leadership, such as trade policy.

The textbook example of externality-focused trade policy is well known (see Harrison and Rodriguez Clare 2010). In an economy with two sectors, one with constant returns to scale and the other subject to production externalities, there can be multiple equilibria. The economy may end up on the equilibrium with full specialisation in the first sector, which is dominated by the equilibrium that involves specialisation in the externality sector. Protection of the second sector is the appropriate intervention. When the positive externalities are thought to involve dynamic features, this policy is often termed infant industry protection (see Section 2.3.d for a review of the empirical literature on this topic).

Here again, the main issue for policymakers is whether they have the ability to identify externality-generating sectors and the capacity to design the appropriate trade policy in response. While production externalities provide the rationale for state intervention, all actions may not be equally cost effective or efficient. Harrison and Rodriguez-Clare (2010) discuss the Bastable test—an investigation of whether the discounted gains from the intervention are larger than the consumption loss from temporary protection. On this, Melitz (2005) argues that production subsidies are more efficient than trade protection in addressing Marshallian externalities, as they avoid the consumption cost of higher tariffs. However, implementing fiscal incentives may be more challenging in practice than setting tariff schedules (see Section 3.c.1 for a discussion on the infrastructure of customs collection). Bartelme et al. (2019) compare the benefits of trade policy, industrial policy, and the optimal combination of the two in response to external economies of scale. The welfare benefits of one or the other alone are small, but the interaction of the two generates higher gains by allowing for full control of production externalities via industrial policy while simultaneously avoiding deleterious terms-of-trade effects via judicious unilateral trade policy. As discussed previously, though, these gains remain small relative to the size of the economy. The optimal structure of government intervention between industrial and trade policy to address production externalities, taking into account capacity constraints, is an area of research that deserves further attention.

A large literature has documented that in developing countries, small firms tend to neither grow nor get driven out of business, and that these constitute the bulk of private-sector firms.

In addition to the research agenda developed in the industrial policy section above, we see three promising avenues of research for trade-related production externalities. The first relates to the textbook model presented above and the presumption that the economy may end up in the "wrong" equilibrium. It may be that in a number of sectors, trade openness actually fosters externalities—by, for example, creating larger production clusters. Second, quantifying the spillover effect from tradable to non-tradable sectors, such as services, is necessary to put together the full picture of the structural transformation induced by trade policy. Finally, developing structural models in a developing country setting—i.e., with limited sectoral data—to predict whether trade openness will lead to specialization in high- or low-externality sectors would allow policymakers to add to their tools for decision making.

2. Firm-level size-dependent distortions

A large literature has documented that in developing countries, small firms tend to neither grow nor get driven out of business, and that these constitute the bulk of private-sector firms (see, e.g., Hsieh and Klenow, 2014). This is suggestive of size-dependent distortions that favour small and unproductive firms. For example, large firms may face excessive tax and regulatory burdens that prevent them from expanding and driving out small firms. Alternatively, credit and labour market constraints or corruption might particularly affect small firms; in this case, we have too few small firms. Finally, distortions may affect certain types of firms rather than sizes. For example, state-owned enterprises may have favourable access to capital.

Trade has the potential to alleviate or magnify these distortions, depending on whether more distorted firms benefit or lose out from trade reforms. An obvious starting point is that trade leads to the expansion of larger firms relative to smaller ones in a broad class of trade models (Mrázová and Neary 2018), as only the most productive firms benefit from access to foreign markets. We now turn to the empirical evidence for which types of firms benefit.

By providing better access to a wide range of new markets to efficient but constrained firms, trade liberalisation can reduce the market share of politically connected firms.

Small informal firms and family businesses

A large portion of firms in developing countries are informal. How are these firms impacted by trade openness? Nataraj (2011) uses firm-level surveys representative of the Indian manufacturing sector. She finds that in response to trade liberalisation, a large number of informal firms exit the market, and the firms that survive increase their productivity.

McCaig and Pavcnik (2018) show that the 2011 US-Vietnam Bilateral Trade Agreement led to a reallocation of labour from informal to formal firms.

Lower tariffs in the US provided new market opportunities for large firms, which pulled labour from informal firms. This process enhanced efficiency, as large formal firms are substantially more productive (in value terms) in this context.

Informality has several different margins. Firms can remain informal to evade taxes or because they face regulations or entry costs they are unable to overcome. The informal sector may also be a pressure valve for unemployment in developing countries. To benefit from trade opportunities, firms typically need to be formal, so these factors could have consequences on how trade affects informal firms. If they "choose" to be informal, trade liberalisation could pressure them to formalise; if the costs of formalisation are too high for them, they will likely not be able to do so.

Family-run firms—which are also prevalent in low-income countries—tend to rely on siblings for senior levels of management. The rationale for doing so may be a lack of trust in delegating management decisions to individuals outside the family circle (Bloom and Van Reenen 2007). This could have important consequences for capturing the gains from trade liberalisation. If there are only a limited number of siblings available to fill management positions, firm growth could be blocked.

More research is needed to better understand the link between trade liberalisation and its impact on the distortions that affect more strongly the left side of the firm distribution. We return to this issue in Section 3.d.

Politically connected firms and business groups

Business groups—a set of horizontally or vertically integrated firms—are also ubiquitous in developing countries. Khanna and Yafeh (2007) argue that these conglomerates may act as a solution to capital market failures in that they provide opportunities for within-network finance systems. However, evidence on how these groups of firms respond to trade shocks is still an open area for future research.

Many key sectors in low-income countries are controlled by state-owned enterprises (SOEs) or politically connected firms. Despite their large size, these firms can be particularly inefficient and potentially only benefit from preferential access to credit or markets to sustain their dominant positions (Mobarak et al. 2006). As such, it is not easy to predict whether trade openness reduces or increases these connection-based misallocations. By providing better access to a wide range of new markets to efficient but constrained firms, trade liberalisation can reduce the market share of politically connected firms. However, access to specific inputs or capital may constrain non-connected firms from expanding; by contrast, connected firms may be the only firms capable of benefiting from trade.

Khandelwal et al. (2013) provide evidence for the first mechanism in the Chinese textile industry. A reform in 2005 removed a quota system whereby firms were given a license to export a specific fabric or garment to a specific destination.

Following the liberalisation event, they document a significant market share reallocation from unproductive SOEs to more productive private firms.

Two papers provide evidence for the second view. Brandt et al. (2017) document that the pro-competitive effects following China's entry into the WTO did not significantly affect SOEs. Similarly, Baccini et al. (2019) find that though there were significant reallocation effects from Vietnam's entry into the WTO, they were fairly small for SOEs. Both studies argue that preferential access to capital may be the main reason that SOEs tend not to be highly impacted by trade liberalisation.

More research is needed on this topic—particularly on the mechanisms through which connected firms obtain dominant positions in specific markets and how these can be removed smoothly to increase efficiency. If these mechanisms are not removed properly, it can result in even greater problems: Naidu et al. (2017) show that private-sector elites supported a military coup in Haiti to put an end to the previous government, which was considering removing the licensing scheme for imports that provided them rents.

Trade and competition

Trade can produce efficiency gains by causing inefficient firms to exit the market and allowing productive firms to grow. However, there is limited evidence on the effect of trade on market power, mark-ups, and consumer prices. Edmond et al. (2015) show evidence that trade lowers mark-ups and mark-up dispersion in Taiwan. By contrast, De Loecker et al. (2016) document higher mark-ups in response to India's trade liberalisation. Tariff duty drops led to cheaper inputs, but these did not entirely pass through to consumers. In other words, the price reductions were small relative to the decrease in marginal costs.

In summary, some progress has been made in understanding which types of firms are most affected by trade liberalisation. However, there is still much to learn about both which types of firms face the largest distortions, and hence, whether trade reforms raise or reduce efficiency.

3. Distortions in factor markets

Distortions in factor markets and the potential for misallocation were introduced and discussed in Sections 2.b and 2.c.1. Of course, these factor-market distortions are partially responsible for the firm-specific frictions presented above that may lead trade to raise or lower efficiency. This section focuses on how trade may magnify or shrink these factor-market frictions.

Capital

International trade typically involves long distances and slow passage at borders and ports, increasing the need for trade credit and working capital. Moreover, a number of papers have estimated high fixed costs for firms enter-

ing foreign markets (Das et al. 2007, Lincoln and Maccallum 2018, Piveteau 2019), which requires further capital. Learning about market conditions elsewhere, finding buyers abroad, building distribution channels in foreign countries, and buying equipment for the shipment of goods are normally essential investments for firms considering export.

Thus, credit constraints can prevent firms from reaching their export potential. Paravisini et al. (2015) study how the 2008 financial crisis, which differentially impacted banks in Peru, impacted trade. With data on firm-bank matches, they document that exporters who were clients of local banks that were more exposed to the US financial crisis reduced their export volumes. This reduced both the volume of exports but also the selection of firms that ended up trading (see Foley and Manova 2015 for a review).

Despite this evidence on the importance of access to finance in international markets, there is little empirical evidence on how facilitating trade credit or state-subsidised trade specific loans can ameliorate these constraints. As most export and import transactions in developing countries are typically invoiced in US dollars, the role of access to foreign currencies for trade credit should also be studied.

Labour

Trade may also affect labour market distortions. Export opportunities may increase requirements for high-skilled workers or workers with particular skills. For example, Mion and Opromolla (2014) document Portugal's need for experienced marketing employees in order to make inroads into foreign markets. If there are distortions that limit the supply of such workers, trade may exacerbate the impact of these distortions.

Labour mobility distortions can also limit the optimal reallocation of labour across sectors that follows trade liberalisation and hence reduce the gains from trade openness relative to a frictionless benchmark (Dix-Carneiro 2014). We return to these issues in Section 3.d.2, where we discuss adjustment mechanisms to trade shocks. But beyond simple adjustment costs, the process of adjustment may generate or exacerbate market failures.

Labour mobility distortions can also limit the optimal reallocation of labour across sectors that follows trade liberalisation and hence reduce the gains from trade openness relative to a frictionless benchmark.

One example could involve the size of the informal sector, to the extent that the presence of such a sector is the source of distortions (e.g., through tax and regulation evasion). As discussed above, there is some evidence that import competition shocks can potentially exacerbate informality. For example, Dix-Carneiro and Kovak (2019) study the labour market response to trade liberalisation in Brazil. They document a strong shift toward informal employment or employment in low-paying service industries in the regions facing the largest tariff declines. Most work-

ers do not respond to these negative shocks by migrating to regions offering better employment opportunities; they simply shift to the informal sector. These results suggest that the informal sector absorbs a large share of trade-displaced workers who are unable to move to benefit from employment opportunities that arise from trade liberalisation elsewhere.

To take another example, if labour market search is inefficient due to congestion externalities, then the labour market adjustments required by any change in the demand or production structure of an economy—such as a change in outside trade conditions—will necessitate more search, and hence a broader incidence of congestion externalities. There is also the possibility that firm-specific training will be especially underprovided (even relative to a benchmark in which it is underprovided due to the hold-up problem) in an environment with a higher risk of external shocks.

More research is needed to understand the complementarities between labour market policies and trade reforms. Just as for capital, specific policies can worsen barriers to labour mobility. Conversely, labour market reforms may be needed in parallel to trade liberalisation. Increasing spatial and sectoral mobility may require more complex policies than simply subsidising worker movement.

Next steps and research priorities

- Does the reallocation that results from opening to trade promote positive production externalities?
- What is the optimal structure of government intervention between industrial policy and trade policy to address production externalities?
- Does opening to trade reduce distortions in domestic markets?
- What are the impacts of trade policy on informality?
- How are connected firms affected by changes in trade policy?

B International connections as a vector for spillovers

Many developing countries create strategies to promote exports and attract foreign direct investment (FDI), in hopes that these policies will have a significant impact on their economic development. The potential long-run benefits of these policies are that they generate externalities for exporting firms, or for domestic firms in proximity with foreign firms. We discuss below some existing evidence on spillovers from exporting and FDI and consider potential policies that can promote them.

1. Spillovers from exporting

Does exporting increase productivity at the firm level? Clerides et al. (2017), using firm-level data from Mexico, Colombia, and Morocco, do not find evidence that serving foreign markets reduces costs. Similarly, Luong (2013) finds that productivity estimates for automobile manufacturers in China do not increase when businesses start exporting.

By contrast, a number of other papers have found positive effects of exporting on productivity in developing countries, including Blalock and Gertler 2004, Van Biesebroeck 2005, and Park, Yang, Shi, and Jiang 2010.

The main challenge in identifying the impact of exporting on efficiency is how to adequately estimate productivity. This variable is unobserved, and researchers typically resort to structural estimation techniques to measure productivity at the firm level, each method being subject to different potential biases. De Loecker (2007, 2013) develops a methodology that addresses the fact that standard structural approaches assume that productivity evolves exogenously. By contrast, De Loecker's proposed methodology allows the productivity process to be endogenous to exporting. Using data from Slovenia, he finds evidence of learning by exporting, primarily when firms export to wealthier countries. This result suggests that many of the previous null results may have occurred because learning by exporting is only present when poorer, less capable countries export to richer, more capable ones.

Another constraint faced by researchers when estimating productivity at the firm level is that it may not be possible to observe the output quantity of each of the goods produced. Thus, productivity measures are generally revenue based, and since more efficient firms tend to charge lower prices, this leads to a bias in productivity measures. Garcia-Marin and Voigtlander (2019) develop a method to separate technical efficiency from markups and find that marginal costs decline by about 20% for new exporters in Chile, Colombia, and Mexico. Atkin et al. (2019) argue that traditional revenue-based measures may perform better in environments where more productive firms manufacture more complex products.

Atkin et al. (2017) provide the most direct evidence on learning by exporting. They randomly provide opportunities to export to Egyptian rug manufacturers. By focusing on a narrow industry, they are able to measure productivity more convincingly. Several years after the initial opportunity, treated firms have higher quality-adjusted productivity. Making rugs with identical specifications and materials on the exact same equipment, treated firms produce higher quality rugs but do not take any longer to manufacture them. The authors document productivity improvements that come, at least in part, from knowledge flows between foreign buyers, local intermediaries, and the producers.

While there is growing evidence that there is learning from exporting, there is currently limited evidence on whether this learning is external to the firm—that is, not the result of a firms' investment in its own productive capacity, or of payments or price reductions made in exchange for the training offered by a buyer.

Export promotion policies predicated on spillovers require that these are external. If they are, we need to know what the magnitude of this externality is across sectors or destinations to appropriately target export promotion programmes given limited government capacity. Thus, policymakers need to better understand where to spend the marginal dollar for export support. As randomly dropping foreign demand across a wide range of sectors cannot be easily replicated, progress in this literature will likely have to come from the development of more theory-driven empirical approaches to improve upon the measurement of productivity spillovers from exporting.

Moreover, the mechanisms through which those productivity benefits appear when exporting are only explored in Atkin et al. (2017). Research is lacking on the quantitative importance of productivity improvements from increased production volume versus learning from foreign buyers' feedback. If the first one is more important, this suggests that sector targeting—where the potential for learning by doing is larger—may be more efficient. If, on the other hand, the effect takes the form of quality upgrading to meet the standards imposed by foreign markets, it may be more efficient to promote exports to specific destinations.

Another interesting avenue for future research could be to follow the efficiency benefits from exporting along value chains. Exporters often source inputs from other firms in the local economy, so these firms could also exert a positive externality for their suppliers. This research agenda will make progress with the collection of administrative data on value chains, particularly VAT data.

2. Spillovers from FDI

Many developing countries dedicate substantial resources to attracting FDI. These resources can take the form of newly built infrastructure, investment facilitation services, and tax incentives, all considered important for increasing FDI flows. To justify these expenses, the economic benefits from FDI attraction have to outweigh the costs. The focus of policymakers is often on job creation and export growth; with multinational corporations being good candidates for reaching these objectives by size and nature, spillovers from high-productivity foreign firms is also often cited as an argument for capturing higher FDI flows.

A number of early studies have looked at whether sectors that attract more FDI are more productive or become more efficient over time (Blomström and Persson 1983, Haddad and Harrison 1993, Aitken and Harrison 1999) and found mixed results (see Demena and Van Bergeijk 2017 for a meta-analysis). The exact location of establishments has also been used to show that firms located closer to FDI firms are more productive (see, e.g., Khalifah and Adam 2009). However, the identification strategy in most papers leaves open the possibility that a surge in FDI flows could be the result of changing (local) comparative advantage or competitive pressures that push domestic firms to become more productive.

Moreover, most empirical work on the issue fails to identify the mechanisms responsible for these spillovers and instead focuses on whether the presence of foreign firms increases the productivity of domestic firms. Javorcik (2004) is an exception. Using the input-output matrix for Lithuania, she documents productivity gains in sectors that supply FDI firms, which she calls "backward spillovers". By contrast, she finds no evidence for spillovers in sectors downstream to foreign firms or in the same sectors in which FDI companies operate. Similarly, Kee (2015) finds evidence for backward linkages from FDI in the garment sector in Bangladesh. Foreign firms exert a potential externality on domestic firms when they share an intermediate input supplier. As FDI firms typically require higher quality inputs from their suppliers, other downstream domestic firms indirectly benefit from quality upgrading and productivity gains from common suppliers. Atkin et al. (2017) discussed above also provides a rationale for why productivity spillovers may come from backward linkages. By selling inputs to foreign multinationals, domestic firms can potentially learn and implement more efficient production processes from the feedback they receive in this supplier-buyer relationship.

Yet, there is limited evidence on the other channels through which productivity spillovers from multinational corporations may arise. These include horizontal spillovers or externalities that arise from technology or ideas radiating from foreign firms to domestic companies. Another overlooked mechanism could be worker training inside FDI firms. Many foreign companies employ domestic labour, as they are more productive, better equipped in terms of technology or management practices, and the workforce may learn more on the job than in local firms.

By selling inputs to foreign multinationals, domestic firms can potentially learn and implement more efficient production processes from the feedback they receive in this supplier-buyer relationship.

If the magnitude of the externality from FDI could be important, spillovers may not materialise in a vacuum. Productivity gains from backward linkages will not emerge if foreign firms face significant barriers to sourcing their inputs locally. Similarly, if multinational enterprises have no incentive to hire and train local labour, they may resort to asking senior expats to run operations, which will limit the potential for knowledge transfers. Quantifying the channels through which externalities may arise is a necessary first step to guiding policy and implementing efficient mechanisms to promote spillovers.

Steenbergen and Sutton (2017) argue that soft policies to promote linkages are more appropriate than rules imposing that some share of inputs to be sourced locally. The latter option tends to increase the cost of an investment if local firms are not able to supply the right inputs and so may deter FDI flows. Instead, they recommend that a small team of capable bureaucrats and experienced managers from the private sector work together to form a local content unit. This agency would aim to reduce matching frictions between local and

foreign firms and support domestic firms in upgrading their product standards to meet the requirements that multinational firms impose.

In a recent paper, Alfaro-Urena et al. (2019) examine the effect of a government programme linking domestic firms to multinational firms in Costa Rica. They use VAT data on supplier-buyer matches to show that domestic firms that win contracts with FDI firms experience a 4% increase in productivity 4 years after matching with a foreign company, as well as higher sales from a larger number of buyers than just the newly acquired foreign buyer. These results suggest significant potential for policies to link firms to global value chains.

More research is needed on the impact of such programmes. Even if they lead to significant productivity improvements, these economic benefits from backward linkages may not justify the cost of the policies. Moreover, there is no evidence as to whether and how governments should facilitate the transfer of knowledge to domestic firms and wider participants.

Finally, many developing countries make use of special economic zones to attract foreign investment. Such an institutional setting allows governments to more closely monitor the activities of FDI firms, and as such, management committees of zones may be well placed to facilitate linkages between multinational enterprises and the domestic economy.

Next steps and research priorities

- Does exporting promote external learning or quality upgrading? In which sectors are these effects the strongest?
- What are the channels through which spillovers from FDI arise?
- What is the impact of policies linking domestic firms to foreign firms, and what policies are effective and cost efficient in promoting spillovers?

C State-provided services that aim to promote trade

1. Trading infrastructure

Our discussion of international trade has thus far focused on settings in which exporting and importing can potentially impact, either positively or negatively, domestic and international externalities. Such phenomena would provide a natural motive for intervention in traditional trade (or even domestic) policies such as taxes and subsidies. But there are many other government policies and public goods that impact trade flows, which one could broadly term a country's "trading infrastructure". A natural example would be the deep-

sea ports used by large container ships to offload goods. But another equally important example is the communication infrastructure, such as the internet, that allows firms to market their products and wholesalers to find new suppliers. When this sort of "infrastructure" is provided by a state, the natural question is whether the state is providing the right amount of it, which requires an estimate of its marginal returns. That brings in the need for rigorous evaluations; we discuss some of these next, but a great deal more remains to be learned about the returns to state-provided trading infrastructure. This is also a setting in which modern tools from the study of public finance, such as the "marginal value of public funds" calculations from Hendren (2016), would be powerful for comparing and ranking various policies.

Numerous public services are involved in getting goods physically to and from international markets. Roads, railways, and ports are all used to transport goods within countries to or from the border. Virtually all are settings in which the user is not covering the marginal cost of building the infrastructure. But evaluation of these physical infrastructure investments—considering how large a share of the public purse they can comprise—lags way behind the need for such inputs into the policy process. As discussed above, some evidence (e.g., Atkin and Donaldson 2016) suggests that the cost of transporting the same goods over similar distances is many times more expensive in areas of sub-Saharan Africa than in high-income countries like United States. Therefore, it seems plausible that internal transport costs *can* be lowered in many low-income countries; but the question of whether they *should* be—and whether this is possible in a cost-efficient way—remains largely unsettled.

Physical transportation infrastructure

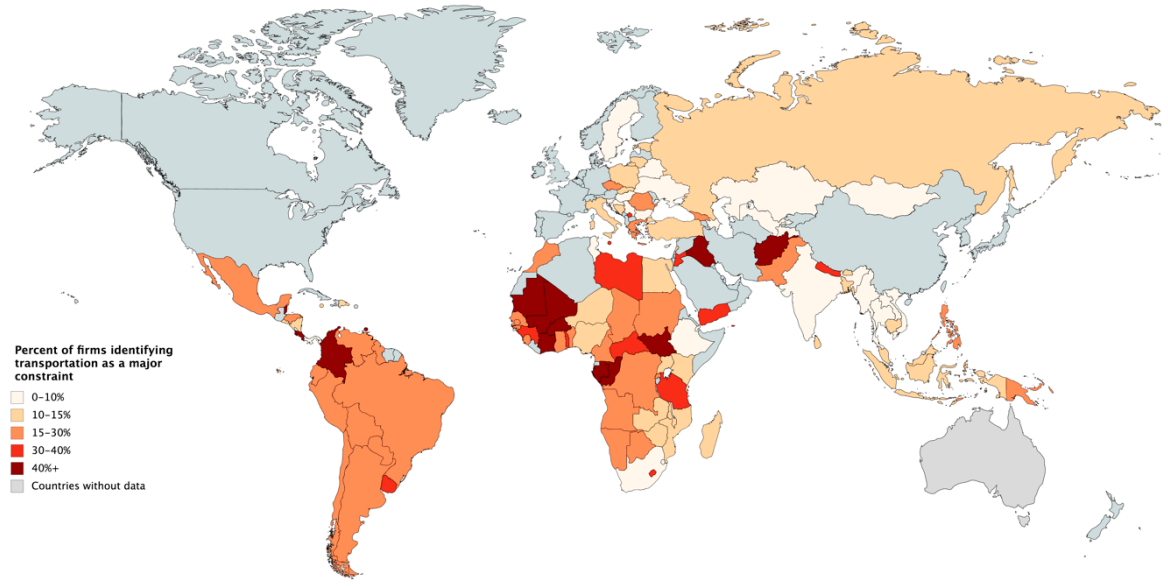


Figure 4: Percentage of firms identifying transportation as a major constraint (Source: World Bank Enterprise Survey)

A good example of existing evidence on measuring the impact of physical infrastructure, including a cost-benefit assessment, can be found in Cosar and Demir (2016). They study the impact of an upgrade of single-lane intra-national roads to high-capacity expressways on facilitating foreign trade to and from Turkey. Over a 10-year period, the estimated present value of the additional trade flows generated by a US$ 1.0 investment in infrastructure are between US$ 0.7 and US$ 2.0. These effects are likely to be heterogeneous across countries or even regions. In 2002, when the infrastructure projects were initiated, Turkey was already trading considerably—particularly with the European Union—and was classified as an upper-middle-income country. In sub-Saharan Africa or South Asia, the trade elasticity of intra-national infrastructure may be considerably different, and it may be harder to estimate given the lack of data.

Infrastructure also shapes the patterns of specialisation within countries. Cosar and Fagjelbaum (2016) hypothesise that intra-national trade costs imply that regions near international gateways have a natural comparative advantage in export-oriented sectors and find compelling evidence of this in China. Consistent with this theory, Storeygard (2016) finds that following oil price increases, cities near large ports in sub-Saharan Africa grow faster than cities further away. Roads can also impact structural transformation by bringing people to cities with higher productivity activities. Using panel data on roads in 39 African countries over 50 years, Jedwab and Storeygard (2019) show that increased market access accelerates cities' population growth. They find a stronger effect for small and remote locations, again supporting the evidence that the economic returns to infrastructure are higher where it is most lacking. Similarly, Fajgelbaum and Redding (2018) argue that the construction of the railway network in Argentina in the late 19th century was instrumental to its process of structural transformation, economic development, and international trade openness.

Of course, many road and railway projects cannot be neatly divided into those segments that promote intra-national trade and those that promote international trade. So much of the demand for evaluation here resonates with the wider need to understand the economic impact of publicly provided transportation infrastructure services. New data sources such as VAT and customs records, as well as tracking technologies from smartphones and other devices, offer hope for an improved understanding of who is travelling from where to where and for what purposes. In turn, this may facilitate a greater understanding of who benefits from infrastructure projects, as well as the extent to which those benefits are linked (or not) to trading with the outside world.

About 90 percent of the world's trade transits by sea, so containerisation is at the centre of these global trade patterns (Bernhofen et al. 2016, Rua 2014, Cosar and Demir 2018). Recent work has also attempted to understand—though so far more in a cross-country context—the effects of improvements in a nation's port facilities. For example, Nordas and Piermartini

(2004) argue that among all indicators of infrastructure, the quality of port installations has the largest impact on relative bilateral trade flows. Stressing further the importance of port infrastructure, Brooks et al. (2019) show that US cities neighboring ports that were exogenously deeper prior to the advent of large container ships grew about twice as fast as other coastal cities. However, Ducruet et al. (2019) show that much of this growth was "zero-sum" at a relatively local scale, since new port technologies displaced economic activity from large to small cities.

Air travel also plays an important role in carrying out global trade. Campante and Yanagizawa-Drott (2017) show that an increase in an airport's connectivity has a positive effect on local economic activity. This effect is likely due to air travel facilitating the movement of people rather than the movement of goods. In particular, they document that foreign ownership of companies is stronger between two cities just below 6,000 miles in distance than just above, a regulatory threshold that makes it more expensive to connect two cities by air on one flight. Startz (2016) also shows the importance of face-to-face relationships for retailers based in Nigeria. To remove contractual and informational frictions with manufacturers in China, these retailers constantly need to travel to China to source goods for their stores, making air connectivity extremely important.

Information frictions are arguably another important barrier to trade. However, evidence on the impact of communication infrastructure on trade flows is thin. Using historical examples, Steinwender (2018) and Juhasz and Steinwender (2019) show that transatlantic telegraph lines impact trade flows along two dimensions: They allowed exporters to learn about foreign market conditions and allowed buyers to acquire information on the characteristics of codifiable products. The expansion of internet access and its market platforms could significantly boost the export potential of developing countries (see Hjort and Poulsen 2019 for suggestive evidence on the effect of internet on exporting status).

Overall, while the literature points to a positive and significant impact of physical infrastructure on trade and economic development, more evidence is needed on the cost efficiency of infrastructure projects and where their returns are the highest on the margin.

The infrastructure of customs collection and trade facilitation

To be exported or imported, goods typically need to be inspected by customs agents, and they are often subject to tariff duty collection. Firm perception studies such as the World Bank Enterprise Survey typically point to delays in clearing customs as a significant trade barrier. Djankov et al. (2010) find support for this view in the data. The distance equivalent of customs compliance time is quite high: each day of delay corresponds to an increase in distance of about 70 km. Given that the average time to clear exports through customs is on average 11 days in sub-Saharan Africa (compared to, e.g., 3 days in the

European Union), developing countries are de facto further away from trade partners. Policies to improve customs efficiency relate more to state efficiency than trade policy, but we stress this as an important and relevant area for further research.

Tariff collection is customs agents' other main responsibility. This is particularly critical for developing countries, as a large share of their fiscal capacity consists of import duties (Cagé and Gadenne 2018). Due to low tax enforcement capacity, this may be where firms circumvent duties the most. Reflecting this, a number of papers have used mirrored international trade data to show the prevalence of tariff evasion in developing countries (Fisman and Wei 2004, Mishra et al. 2008, Rijkers et al. 2015).

While the literature points to a positive and significant impact of physical infrastructure on trade and economic development, more evidence is needed on the cost efficiency of infrastructure projects and where their returns are the highest on the margin.

Sequeira and Djankov (2014) provide direct evidence of the importance of tariff evasion and the role customs agents play in facilitating that process. It is typically done through bribe payments in exchange for tariff payments that are lower than the official rate, which reduces trade costs for importing firms. This may be why a *de jure* tariff reduction might not translate into a significant increase in trade flows in some settings, as *de facto* tariff duties are already very low. Additionally, coercive corruption, whereby bureaucrats ask for additional fees to remove the threat of having goods locked at the border, also takes place. This process may also explain why the customs clearing process takes substantially more time in developing countries. At the border, gender or ethnic attributes might affect the bargaining relationship between customs agents and traders and so these distortions might disproportionally affect certain groups.

Reducing corruption and tariff evasion at the border is a challenging task. The process of assessing the value of a good crossing the border leaves room for bargaining; as such, strict rules on methods for evaluating product prices, such as the WTO Customs Valuation Agreement, could be a reasonable solution (Javorcik and Narciso 2017). Hiring private firms to conduct shipment inspections has also shown promising results for tariff collection (Yang 2008). Financial incentives for customs agents could also be an alternative (Chalendard et al. 2019), as it has yielded promising results for administrative workers in other fields (e.g., Khan et al. 2016, who offered performance-based incentives to tax collectors in Pakistan). Finally, recent developments in technology or advanced statistical techniques could support the efforts of states to detect tariff evasion (Demir and Javorcik 2019, Mittal et al. 2018). More research is needed at the intersection of state capacity and trade policy to reduce the costs associated with the burden of red tape and corruption at the border.

On top of customs, exporters and importers typically need to interact with several cross-border agencies that develop trade regulations and enforce them. The digitisation of some of these procedures could have a significant impact on trade flows. Similarly, a change in international regulations or harmonisation of norms between countries trading with one another could have an effect on exports. Yet, evidence on the effectiveness and the economic returns of such policies is lacking.

Next steps and research priorities

- Develop methodologies to perform cost-benefit analyses of physical trading infrastructure.
- Where—in terms of location and sectors— are the marginal returns of infrastructure the highest?
- What policies can improve the processes of customs collection? How can corruption at the border be reduced?
- What trade facilitation services can significantly increase trade flows?

2. Export promotion

While export growth and promotion are at the centre of most developing countries' growth strategies, this objective often remains difficult to implement in practice. World export markets are extremely competitive, and a sector must have the right comparative advantage in order to succeed. In addition, a number of market failures can prevent domestic firms from accessing export markets, and this is where export promotion agencies have a role to play.

Section 2.c.2 reviewed a number of potential market failures on the demand side. In export markets specifically, search frictions may be even more important. Finding buyers in remote countries seems likely to be harder than it is in one's home country. One rationale for policy intervention is that knowledge about available exporters and importers can be considered a public good. As such, governments should focus on collecting and providing information that is useful for entire sectors, as opposed to facilitating only firm-specific relationships. In the latter case, the state may just be subsidising the cost of finding new buyers that firms may have found anyway on their own. To be efficient, government intervention should be focused on solving coordination failures (such as marketing an entire industry's products abroad) or building tools with large economies of scale (such as listing all available exporters on a web platform). While there is a large body of evidence on the existence of search

frictions (Allen 2014, Startz 2017, Jensen and Miller 2018), research on how these frictions can be addressed in practice is scarce.

A second important market failure could be collective reputation. Foreign buyers, unable to assess the quality of potential exporters' products, are likely to rely on signals from the rest of the industry or country to decide whether they want to import goods from a particular firm. In turn, high-quality exporters may have difficulty reaching export markets (Macchiavello 2010, Bai et al. 2017). To increase trust, governments can promote reputation mechanisms that reliably rate sellers and buyers, such as international certifications. On this issue, too, evidence is lacking.

Credit constraints could also play a prominent role in preventing firms from exporting. As discussed in Section 3.a.3, estimates of the fixed cost of entering foreign markets are quite high, and firms may not have the resources necessary to pay that cost. Improving access to trade credit or directly subsidizing the costs of export business plans are potential solutions. Cadot et al. (2015) estimate the effect of FAMEX, an export-matching grant programme in Tunisia. While the impact on exports is strong in the short run, it fades out after 3 years. Yet, the additional corporate tax revenue generated from the programme covers its cost, suggesting that such interventions could be cost efficient.

Perhaps because so many developing countries already conduct export-promotion activities in some form, a promising research strategy could be to initiate collaborations with these export agencies and randomise export promotion interventions. This would potentially allow researchers to quantify the size of different externalities while measuring the cost efficiency of various policies at the same time. Interactions between researchers and tax administrations in developing countries over the past decade have led to significant progress in this literature, and we believe there is a similar potential for export promotion.

Next steps and research priorities

- What externalities or market failures legitimate export promotion programmes? How large are these externalities?
- What type of interventions are effective and cost efficient in addressing these market failures?

D Trade and inequality

Over the past few years, trade has been at the centre of the inequality debate. While globalisation was followed by significant growth for many countries around the world, it has left a number of people behind. Lakner and Milanovic (2015)'s "elephant curve" showed that the middle class in developing countries and the poorest in developed countries experienced less growth than the average. The recent rise in protectionist views generated by shrinking industries in high-income countries raises the threat that if the trade gains are not sufficiently shared across the population, they may slow to a halt in the future.

We first discuss the issue of inclusive export-led growth. How can the gains from trade be more widely shared? We then turn to mitigating adjustments from trade shocks. In the short run, certain groups of firms or individuals may be particularly affected by liberalisation reforms, variations in world prices, or trade policies implemented by other countries. In general, the agenda for this section aims at better understanding who benefits and who loses from trade. If we can learn more about this, it may be possible to determine which policies should be enacted to make growth more inclusive.

Perhaps because so many developing countries already conduct export-promotion activities in some form, a promising research strategy could be to initiate collaborations with these export agencies and randomise export promotion interventions.

1. Inclusive export-led growth

Export-led growth has lifted many people out of poverty, especially in China. Thus, many policymakers nowadays believe that trade openness is a reliable poverty-reduction strategy. The intuition for that presumption is simple. Standard trade models predict that when opening to trade, developing countries—who tend to have a relatively more abundant unskilled labour supply—should see higher employment opportunities and an increase in earnings for the poorest.

However, several papers have documented that the trade liberalisation episodes that took place in the 1990s in many low- and middle-income countries were typically followed by a relative increase in the wages of the most educated (see Goldberg and Pavnik 2007 and Pavnik 2012 and Figure 4 below showing the increase in inequality in Mexico at a time where exports boomed). These patterns were rationalised by the subsequent observation that reaching export markets typically requires technological upgrading (Bustos 2011) or quality upgrading (Verhoogen 2008), all of which require that firms use skilled workers more intensively (Brambilla, Lederman, and Porto 2012).

The effect of trade on wages also varies across firms. Trade openness increases competition and makes the least productive firms die or shirk (Melitz

2003). Supporting this hypothesis, Menezes-Filho and Muendler (2011) document large employment declines in the least productive firms in response to trade liberalisation in Brazil in the 1990s. Amiti and Davis (2012) show that Indonesia's tariff cuts in the 1990s reduced wages in firms competing with imports while increasing wages among exporters. A large literature has shown that firm fixed effects account for a large part of the variation in wages observed within industries (Card et al. 2013, Song et al. 2016, Barth et al. 2018, Alvarez et al. 2018). Depending on the firm they join, workers can earn significantly different wages. Helpman et al. (2016) find that most of the wage inequality generated by trade shocks in Brazil comes from changes in the wage gap between workers with similar characteristics, in the same industry, but employed in different firms.

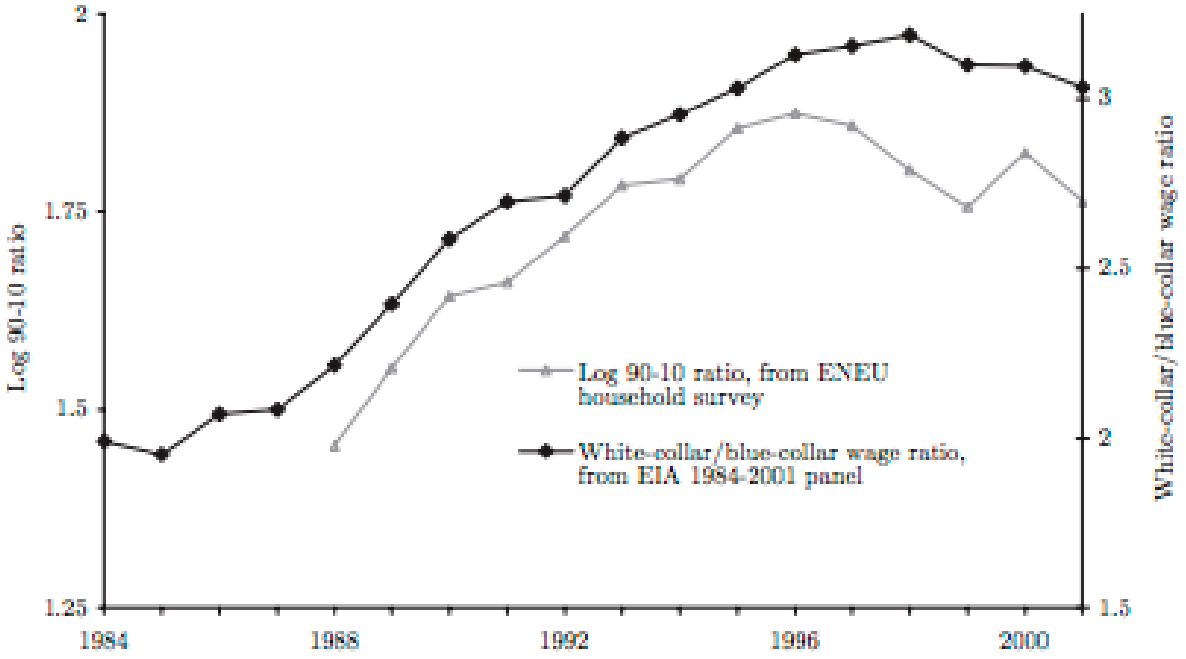


Figure 4: Increase in inequality over time in Mexico (Source: Verhoogen, 2008)

Trade impacts welfare through more than just employment and wages. By increasing competition and allowing consumers to buy goods from cheaper countries, trade also reduces prices and increases product variety. While these effects are clear, evidence on the distributional impact of trade openness on consumer welfare is rare. Fagjelbaum and Khandelwal (2016) argue that the poor in the US benefit more from trade, as they spend more on imported goods relative to their income. By contrast, using consumer expenditure survey data from the US, Borusyak and Jaravel (2018) find that the expenditure distributional effect of the gains from trade is neutral. These effects may be slightly different in developing countries, where the poor rely heavily on crops that may not be traded on international markets.

In a recent paper, Artuc et al. (2019) measure the overall effect—from employment to consumption—of trade policy in developing countries. They investigate both the welfare gains and distributional impact of trade across 54 developing countries. While trade openness creates an income-inequality trade-off, imposing structure on the social welfare function associated with inequality, they conclude that the majority of developing countries would still be better off by reducing protectionism.

Several papers have documented that the trade liberalisation episodes that took place in the 1990s in many low- and middle-income countries were typically followed by a relative increase in the wages of the most educated.

Finally, trade liberalisation can also impact the structure of the economy in the long term. Evidence thus far points to trade openness having some adverse effect on education. Edmonds et al. (2010) show that in districts in India that were the most exposed to increased competition from trade liberalisation, parents took their children out of school to cope with the increase in poverty. When trade positively affects the local economy, it also increases the opportunity cost of schooling, as new employment opportunities arise. Atkin (2016) finds that although the returns to education are high, when export-oriented factories open in Mexico, local high-school dropouts increase.

In sum, the literature on the inclusivity of trade liberalisation strategies is already substantial. However, we see three new important avenues for research on this issue. First, as trade does not start at the border, trade policy does not only impact firms that directly engage in exporting and importing activities; rather, the entire upstream and downstream value chains are likely to be involved. However, there is limited evidence on how trade policy impacts value chains.

Second, the issue of compensation for individuals that are negatively affected by trade deserves more attention. This compensation is typically done through social protection programmes and tax policy, which create distortions. Striking the right balance between sharing the gains from trade more equally and the loss in efficiency from higher taxes is challenging. Antras et al. (2017) explore this issue theoretically in the US, but to our knowledge, no study dealing with this issue exists for low-income countries.

Third, unionisation and other labour market policies such as the minimum wage are becoming more common in developing countries as well. Yet, little is known on how they alter the distributional impact of trade openness. More evidence on the consequences this has for the distributional impact of trade policy is needed. Unionisation per se is typically not a government policy but the state can create an enabling environment that favours trade union membership.

As a final point, the spatial distributional impact of trade integration is also a first-order issue for many developing countries. Regional economic integration has increased substantially in sub-Saharan Africa and in Asia over the past decade. Yet, when multiple countries sign a trade deal, little is known about which of them benefit from it. How do common market agreements impact the reallocation of factors of production across countries? As transfers across countries are rare, the winners of trade deals do not necessarily compensate the losers.

Next steps and research priorities

- Investigate the impact of trade policy and trade liberalisation on consumer welfare in developing countries.
- Which firms (in the value chain) are the most impacted by trade policy?
- How can the gains from trade be more equally shared? How can redistribution be done efficiently?
- What is the spatial distributional impact of regional trade integration?

2. Mitigating adjustment effects of trade shocks

While ensuring that export-led growth is inclusive in the long run is a first order priority, developing countries are also exposed to various trade-related shocks that they have to bear in the short run. These can take the form of prices of internationally traded commodities being subject to high volatility or a change in the policy of an important trade partner. The dynamic transition from a relatively closed to a more open economy is also of importance. A number of frictions can make trade shocks more costly or delay the time until the gains from trade openness are fully grasped.

Evidence for the slow adjustment of developing countries' economy in response to trade shocks is growing. This be explained in part by their lack of labour mobility (see Pavnik 2017 for a recent review). Artuc et al. (2010) document significant switching costs for workers in the US. Similarly, in Brazil, as discussed above, Dix-Caneiro (2014) estimates meaningful costs of mobility between 1.4 and 2.7 times average annual wages. Worker mobility can take the form of changes in sectoral occupation as well as spatial movement. A number of papers have also shown that workers do not necessarily move to regions where employment opportunities emerge following trade shocks (Chiquiar 2008, Topalova 2010, Kovak 2013, Dix-Carneiro and Kovak 2017). This particularly applies for low-skilled workers, who face relatively higher migration costs relative to earnings (Notowidigdo 2019). Finally, Artuc and McLaren (2015) have shown that in the US, a worker's occupa-

tion is as important as their industry of employment. In low-income countries, understanding which type of mobility—sectoral, spatial, or occupational—is responsible for the slow adjustment to trade shocks remains a relevant area of research. Do these barriers disproportionately affect low-skilled workers? Equally important is the need to design policies that can smooth the response to trade adjustments so labour markets can rapidly grasp the benefits from positive shocks and be more resilient to negative ones. It seems likely that high transport costs (Morten and Oliveira 2019), scarce opportunities for later-life job training, or the reliance on informal safety nets (Munshi and Rosenzweig 2016) all contribute to making labour mobility more costly in low-income countries (Artuc et al. 2015). But we have much to learn about the details.

Another channel through which trade shocks propagate is through production networks. As discussed in the previous section, a small fraction of a country's firms export, but the number of companies involved in business relationships with exporters is very large. The recent opening of VAT data to researchers allowed to document the structure of production networks and how shocks spread through these networks. Yet, most of the research on this issue focuses on high-income countries (see Bernard and Moxnes 2018 for a recent review). In a recent paper, Huneeus (2019) shows that firm-to-firm relationships do not react strongly to firm-specific international trade shocks but are far more responsive to aggregate shocks.

Understanding the selection into entrepreneurship and the dynamics of firm growth are also important aspects of how markets function.

Finally, the political economy of trade policy is likely to be important for both the impact of international trade on inequality and how an economy responds to trade shocks (Rodrik 1995, Gawande and Krishna 2003). Interest groups may lobby the government to influence trade policy toward an allocation that benefits them rather than the majority of people in the economy. Data on lobbying efforts, the composition of company boards, and measures of connections to politicians in power are all the more difficult to get in a developing country context, but the increased focus on transparency imposed by donors may allow this literature to make significant progress in the years to come. In fragile states, lobbying can take a more radical form. For example, Naidu et al. (2017) show private sector elites supported a military coup in Haiti to put an end to the previous government, which was considering removing the licensing scheme for imports that provided them rents.

Research on how the gains from trade are distributed across firms and subgroups in the population would also shed light on why policymakers make specific trade policy choices that may not be favourable from an efficiency standpoint but are the result of an equity constraint.

Next steps and research priorities

- What factors are responsible for the slow adjustment to trade shocks? For whom are these barriers the strongest?
- What policies can speed up the adjustment to trade shocks?
- Investigate the importance of lobbying and the political economy in shaping trade policy in developing countries.

Conclusion

There is a pressing need for productivity growth in low-income countries as it provides the only sustainable pathway out of poverty. While a number of countries have experienced high growth rates over the past few decades, allowing them to catch up, productivity remains low for most developing countries, particularly in sub-Saharan Africa and South Asia. Understanding what holds firms back is a necessary step to making progress and guiding effective policies to support productivity growth. In this paper, we have discussed the existing evidence on the distortions that curb productivity growth at different levels, from individual firms to an economy's integration in global markets.

We end this paper by highlighting broad areas for future research that run through the sections presented above. The first is the need to deepen our understanding of how markets function and the consequences that has for firms. The focus on markets must be broader than firm-to-consumer relationships; firm-to-firm relationships and value chains are also central. Well-functioning markets provide high-powered incentives for both existing firms and potential entrants, facilitating a robust Schumpeterian selection process that allows dynamic entrants to induce innovation and slower-moving incumbents to exit. Understanding the selection into entrepreneurship and the dynamics of firm growth are also important aspects of how markets function.

The second general theme that emerges is the need to measure the size of externalities and market failures and identify where—in which sectors and for which firms—they are most important. Externalities and market failures come in various forms, from standard production externalities and agglomeration effects to contractual frictions and external learning through business relationships. We believe this is a first-order issue for policy design, as any government intervention whose intent goes beyond redistribution must draw its legitimacy principally from the existence of market failures and externalities.

The final cross-cutting issue is the need to evaluate the effectiveness and cost efficiency of various policies that aim to increase productivity. A given distortion can in general be addressed through a variety of potential interventions, yet little is known about which will have significant impact and which are cost efficient.

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