IGC Research strategy

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IGC

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Contents

Introduction

Growth is the *sine qua non* of long run prosperity. It is the result of actions of millions of people and firms. People have ideas for new goods and services and create and grow firms that bring these ideas to the market. When many people develop firms and persuade consumers to part with their hard-earned income for these products, well-paying jobs are created, workers gain new skills, cities expand, and exports grow.

Growth is also the only route to achieving sustained reductions in poverty. The number of people living in extreme poverty went from 2 billion in the early 1980s to less than 850 million today. This is a demonstration of the staggering power of economic growth for economic development. However, growth has not raised all people out of poverty everywhere. While in China, high rates of export-led growth reduced the number of people in extreme poverty by 98%, poverty rates have remained more stubborn in other middle-income countries, which together now contain more than half of the world's extreme poor (Page and Pande 2018). Moreover, extreme poverty is increasingly concentrated in fragile states that are largely side-lined from growth and globalisation processes.

Achieving the global goal of eliminating extreme poverty by 2030 is therefore all about promoting growth and ensuring that poor people are included in the growth process. It is also about making sure that production and consumption is cleaner, and that the poor are protected from environmental change. Otherwise, key externalities from growth – climate change, pollution, and environmental degradation – may ultimately block humanity's path to prosperity. Understanding how to promote growth that is both inclusive and sustainable lies at the core of our mission. Doing this effectively to help us both eliminate global poverty and confront the climate crisis will require innovative thinking and research. With 14 years of experience, an unparalleled network of researchers and strong, established relationships with governments in Africa and Asia where the world's poor are concentrated, the IGC is in a strong position to become the global leader in this area.

We believe that any effective long-term growth strategy is by nature inclusive as it must focus on making people and businesses more productive and thus on giving the poor the opportunities and the capabilities they need to realise their potential. The root cause of mass poverty is that most people, despite working long hours, remain acutely unproductive. Thus, the transformation needed to achieve higher rates of growth is one that generates a large number of productive jobs, one where people shift *en masse* into higher productivity activities.

While growth and structural change are macroeconomic phenomena, they are ultimately the result of microeconomic transformations. Productive jobs are created when individuals start new companies, when labour demand rises and existing firms expand, when companies invest and get access to reliable sources of energy, when trade flourishes, when cities enable firms and people to be better connected, and when a functioning state guides all these transformations.

The goal of the IGC's research programme is to understand why these microeconomic processes play out differently across countries and to identify policies that can accelerate transformation. To this end, we will organise our research under **four key interrelated microeconomic transformations**. These are transformations in the capabilities of **firms** and the functioning of markets, in the capacity of the **state**, in the organisation of **urban areas**, and in the provision of **energy** and the greening of growth.

First, we seek to understand the sources of the productive potential of all firms within an economy, be it large formal firms, small informal firms, large commercial farms, or small-scale family farms. We focus particularly on interventions and policies to reduce barriers preventing firms from developing their capabilities and from accessing domestic and international markets.

The second key transformation is the development of an effective state that is capable of raising revenues, implementing essential economic policies, protecting citizens from shocks and providing key public goods, such as infrastructure and the rule of law, and providing basic stability against violence. We will focus on how the state can develop and use these capabilities to improve overall welfare and resilience and to promote inclusive and sustainable growth.

Third, it is clear that the future of the developing world is urban, and that the productive potential of firms depends critically on the nature of urban areas. Cities play a central role in facilitating the externalities that are crucial to growth, but they are also breeding grounds for congestion, pollution, emissions, and crime that limit growth. Understanding how to mitigate the downsides of urban density and maximise productive externalities will be crucial to reducing poverty and sustaining high rates of growth.

Fourth, no country can grow in the absence of cheap and reliable sources of energy. We will study the most effective sustainable ways to improve electricity access both in regions already covered by national grids and in rural areas yet to be connected. The increases in energy consumption necessary to support growth also creates externalities in the form of pollution and climate change which must be addressed if the benefits of growth are to be shared and sustained. Achieving a better balance between human activity and the natural environment without sacrificing economic growth represents a major challenge here. Today's poor countries will have to emit much less carbon than rich countries did along their growth path, and innovation will be essential to achieve this balance.

These four transformations do not operate in isolation. For example, the lack of energy access affects firms' capabilities and the state can implement labour market policies that increase firms' productivity. Similarly, the externalities from energy consumption in the form of climate change affect workers, firms and cities and will require interventions by the state. While we examine these four themes separately below, we are also particularly interested in how these transformations interact.

The IGC's four themes:

Firms, trade, and productivity – Increasing productivity through structural changes in firms' capabilities, the functioning of markets and how firms interact with world markets.

State effectiveness – Escaping fragility and improving the capabilities and effectiveness of states to deliver higher rates of inclusive growth.

Cities – Making cities more productive and inclusive while addressing the downsides of density.

Energy and environment – Improving access to reliable, cost-efficient energy and developing strategies to mitigate and adapt to externalities from energy consumption.

IGC research priorities

Firms, trade, and productivity

Main themes of research under firms, trade, and productivity

Firm capabilities:

- Entrepreneurship, management practices, training programmes
- Technology adoption, innovation, and quality upgrading
- Labour market policies
- Access to finance, venture capital, material inputs, electricity, and other inputs

Markets:

- Misallocation of factors of production and structural transformation
- Value chains, firm-to firm relationships, intermediaries, access to markets
- Market power and competition policy
- External economies and industrial policy

International trade:

- Impact of trade in presence of distortions
- Export promotion, trade policy and other related policies
- Trade integration and trade infrastructure
- FDI policy (attraction, SEZs, spillovers)
- Trade and inequality

The goal of the IGC research programme on firms, trade, and productivity is to uncover forces that can unleash the potential of firms in developing countries to more efficiently deliver products and services that consumers at home and around the world are willing to pay for. We find it useful to think about the necessary transition as arising from three types of transformations: a change in the capabilities of firms, in the functioning of markets, and in the interaction of firms with world markets. These three transformations form the basis of our three areas of research for this theme.

The objective of our first area of research is to identify barriers that prevent firms from developing their capabilities and the effectiveness of policies that could remove these constraints. There is a large body of evidence that the typical firm in poor countries is poorly managed (Bloom et al. 2012). However, there is much less evidence on what works to improve management practices. For example, there is by now a large body of evidence that shows that provision of management training to entrepreneurs has little effect (McKenzie and Woodruff 2014; Grimm and Paffhausen 2015).

There is also some evidence that focused consulting services have a larger effect and are cost-efficient (Bloom et al. 2013; Bruhn et al. 2018). However, the question this raises is why don't firms pay for these services themselves? Another approach to improving firm capabilities focuses on coaching, mentoring and peer interactions programmes. Cai and Szeidl (2017) and Fafchamps and Quinn (2018) generate networking opportunities among business owners and show promising effects on firm performance. More evidence on the effectiveness and scalability of such programmes would be useful. We also seek to understand the diffusion of good management from the entry of foreign owned firms, or those in international supply chains, as well around the market for managerial talent more broadly.

Another possible explanation for the observed low productivity of firms in developing countries relates to the use of the technologies or inputs. We have some patchy evidence on this from agriculture, and recent work from the soccer ball industry in Pakistan suggests that barriers to technology adoption may exist outside of agriculture (Atkin et al. 2017). We want to build on this evidence in more sectors. Even if we find evidence of low adoption, we need to understand why firms do not adopt inexpensive production processes that would bring them closer to the production frontier.

We also want to understand what policy interventions can promote the use of better technologies. For example, producers may not have enough information about technologies, or the returns to such technologies. Another possibility could be that credit constraints prevent them from acquiring technology, despite the high returns. Lastly, risk aversion and incomplete insurance markets can also lead to inefficient adoption. We have very little information on which explanations are the right ones, and what policy interventions are effective at addressing the relevant constraints. We will prioritise research that seeks to find answers to these issues.

Firms may also not reach their full capabilities because they do not have access to necessary inputs such as labour, capital, material inputs or electricity. Labour market search frictions may make it difficult for small firms to find the workers necessary to grow. It could also be the case that the supply of skilled workers is very thin, or that there is a skills mismatch. We will work to understand ways to build the supply of workers with relevant skills, for example through vocational training, apprenticeships, and the provision of information on the returns to such programmes. There is also some suggestive evidence that firms in developing countries do not support the acquisition of skills by their workers (Lakagos et al. 2018). We are also interested in understanding the role informal firms can play in buffering workers from formal firms when they are hit by shocks. Additionally, do they reduce misallocation by allowing already-distorted small firms to avoid the additional distortion coming from taxation or onerous regulation?

Credit constraints may also be important for firms in developing countries. A large body of evidence suggests that the marginal return to capital is large for small businesses (De Mel et al., 2008; McKenzie and Woodruff, 2008). However, microfinance does not seem to have transformative effects on recipients (Meager 2019). Further research would be useful on innovative contracts to address the challenges presented by identifying, vetting and monitoring firms, and on models for angel investors, venture capital, incubators, and accelerators in developing countries.Evidence on the marginal product of capital for large firms is also needed. Removing credit constraints for large firms could have important spillover effects upstream and downstream. Finally, many firms in developing countries suffer from the lack of access to a reliable source of electricity.

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. Linking this theme with Energy and Environment, the IGC will build evidence on the impact of the lack of access to reliable electricity on firm performance. Here it will be interesting to see how energy systems that rely more on renewables affect firm productivity and growth.

Our second area of research seeks to transform the way markets function in developing countries. There is a large body of evidence that resources are not only scarce but also misallocated in developing countries (Hsieh and Klenow 2009). The misallocation can be between firms, industries, or regions in a country. We have, however, much less evidence on what exactly are the policies and institutions that generate factor misallocation. The list of potential candidates is very large and likely to vary across countries and time. There is also suggestive evidence that distortions or frictions on the demand side might reduce market access or misallocate demand across firms and in turn can slow down the integration of firms into value chains. These potentially include high trade costs, search costs, or contractual frictions. We encourage further research in this area.

Some markets in developing countries are captured by powerful firms. For example, there is evidence that the trading and transportation sectors are often captured by a small number of large companies. The retail sector in particular, appears to be less competitive in developing countries than in high income countries (Atkin et al, 2018). The cement industry is another example (Kirchberger and Bernier 2021, Leone et all 2021). This, in turn, can have a large impact on the upstream and downstream sectors. We aim to better document the patterns of market power in developing countries, and also examine possible interventions to improve the functioning of these critical sectors. The needs here include measuring mark-ups, understanding in which contexts lower competition is welfare-improving, documenting better how competition and market structure at different levels impact the entire value chains, and identifying effective policy measure to enhance competition.

The existence of externalities such as external economies of scale, agglomeration economies and technological or human capital spillovers create a rationale for state intervention, usually referred to as industrial policy. While a large number of governments in developing countries already implement industrial policy in some way, there is very limited evidence on the size of the externalities that justify these interventions and where – in which firms and which sectors – they are the strongest. Conditional on the existence of certain externalities, there is also a need for more evidence on how governments should respond to them, in particular when states have limited capabilities and coordination to implement complex policies effectively, and how they might design policies in the face of uncertainty over which firms and sectors to target.

Our third area of research relates to how domestic firms interact with international markets. We see four important dimensions of this interaction. The first is how opening to trade affects the functioning of markets and firms. For example, does it worsen or alleviate resource misallocation and market power? Does the allocation of factors resulting from trade openness promote production externalities? How are different types of firms impacted by trade policy? The second is whether access to world markets facilitates transfer of knowledge and adoption of best practices and technologies. Atkin et al. (2017) show that firms' performance improves when they start selling to foreign buyers and a growing body of evidence suggests that foreign direct investment entry generates productivity spillovers for domestic firms (Alfaro-Urena, et al 2021). Evidence on the magnitude of these externalities remains thin and we encourage further research on these questions. The third aims at measuring the economic returns of public goods such as transport infrastructure and export promotion services that facilitate integration into global value chains. While the benefits of these interventions are clear, there is limited evidence as to whether they are effective and cost-efficient. Finally, an important question is the extent to which opening to trade redistributes income within the domestic economy, either mitigating or exacerbating existing inequality. Inequality can take various forms. A large literature has shown that the skill wage premium increases with trade openness, increasing income inequality (Goldberg and Pavcnik 2007). Evidence on the impact of trade liberalisation on consumer prices in developing countries is lacking. There is also less evidence on which firms in the value chains – in which sectors and which locations – are most affected by trade shocks and regional trade integration policies. If access to world markets increases inequality, a central question is how redistribution can be done efficiently. Similarly, who bears the cost of adjustment to trade shocks is a question that deserves more attention.

Research questions under *firms, trade, and productivity*

- What types of entrepreneurship training programmes are cost-efficient? Can these programmes be scaled?
- Should entrepreneurs be selected into training programmes? Should governments identify and support gazelles?
- What barriers prevent firms from adopting technology? Which policy measures are most effective in reducing these barriers?

- What is the magnitude of search costs for skilled workers? How can the supply of skilled labour be increased?
- Can new forms of capital (micro-equity, angel investors, VC...) provide a solution for access to finance in developing countries?
- Are large firms credit constrained in developing countries? How does removing these constraints affect firms upstream or downstream?
- What factors are responsible for the misallocation of factors of production across firms?
- What barriers constrain the optimal allocation of labour across sectors? How can structural transformation be promoted?
- Is there less disruptive entry in developing countries? If so, why?
- What is the magnitude of market failures that reduce market access for firms? How can they be addressed?
- How strong are competition forces in developing countries? Which sectors are the least competitive? How should competition policy be conducted?
- What is the size of production externalities? In which sectors and for which firms are they the strongest?
- How should industrial policy be designed in an environment with low state capacity and coordination?
- Does trade reduce or increase existing distortions? Does the reallocation that results from opening to trade promote positive production externalities? What is the impact of trade policy on informality and connected firms?
- 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 policies are effective and cost-efficient in promoting spillovers?
- Where are the returns of building new trade infrastructure the highest? What interventions should export promotion activities be focused on? Are they effective and cost-efficient?
- Which firms in value chains are the most affected by trade shocks and changes in trade policy?
- How can the gains from trade be more equally shared? How can redistribution be done efficiently?
- What is the distributional impact of regional trade integration?
- What are the factors responsible for the slow adjustment to trade shocks?
- What will encourage the diffusion of green technologies into developing countries?
- How can firms adapt to climate change?
- How will trade policy affect where polluting firms are located?
- How will energy and transportation systems that rely more on renewables affect firm productivity?
- How do incentives (taxes, subsidies) affect technology adoption in dirty industries versus services led growth?

State effectiveness

Main themes of research under state effectiveness

Fragility and economic development:

- Escaping extreme fragility
- Inclusive institutions: political selection and state accountability
- New challenges of fragility: populism and economic integration of refugees

Poverty, labour markets, and inclusive growth policies:

- Social protection
- Adaptation to climate change
- Occupational transformation, inclusive labour market policies

State revenue and effective state policies

- Tax capacity (equitable and efficient revenue collection; tax morale
- Public sector organisation, effective bureaucracies, policy implementation
- Spending effectiveness (procurement rules and systems, PPPs, targeting)

An effective state operating in a functioning and stable political environment is a necessary condition to achieve higher rates of inclusive growth (Besley and Persson 2009). The state not only designs economic policies but also provides key public services that are essential for growth, structural change and poverty reduction. However, in a large number of developing countries, the state fails to deliver on these responsibilities (Collier 2007).

Understanding why states are less effective in low-income countries is an inevitable first step. However, we also need to bridge the divide between diagnosis and the identification of implementable policies and reforms to improve state capabilities. This is the space that the IGC research programme on State Effectiveness will help to fill. Identifying concrete reforms and policies to strengthen state capabilities and to enable the state to deliver the services needed to promote inclusive growth and poverty reduction is the core aim of the programme.

We see future research that can help fulfil this objective falling into three key areas. The first area focuses on how state fragility affects economic development and how states can escape fragility by building a functioning state, strengthening institutions, and making them more inclusive. In the second area, we look at what the state should do to promote inclusive growth and hasten poverty reduction. Here urgent and innovative thinking is needed to recast the set of policies that the state should engage in to promote the welfare of its citizens. In the third area, we look at how state policies can be made more effective. Here improving state effectiveness centres on mobilising domestic resources, building effective bureaucracies to implement key economic policies, and making state expenditures more impactful.

The starting point for our first area of research is that state fragility is a trap from which it is difficult to escape (Fragility Commission, Cameron et al. 2018). The uncertainty, low state capacity and absence of public goods that come with fragility all constrain the private sector. Firms are then reluctant to invest or create jobs, economic development stalls and the growth needed to support increases in state capacity does not take place. We welcome research on how the core economic functions of the state can be established and sustained in extremely fragile political and economic environments. Research also is needed on the set of economic factors and policy priorities that allow peace to be sustained and put countries on a path out of extreme fragility.

State fragility is also a spectrum. For all developing countries, the question of how institutions can be strengthened and become more inclusive merits further research. Strong and inclusive institutions reduce the economic and political uncertainty that constrains firms from investing and creating jobs while allowing talent to be better allocated and creative ideas rewarded, all of which fosters economic cooperation and growth (Acemoglu and Robison 2012). The first area for research concerns political selection. A growing literature has shown that political leaders, not just at the top but across government organisations, determine and drive economic policy (Burgess et al. 2015; De Luca et al. 2018). We would like to encourage more research linking political selection, representation and inclusion in the political process, to economic policy outcomes and to growth. Acemoglu and Robinson (2012) also emphasise state accountability as an essential ingredient for economic development. The evidence on whether and how accountability can be promoted, particularly in fragile states, is very thin and we want to contribute to filling this gap. However, given the sensitivity of political selection and state accountability issues in many of the countries in which the IGC works, we aim to seize the opportunities that may arise from our longstanding relationships with policymakers to design innovative projects in this area.

Our second main area of research concerns what the state can do to reduce poverty and generate higher rates of inclusive growth. This objective is important in its own right but also because it helps to re-establish a social contract between the state and mass of the population that tends to be poor. Finding innovative ways to accelerate poverty reduction in low-income countries can better allow the poor to make productive use of their abilities, thus enhancing the overall efficiency of the economy, while also tackling the lack of social mobility that is often at the root of political dissatisfaction and conflict.

Recent changes in the distribution of poverty around the world heighten the need to re-think growth policies and poverty reduction programmes. Most of the world's remaining poor are either in fragile states or being left behind in rapidly growing economies (Page and Pande 2018). While the state capabilities needed for effective poverty reduction are likely to be different across countries, we believe that at a global level, there is a need to target the poor directly through more ambitious pro-poor growth policies and poverty reduction programmes. In the absence of fresh approaches to the role of the state in poverty reduction, it is unlikely that many low-income countries will achieve the sustainable development goal of eliminating extreme poverty by 2030.

In this area, we are looking for research that identifies innovative ways for the state to transform the economic lives of the poor. This requires us to change how we think about social protection in developing countries. The performance of a wide range of interventions has now been measured through randomized control trials. While the outcome of these can be particularly informative for policymakers, the existing stock of knowledge is biased towards the evaluation of consumption support programmes which aim to bring the poor above a level of subsistence. Few of these programmes have a transformative impact on the poor. We need more research on production support programmes that lift people out of poverty permanently. Given the need to make a big push on poverty reduction at a global scale, we also need to understand better how innovative poverty reduction programmes can be taken to scale by the state, in particular the general equilibrium (Imbert and Papp, 2015, 2019) and long-term effects of these programmes. We will also support research that identifies labour market policies to promote occupational transformation for the poor. These include removing the barriers that prevent the poor from accessing productive jobs as well as interventions that raise the productive potential of the poor. This work is made more pressing by the growing evidence that climate change most negatively affects the poor in low-income countries. Policies that encourage growth and occupational change are critical to helping poor adapting to these changes and identifying them will be central to the design of social protection systems.

Our third area of research concerns how the state’s policies can be made more effective in order to promote inclusive and sustainable growth. The economic challenges that low-income countries face require more resources to increase the scale of the existing state-run

programmes and to expand their scope. The tax revenue share of GDP in in sub-Saharan African and South Asian countries is typically well below 20%, less than half that of most European countries. We are looking for research on innovative and cost-effective means of increasing tax revenues by improving tax compliance, to ensure that individuals and firms pay taxes as they are defined in the law (Slemrod 2007), and by designing better tax instruments, which increase revenues while having a limited impact on the economy's efficiency (Gordon and Li 2009; Best et al. 2015). Equity considerations are likely to be important determinants of support for tax policy reform in developing countries and should be the subject of further research. We would also like to see more research on how states can stimulate quasi-voluntary compliance and improve tax morale (Luttmer and Singhal, 2014).

The set of economic policies that are essential for inclusive growth are generally designed and delivered by bureaucracies. Making these policies more effective also requires building more efficient, capable, and impactful state organisations. A number of studies have documented the power of incentives in driving bureaucrats' performance (Khan et al. 2016; Bertrand et al. 2019). There is less research however on how government officials at different levels interact, whether poor management at the top impacts civil servants and more generally how the state can build stronger bureaucratic systems. This need is particularly important for thinking about policy implementation. A wide range of policies, from industrial policy to competition, require the setup of complex agencies where governance plays an important role, for example with respect to identifying the key market failures that need to be addressed or positive externalities that should be promoted. For example, establishing effective regulatory institutions and mobilizing political will are both key hurdles in the fight to mitigate climate change. Funding innovative research on the organisation of the state is thus a central aim of the IGC programme.

Finally, in providing public goods and services, the state disburses large amounts of resources and there is significant dispersion across countries as to how effective this spending is. Leakages in spending are prevalent in developing countries (Niehaus and Sukhtankar, 2013; Olken 2006). In this area, we would like more research on how to reduce passive waste, in particular by improving government procurement rules and management systems, s well as expanded research on reducing active waste and overt corruption. We would also like to see more research on policy tools to enable governments more effectively to target expenditure programmes, such as social assistance, to ensure spending efficiency.

Research questions under *state effectiveness*

- What interventions can promote key development objectives in extremely fragile environments, in particular in the presence of conflict or organised violence?
- How can economic governance make peace more durable? What economic policies decrease the likelihood of future conflict?
- What are the key factors that facilitate the selection of representative and competent leaders?
- How do politicians react to interventions aimed at promoting accountability? How do these interventions affect economic policy?
- What economic factors are responsible for the rise of populism in developing countries?
- How can we design social insurance and "big-push" transfer programmes so as to transform the labour market and production activities of the poor?
- What are the constraints on implementing state-run social protection programmes at scale?
- What are the general equilibrium effects of social protection programmes?
- How can transfer programs and other policies be designed to protect populations from climate change?
- How can we design institutions to plan for the transition to net zero and to protect populations from environmental shocks?

- What are the main barriers that prevent productive people from getting productive jobs? What public services and policies can remove these frictions?
- How does the marginal value of public funds of the same state-run programme compare across countries? How does the marginal value of public funds compare across public services and expenditure programs within a low-income country? How does it vary across levels of decentralised government?
- What measures are most effective for improving tax compliance by individuals and firms?
- What are the optimal tax instruments in an environment with low compliance?
- Are tax incentives helpful to achieve production objectives or do they mainly lead to foregone tax revenues?
- What is the incidence of different tax instruments? What are people's perceptions of fairness in tax systems and how do equity considerations influence the use of specific tax instruments?
- How can states improve tax morale? Do policies which increase morale help to foster quasi-voluntary compliance?
- How can states build more efficient governance structures for natural resource revenues? How should states tax natural resources?
- How can the design of screening mechanisms for bureaucrats be improved? How can bureaucrats at the top of the hierarchy be better selected, incentivised, and monitored?
- How can the state build complex agencies that deliver its policy objectives on structural change?
- What are the most effective ways of targeting state programmes? How can technology facilitate the identification of the appropriate beneficiaries?
- Should there be more autonomy in procurement systems? If so, what type of management structures give more autonomy while maintaining oversight?

Cities

Main themes of research under *cities*

Firms and employment in cities:

- Industrial parks and clusters
- Labour market policies
- Slums and inclusive cities

Housing, crime, pollution, climate change and urban public services:

- Housing
- Crime
- Pollution
- Climate change
- Water
- Waste management
- Other local public services

Municipal finances and urban governance

- Tax policy and compliance
- Governance and public finance management

Urban land, energy and transport:

- Land ownership
- Urban planning
- Energy systems
- Transport infrastructure

The future of the developing world is urban. According to the United Nations, Africa's urban population will triple by 2050. South Asia and in particular India, also account for a large fraction of the projected increase in the world's urban population over the coming decades. This profound spatial transformation, which will be central to these economies' structural transformation, generates both challenges and opportunities. The density that defines cities generates a wide range of externalities, positive and negative. The interactions between people and firms that are at the centre of innovation and productivity growth takes tangible form in urban areas. On the other hand, traffic congestion and contagious diseases are hyper-charged in the extreme densities of poorer cities.

The central question then is how to harness the positive externalities generated by cities while minimising the negative effects of density. The IGC research programme on Cities will focus on three broad areas of research: agglomeration economies, density's downsides, and spatial models of transportation and housing in cities.

Our first area of research relates to agglomeration economies in cities. The central question is whether cities actually increase the productivity of people and firms or if, instead, the positive relationship between density and income is simply a reflection of the selection of more skilled people into cities – or of omitted variables that both attract people and make them wealthier. A growing urban development literature seems to support the first explanation (Chauvin et al. 2017). Experiments that incentivise migrants to come to cities have provided the most compelling evidence supporting the hypothesis that urban status increases income (Bryan et al. 2014). There is limited evidence however as to how this productivity premium materialises. Do cities generate economic gains primarily by facilitating the matching between firms and workers or do they promote rapid human capital accumulation?

Despite the observed average positive effect of cities on earnings, there is also evidence suggesting that slums contain millions of people who have been in cities for decades but remain poor (Marx et al. 2013). Resolving the question of how cities can be more inclusive and provide pathways to prosperity remains central to research on cities in developing countries. Burdensome regulations, a low supply of skilled workers, the persistence of informality could all prevent cities from achieving their full potential. The IGC Cities programme will support research to identify interventions and policies that improve the productivity of developing cities by increasing economic opportunities for the poor.

Our second area of research focuses on reducing urban disamenities. Urban proximity enables poorer workers to connect with employers, but it also enables the spread of disease and the perpetration of crimes. Water-borne illnesses remain a serious challenge in the world's poorest cities. Cities are also major sources of pollution and emissions and are increasingly suffering from the effects of climate change. While demand for urbanisation is high, it often capped by a low supply of housing. The treatment of informal housing or 'slums' deserves particular attention. There is an urgent need for research and public policy action that can address these challenges and make developing world cities more liveable. One objective of this research agenda is to estimate the social costs associated with higher urban density, particularly across population groups. This question is critical for policymakers trying to identify priorities for policy action.

Evaluating the effectiveness of the policies that try to address the challenges created by rapid urbanisation is also an important avenue of research. The IGC will support research to analyse the role that incentives play in generating change in harmful behaviours. For example, more evidence is needed on the impact of subsidies for last mile water connection fees or incentives to avoid peak times in crowded roads. Infrastructure and institutions are essential to reduce urban crime, traffic congestion, pollution and disease in developing world cities. Measuring the social benefits across socioeconomic groups of these public goods is important for determining the best use of local public funds. We will also examine how municipal governance impact local infrastructure and housing policy. To provide these essential services, cities need to be able to raise resources. Increasing tax enforcement and improving tax policy at the local level are two essential elements of that effort. Institutions such as public private partnerships are also prevalent in cities in the developing world, yet there is little evidence on their impact. Finally, given that cities are responsible for about 75% of global carbon emissions, there is a need for research to think about how cities can be designed in way to reduces both global and local externalities.

Developing structural approaches to model cities in low-income countries constitutes our third area of research. While the field of development economics has greatly benefited from the widespread use of randomised control trials, cities are complex systems and most research questions in the field of urban economics cannot be answered solely with research interventions that can be randomised at the individual level. For example, studying how land use impacts the performance of cities involves a full spatial model that can inform on the general equilibrium effect of transforming a metropolitan area. Similarly, since zoning policies that attempt to promote certain agglomeration externalities are difficult to randomise, there is a role for quantitative models to use these estimates to inform policy makers about the consequences of alternative zoning or land use policies. While the set of available structural models for cities is large for high income countries, very few low-income country cities have been modelled so far. This is particularly important as developing country cities differ in many ways from those in Europe or the US. For example, the type of transportation infrastructure available and the distribution of sectoral activities and skills vary across cities. Thus, the model parameters that govern the locations and employment decisions of people and firms need to be estimated for low-income country cities. These can be estimated directly from the data, as it becomes more available, or by using other sources of information, including randomised control trials. These fully developed models can then be used to simulate different policy

interventions. The IGC will support the development and use of structural models in urban economics to assess these questions. These models are just starting to be applied to contemporary policy challenges, but structural spatial models seem particularly adapted for land use and transportation decisions in developing countries.

Research questions under *cities*

- Do cities facilitate matching between firms and workers and encourage the exchange of goods and services?
- Are cities escalators that facilitate rapid learning of new skills and techniques?
- Do slums help or hinder access to economic opportunity and social mobility?
- Which local constraints on firms — such as a lack of skills, access to input and output markets, burdensome regulations or limited energy access — constrain labour demand and contribute to high unemployment amongst the young and vulnerable population?
- What limits workers' abilities to acquire skills and learn from employers and co-workers?
- How do the specific features of developing country cities — such as unplanned spatial expansion and the persistence of informality across land and labour markets — drag down economic performance?
- What should be the role of local government in local economic development policy?
- What are the social benefits of sanitation and health services? How can these services be better provided? How do these benefits vary across population groups?
- What is the impact of public housing projects, slum upgrading programmes, and land readjustment, on residents' welfare, land prices, productive activity and fiscal revenues?
- What is the effect of land use regulations, including the rules that promote or reduce economic inclusion?
- What is the impact of informal networks in facilitating transit and reducing congestion?
- How can municipal governance be improved?
- What can new instruments, such as programmes that capture land value, do for areas with low state capacity and high rates of informality?
- How can municipalities and local governments enhance tax enforcement and compliance?
- How large are the aggregate gains from infrastructure investments at the local level?
- How large are the benefits from more compact cities, and what policies can incentivise this?
- What are the general equilibrium effects of increasing the housing stock?
- Is the current spatial configuration of a city (such as the location of ports, markets and schools in central areas) efficient given the current urban organisation and the opportunity cost of allocating that land to other purposes?
- What zoning or land use planning policies could improve the current and future spatial configuration of cities, given that so many of the world's cities have yet to be built?
- How can cleaner energy and transportation systems be built in cities and what impact will they have on living standards and productivity?
- How will climate change affect cities and how can citizens and firms be insulated against its effects?

Energy and environment

Main themes of research under *energy and environment*

Access to energy

- Impact of energy access on firms and households
- Energy market design
- Political economy of energy supply

Global externalities from energy consumption

- Climate change mitigation and energy policy
- Adaptation to climate change and public goods
- Innovation and diffusion of green technologies

Local externalities from energy consumption

- Consequences of pollution on health and human capital
- Willingness-to-pay for air and environment quality
- Governance and regulations

The path to economic prosperity requires the consumption of large amounts of energy. Americans consume an average of 12,000 kWh per year, Indians less than 1,300 kWh, and Ethiopians a meager 70 kWh – just enough to power a 30-watt bulb for seven hours a day. Low-income countries will not grow out of poverty if they only provide enough energy to supply a single lightbulb for each citizen. More than a billion people, mostly in South Asia and sub-Saharan Africa, still live without reliable and affordable energy.

How can energy policy promote economic development? Since the first industrial revolution, key drivers of economic growth such as mechanisation, transportation, and electrification, have been powered by fossil fuels. This model has generated negative externalities from the beginning (Beach and Hanlon 2017), and their accumulation over time has dire consequences today. Reliance on fossil fuels increases the risks of disruptive climate change while also generating local pollution that causes people to lead shorter and sicker lives (Greenstone et al. 2015; Jacobson 2015; WHO 2016, Burgess et al. 2017). Most of the future growth in energy consumption will occur in developing economies (Wolfram et al. 2012) causing damage to health but also to growth and economic development around the world (IPCC, 2014). For this reason, the energy use and the environment must be considered jointly, not in isolation from one another. Increasing access to energy is essential to generating the economic growth needed to eliminate extreme poverty by 2030. The growth needed to reduce poverty will generate harmful environmental externalities if the right policies are not in place and what constitutes “right” will vary around the world depending on factors like income and the existing climate.

This tension between improved energy access for growth and mitigating the externalities from growth is at the centre of the IGC research programme on Energy and Environment. We will support research in three main areas.

The first is **energy access**: how will the last billion get access to energy, and what benefits will it bring for their livelihoods?

The second is **climate change mitigation and adaptation**: what are the most effective policies for developing countries to mitigate emissions in the energy sector and adapt to global climate change?

The third is **minimising local environmental damage**: in countries with weak enforcement capacity, how can environmental regulations reduce the local harms from energy consumption?

Cutting across these three areas of research are the core themes of technology and political economy. New technologies can help provide access to inexpensive and reliable energy as well as limit the negative environmental side effects of energy consumption. But these technologies cannot just be invented, it is critical that people actually want them. Fighting climate change will need both innovation and the transfer of existing technologies to developing countries. Whole new energy and transportation systems will have to be developed. Likewise, the state plays a central role in energy markets in most developing countries, which means that political forces are never far away. How energy is priced and who gets access to energy depends on political factors. Strategies for improving environmental quality are intertwined with political incentives.

Our first main area of research concerns the relationship between energy access and economic growth. The starting point for this agenda is understanding the demand side: how households and firms value and use energy (Lipscomb et al. 2013, Aberese, 2017; Lee et al. 2019). While a growing literature has documented the impact of energy access on firm performance and household welfare, research is needed on the long-term impact of energy provision on households and firms, as well as the general equilibrium effects of expanding access. Do energy investments crowd-in private investment and growth? More generally, we need to understand better the appropriate role of energy access in strategies for pro-poor growth.

Energy access might be constrained by demand but also by supply side policies that undercut the profitability of serving poor customers (Burgess et al. 2019). We need to deepen our understanding of the optimal design of energy markets in developing countries. Research in this area will encompass the distribution side of the energy system and the generation and transmission of energy, all of which are often heavily controlled by the state. The politics of energy distort both the demand and supply of energy and may limit access. If research is to have an impact on energy policy, it must consider the constraints that derive from equity, redistribution and political concerns as well as governance failures. For example, a whole range of subsidies, from generation to distribution, have crept into energy supply. Beyond electricity pricing, the design of financial and institutional structures that promote investment plays a central role. A parallel question is how redistribution can be achieved through instruments other than the mispricing of energy. Having prices reflect the social costs of different forms of energy would reduce the externalities from energy consumption, but more research is needed on how this can be done in less regressive and more politically feasible ways.

How to address global externalities from energy consumption represents the second main area of research. Working out ways of reducing greenhouse gas emissions whilst expanding energy access represents a major challenge. We need to think about what policy instruments can be used to promote low carbon energy sources, how the prices of different sorts of energy can be set to reflect their social costs of consumption, and how various policy instruments, such as cap-and-trade systems and carbon taxes, can be used to incentivise carbon emission reductions. Addressing the intermittency problem faced by renewables through for example, regional market integration, improving demand-side management and energy efficiency and working out how to expand investments all require significant research effort. Understanding what drives innovation and diffusion of green technologies (e.g. solar) is particularly important as the adoption of cleaner energy, transportation systems is central to mitigation. On adaptation, we need to design policies that help populations become less dependent on forms of employment and production, such as agriculture, that will be adversely affected by climate change. We will also support research on the set of public and financial services that are needed to support climate change adaptation and help people in developing countries cope with the impact of climate change. Part of this will link to the work on social protection and

climate change under our state theme. Importantly, mitigation and adaptation are intertwined: we need to find ways of reducing emissions that are complementary to efforts to adapt, e.g., with an energy mix that is resilient in moments of climate change-induced distress. More research is needed on how these complementarities can be adequately incentivized.

Minimising local environmental damage is our third main area of research. Developing countries today have perhaps the most acute air pollution problem in world history and the associated costs can be staggering (Chen et al. 2013). Local pollution and climate change are not issues that operate in isolation. Harnessing rising concerns over local pollution represents an indirect but potentially powerful means of tackling climate change, not least by linking the short-term benefits of pollution reduction to the long-term benefits of climate action. Research on measuring the impact of pollution on outcomes such as health, human capital, and the productivity of firms and individuals is critical here (Ebenstein et al. 2017). This research raises awareness and can affect willingness to pay for environmental quality, thus improving the chances that policies to reduce local pollution become politically salient and hence implementable. Greater awareness can also change the social norms and values surrounding environmental quality and help shift us to an equilibrium where there is widespread political support for tackling local pollution – and climate change. We need research on how this can be achieved.

Our final area of interest in this area concerns the design of environmental regulations. Here the gap between de jure and de facto environmental regulation is particularly wide in developing countries. Particularly important are regulations to constrain emissions, pollution and environmental degradation. Limiting these externalities becomes more important as countries grow. Here there is a considerable need for work identifying effective and politically feasible policies. One important question for research is how institutions and policies can be strengthened to ensure stringent enforcement (including via new monitoring technologies). Another is how policymakers can be made more accountable for these costs by designing appropriate governance structures and policies.

Research questions under *energy and environment*

- What are the direct gains to households and firms of energy access?
- What are the external returns to energy access? What are the sources of external returns?
- How does willingness to pay for access depend on scale, reliability and quality of supply?
- What are the most cost-effective strategies for increasing energy access for the poor?
- How does the hybrid construction of energy markets in developing countries, with both state and private actors, affect their efficiency?
- How can market rules, public investments in infrastructure and institutions affect energy efficiency?
- How do supply-side politics affect investment, contracting and the efficiency of energy markets?
- How do demand-side politics affect tariffs, reliability, and the benefits of energy access?
- What reforms can facilitate a successful transition from the “electricity is a right” equilibrium to one where electricity is treated as a private good? What are the welfare consequences of such reforms?
- Can unconditional transfers effectively replace energy subsidies? How can unconditional transfers be targeted to compensate the losers from energy subsidy reform?
- Can markets (e.g., cap-and-trade) be used to incentivise carbon emissions reductions in developing countries?
- What are the gains from market integration in managing intermittency?

- What is the magnitude of credit constraints and capital market imperfections in the adoption of renewables? Are there efficient solutions?
- What are the efficiency consequences of alternative mechanisms (e.g., feed-in tariffs, auctions, technology mandates, capital subsidies, etc.) to increase the use of renewables?
- Are there informational or other barriers to individuals and firms making energy efficiency investments in developing countries?
- How can trade, growth and structural change help households and firms adapt to the effects of climate change?
- How can innovation and diffusion of green technologies be encouraged?
- What actions by the state might encourage the adoption of cleaner energy and transportation systems in developing countries?
- What are the necessary public goods to aid adaptation to climate change for households and firms?
- How should insurance markets, financial markets and transfer schemes be designed to help vulnerable households, particularly in agriculture, adapt to the effects of climate change?
- What is the impact of pollution on productivity?
- What is households' willingness to pay for environmental quality?
- What causes willingness to pay for environmental quality to change? Do public information campaigns alter willingness to pay?
- How can regulations meant to reduce local pollution emissions and improve environmental quality work when monitoring and enforcement are weak?
- What measures are effective for conserving natural assets such as forests and oceans?

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