Place, Productivity, and Prosperity

Revisiting Spatially Targeted Policies for Regional Development

Arti Grover, Somik V. Lall, and William F. Maloney

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Foreword

The prospect of better opportunities, better services, and protection from the effects of conflict and climate change influences where people choose to live. More and more, that choice is to move to cities, a decision that has major implications for a person's standard of living, particularly in developing countries. However, many are unable to make that choice or are bound by strong cultural ties to their homelands.

In the most prosperous areas of low-income and middle-income countries today, living standards—measured by household consumption—are more than twice that of similar households in economically lagging areas. In high-income countries, the difference is only 50 percent higher. Large and sustained gaps in living standards in different locations *within* countries have led to increased concern, even alarm, in policy circles about "places left behind."

Place-based policies—spatially targeted interventions aiming to boost economic development in particular geographical areas—are increasingly being adopted around the world to shore up fortunes in places left behind. Their results, however, have fallen short of expectations. When spatial policies fail to deliver desired outcomes as fully as promised, leaders are entitled to ask: Why? What went wrong? And how can such disappointments be prevented?

As with the previous five volumes in the World Bank Productivity Project, *Place, Productivity, and Prosperity: Revisiting Spatially Targeted Policies for Regional Development* provides a new analytic framework, based on recent advances in economic geography, to help policy makers translate new research into effective programs when choosing among place-based policies or other options that might work better.

The approach developed in this volume should help policy makers arrive at a disciplined view of a place's economic potential—one that recognizes the limits of the government's ability to design and execute programs. It can help them weigh alternatives to place-based policies, such as policies that facilitate migration, skills development, social transfers, and safety nets. In addition, it will help locate place-based policies within the broader context of national productivity and structural transformation policy. It will also

support the rise of vibrant urban agglomerations and, most importantly, put their citizens at the center of development.

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Preface

Productivity accounts for half of the differences in gross domestic product per capita across countries. Identifying policies that stimulate productivity is thus critical to alleviating poverty and fulfilling the rising aspirations of global citizens. In recent decades, however, productivity growth has slowed globally, and the lagging productivity performance of developing countries is a major barrier to convergence with income levels in advanced economies.

The World Bank Productivity Project seeks to bring frontier thinking to the measurement and determinants of productivity, grounded in the developing country context, to global policy makers. Each volume in the series explores a different aspect of the topic through dialogue with academics and policy makers and through sponsored empirical work in the World Bank's client countries.

Place, Productivity, and Prosperity: Revisiting Spatially Targeted Policies for Regional Development, the sixth volume in the series, takes up the geography of productivity within countries—the regional inequalities in production and poverty, and their persistence over millennia. These issues take on new salience as climate, technology, and trade shocks leave once prosperous areas behind, generating demand for specifically targeted and costly spatial policies whose track records are, fairly viewed, mixed. In its anchoring of discussion of the key drivers of spatial economic patterns in novel empirics from the developing world, and development of a new approach to assessing spatial policies, the team aspires to fill an important void in the existing development literature.

This volume is unique in its tight links with both academia and frontline World Bank staff. The core of the assessment framework (chapter 6) through which spatial policies are viewed was contributed by Gilles Duranton (University of Pennsylvania) and Anthony Venables (Oxford University), acknowledged experts in the field of spatial economics. They, in turn, joined the team meeting with Bank task leaders to understand how the leaders designed and assessed projects on the ground. The two-way learning process has ensured that the approach is both solidly grounded conceptually and in the current empirical literature and is relevant to policy makers everywhere.

Somewhat surprisingly, the finding of minimal agglomeration externalities in many developing country cities brings us full circle to the first volumes in the series on innovation and productivity; fundamentally, altering spatial patterns requires an underlying

structural transformation that, in turn, requires a well-functioning enabling environment along with the human and entrepreneurial capital to populate it. Building physical infrastructure may in many cases be necessary, but it will rarely be sufficient.

This book is a joint effort of the Urban, Disaster Risk Management, Resilience, and Land Global Practice of the Sustainable Development Vice Presidency and the Equitable Growth, Finance, and Institutions Vice Presidency.

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Other Titles in the World Bank Productivity Project

At Your Service? The Promise of Services-Led Development. 2021. Gaurav Nayyar, Mary Hallward-Driemeier, and Elwyn Davies. Washington, DC: World Bank.

Harvesting Prosperity: Technology and Productivity Growth in Agriculture. 2020. Keith Fuglie, Madhur Gautam, Aparajita Goyal, and William F. Maloney. Washington, DC: World Bank.

High-Growth Firms: Facts, Fiction, and Policy Options for Emerging Economies. 2019. Arti Grover Goswami, Denis Medvedev, and Ellen Olafsen. Washington, DC: World Bank.

Productivity Revisited: Shifting Paradigms in Analysis and Policy. 2018. Ana Paula Cusolito and William F. Maloney. Washington, DC: World Bank.

The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up. 2017. Xavier Cirera and William F. Maloney. Washington, DC: World Bank.

All books in the World Bank Productivity Project are available free of charge at https://openknowledge.worldbank.org/handle/10986/30560.

Acknowledgments

About the Authors

Arti Grover is a senior economist at the World Bank and leads the analytical agenda on supporting firms to deal with climate change and other shocks such as the COVID-19 (coronavirus) pandemic. In addition to the current volume of the World Bank's Productivity Project, she authored *High-Growth Firms: Facts, Fiction, and Policy Options for Emerging Economies*. Her research covers a range of topics, including economic growth, firm dynamics, productivity, trade, and spatial development. She has published two books on trade in services and more than 30 articles in top peer-reviewed journals, as chapters in books, or as World Bank policy research papers. Based on solid empirical evidence, she designs and implements innovative firm support lending operations in developing countries. Before joining the Bank in 2009, Arti was a doctoral Fulbright fellow at Princeton University, an assistant professor at Delhi School of Economics, and a research associate at the Harvard Business School and the Wharton School of the University of Pennsylvania.

Somik V. Lall is lead economist for the Equitable Growth, Finance, and Institutions Vice Presidency and head of its climate economics and policy team. He was the World Bank's global lead on territorial development solutions and a lead economist for urban development in its Urban, Disaster Risk Management, Resilience, and Land Global Practice. He is a recognized expert on job creation and productivity in cities, development of lagging areas, and enhancing economic outcomes with transport connectivity, and advises national and subnational governments on key policy issues. Somik has led the World Bank's global research program on urbanization and spatial development and founded the Urbanization Reviews program. He led a Global Solutions Group that focuses on developing spatially coordinated multisector investments to support development of specific areas. The group is actively engaged in 45 countries worldwide.

William F. Maloney is chief economist for the Latin America and the Caribbean Region of the World Bank. He was previously chief economist for the Equitable Growth, Finance, and Institutions Vice Presidency; chief economist for trade and competitiveness; and lead economist in the Development Economics Research Group. Before joining the World Bank, he was a professor at the University of Illinois Urbana-Champaign. He has published in academic journals on issues related to international trade and finance, developing country labor markets, and innovation and growth, and has contributed to several flagship publications of the Latin American division of the Bank.

Most recently, he coauthored *The Innovation Paradox: Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up* and *Harvesting Prosperity: Technology and Productivity Growth in Agriculture* as part of the World Bank Productivity Project series, which he directs.

Abbreviations

BRI	Belt and Road Initiative
BRT	bus rapid transit
CFZ	Coyol Free Zone (Costa Rica)
CONAVI	National Housing Commission (Comisión Nacional de Vivienda) (Mexico)
COVID-19	coronavirus disease 2019
DVA	domestic value added
EPZ	export processing zone
EU	European Union
GDP	gross domestic product
GQ	Golden Quadrilateral (India)
GVC	global value chain
ICT	information and communication technology
LED	local economic development
MCMV	Minha Casa, Minha Vida (Brazil)
OECD	Organisation for Economic Co-operation and Development
PAD	project appraisal document (World Bank)
PER	public expenditure review (World Bank)
PVH	Phillips-Van Heusen
R&D	research and development
SEZ	special economic zone
TFP	total factor productivity
TFPQ	physical total factor productivity
TFPR	revenue total factor productivity
TFZ	Tangier Free Zone (Morocco)
WECARE	Western Economic Corridor and Regional Enhancement (Bangladesh)

Executive Summary

Economic Geography Bites Back

The year 2008 was important for the field of economic geography: Paul Krugman won the Nobel Prize in Economics, partly for his work conceptualizing the spatial allocation of economic activity, and the World Bank published a *World Development Report* called *Reshaping Economic Geography*. While these and other efforts were influential in highlighting long-standing issues of spatial inequity and missed regional growth opportunities, the financial crisis diverted policy attention to more immediate issues of resuscitating national economies. This volume, *Place, Productivity, and Prosperity*, is similarly launched in a traumatic year, but geography this time is a central and inescapable concern. The COVID-19 (coronavirus) pandemic has presented a humanitarian and economic crisis of historic proportions that at once reminds us of our global connectedness while highlighting how levels of development that differ between and within countries map directly to mortality. The "code red" alert issued by the Intergovernmental Panel on Climate Change concerning human-driven global warming explicitly acknowledges the geographical inequity of the impact of climate change: high temperatures, rising sea levels, and flooding will make entire regions suffer economically or even become uninhabitable. All this is occurring against a backdrop of concerns about automation and globalization having undermined the comparative advantage of some regions, increasing unemployment and misery, and international migration that is seen as posing a threat to local jobs and identities. And at an even deeper level lie centuries-old disparities of well-being within countries.

All these concerns can translate to political shifts and tensions with unclear consequences. As the economic center of gravity in India shifts from traditional centers of political power in the north to increasingly prosperous regions in the south, for instance, it is unclear how potentially heightened tensions will be resolved. The dimming fortunes of the Midland regions of Great Britain is thought to have been influential in the vote to leave the European Union. Those "left behind" in the American Great Lakes region and South have led to the intensification of populism in the United States.

Historically, the inequalities and productivity differentials emerging from the processes of economic concentration, as well as the inevitable dislocations of creative destruction, have been mitigated by diffusion of capital and technology to the hinterland, as well as migration from lagging and left-behind regions to urban areas with

high levels of productivity. Diffusion and migration, alongside social transfers to ameliorate the often-lengthy transition processes, have led to the convergence of subnational regions in advanced economies. However, three emerging dynamics are dampening such convergence across cities and regions of developing countries.

First, research done for this volume suggests a pattern of "premature urbanization" in developing countries. People are concentrating—but not because industrial dynamism is attracting them. They are simply crowding together. This raises the prospect of "sterile agglomeration"—concentration without productivity gains.

Second, new analysis on internal migration documented for this volume shows that mobility in high-income countries is twice that in low-income and middle-income countries. While migration permits individuals to seek out better lives in more prosperous areas, the pace and magnitude of internal migration appears to be much lower in developing countries than in developed ones. Even if migration was very fluid, the finding on sterile agglomeration raises the question of whether more people migrating to cities to take advantage of better provision of services such as health care and education merely moves a problem of human needs from one place to another. This problem highlights the salience of broadly stimulating agricultural productivity and enhancing human capital, but also emphasizes that more generally, the long-term amelioration of poverty in lagging regions requires advancing the overall national agenda of structural transformation and productivity growth. Only then will there truly be more productive places for people to move to.

Third, the paths of spatial development and structural transformation followed by many European countries and parts of North America over the past two centuries may no longer be available to today's developing countries. When the advanced economies were young, transport costs were still relatively high, so urban agglomerations and nascent local industrialization arose in multiple agricultural regions, and the high costs of trade protected local industry (Henderson et al. 2018). Today, transport and communication costs have fallen well before structural transformation has advanced, so economic activity tends to agglomerate in relatively few, often coastal, locations. Technological progress is also a two-edged and disruptive sword. On the one hand, accelerated automation may displace unskilled labor across the globe, and increased connectivity may facilitate rapid offshoring—again, leaving pockets of unemployment and poverty (Hallward-Driemeir and Nayaar 2019; Maloney and Molina 2019). On the other hand, the decline in connectivity costs through digital means is permitting new forms of national integration.

The Need to Rigorously Assess Proposed Place-Based Policies

These broad trends have given rise to increased concern, even alarm, in policy circles about dysfunctional cities or "places left behind." Spatially targeted interventions are

increasingly advanced with varying motivations. On the grounds of economic efficiency and growth, there is a desire to exploit the "untapped potential" of lagging regions, implicitly assumed to be underperforming because of market failures or barriers to a more efficient allocation of capital and technology. Beyond efficiency considerations, the political and social value of place-specific, job-creating policies are being championed, along with an emphasis on the intrinsic value of work that enhances a person's well-being. Finally, concerns abound that sufficiently pronounced and sustained territorial inequalities can sow social discontent, tensions, and political unrest, which in turn can fuel the rise of populist movements, leaders, and parties.

Place-based policies—spatially targeted interventions aiming to boost economic development in particular geographical areas—are being increasingly adopted around the world, but their results too often fall short of expectations. As widening spatial inequalities leave billions of people ever farther behind, policy makers in many developing countries seek to respond with spatially targeted interventions. Typically involving expensive new infrastructure, such policies are justified by appealing to a need for socially inclusive growth and economic opportunity in lagging areas. So, when spatial policies fail to deliver these desired outcomes as fully as promised, leaders are entitled to ask: Why? What went wrong? And how can such disappointments be prevented?

How can policy makers get better at predicting which spatially targeted proposals are poised for success and which are doomed to failure? Research shows that place-based policies to create transport corridors or special economic zones, to revitalize shocked regions, and to kickstart local industry can succeed in some cases—yet many others misfire. For example, of the seven special economic zones created in Peru since the 1990s, only one has been even mildly successful in generating jobs and investment (World Bank 2016; Rodríguez-Pose and Wilkie 2019). By contrast, special zones in the Dominican Republic have had better outcomes, in part through their ease of access to US markets.

The divergent outcomes of spatially targeted interventions in different places and with different designs are not random, nor are their causes mysterious. While some failures reflect poor execution, most reflect a lack of initial viability and can be rationally explained. Generally, where economic fundamentals are already promising, a place-based policy may be well worth considering. But in areas that lack endowments to make them competitive in a changing economy, place-based policies may not be the most efficient way to help residents improve their prospects, and alternative policies (such as migration support or direct subsidies) could help them more assuredly and less expensively. Finally, even in places whose existing endowments may warrant some type of place-based policy, variations on the design may be expected to yield different economic and social outcomes.

Place, Productivity, and Prosperity presents a new analytic framework, based on recent advances in economic geography, to help policy makers translate new research into effective leadership when choosing among place-based policies or other options that might

work better. Decisions about proposed spatially targeted interventions can be vastly improved by a thorough prior analysis of the challenges that face lagging areas—beginning with an unsparingly honest assessment of an area's current economic endowments and constraints and continuing with projections of the direct and indirect effects of each proposed intervention. Such an ex ante analysis can help policy makers confidently estimate and compare the economic and social benefits of various policy designs. It can also illuminate the true costs of the intervention, including the opportunity cost of adopting a place-based policy as opposed to other inclusive options. Finally, the analysis can specify which complementary policies will be needed for a spatial intervention to succeed: complements that, if not yet present, will add to the policy's overall cost.

Using this framework, policy makers can start with a clearer vision of how each option and alternative is likely to play out, and they can use this understanding to set priorities and build them into the design of the policy. The framework can help steer away from spatial investment that will be wasteful in the event a project inherently lacks viability. It can help policy makers determine which complementary packages will be needed to make a potentially viable place-based policy work in practice. And, when the framework is used to compare the impacts of several variations on a given place-based policy design, it can illuminate the stakes of each alternative for economic growth and productivity and for social value—locally, regionally, and nationally.

The framework for evaluating place-based policies may be summarized here as a three-step heuristic process: *explain* what is going wrong; *estimate* effects likely to result from a place-based policy; and *ensure* that critical actors can be aligned as needed. Before adopting a place-based policy for spatially inclusive development, policy makers should do the following:

1. *Explain* the economics behind the spatial inequality at issue. A technically up-to-date analysis of challenges affecting the target area should be prepared. The analysis needs to be grounded in economic geography and in data on the constraints to growth, productivity, and mobility—the fundamentals that research tells us to look for. These factors can reveal what impedes economic development in a particular place.

2. *Estimate* the effects of proposed place-based policy solutions—both the direct and indirect effects. If the explanation of fundamentals in step 1 gives policy makers good reasons to believe that a place might be made economically viable, policy options for overcoming its economic challenges should be identified, and the likely outcomes of each potential policy design should be quantified. These quantitative projections should include a thorough analysis of needed complementary factors and their cost, with a transparent, readily understood account of the main assumptions and calculations. A clear summary of the math underpinning both the direct and the indirect quantity effects attributed to the place-based policy (when combined with required complements) should be provided. It is also essential to

define the proposed policy's wider social value. Comparisons among policy options should not be restricted to place-based policies. They should compare variations on a given place-based policy design against not only variations in other place-based policies, but also against policy alternatives that are not spatially targeted (such as support for migration, and subsidies or direct transfers).

3. *Ensure* that all key actors can be aligned as needed to put the place-based policy and complementary policies into effect. If the estimates in step 2 point to a potentially viable place-based policy package, assurances are needed from all actors who must implement this package that they will be on board. Strong coordination is critical to ensuring that complements will be in place when needed—not only those that are spatially or locally determined, but also any that are nonspatial. If missing complements are not provided as required by step 2, the place-based policy is sure to fall short of its estimated outcomes.

A prior analysis grounded in economic geography can improve the decision-making concerning spatial interventions by focusing more systematically on the actual drivers of economic inequality across places. Extensive empirical and theoretical research has established certain basic facts about the causes of spatial inequality, with vital implications for decisions about proposed place-based policies. The broadest lesson for policy making is that place-based policies may promote spatial inclusion if they go hand in hand with economic transformation—but without such transformation, they underperform. The lessons from *Place, Productivity, and Prosperity* can substantially advance the World Bank's ongoing efforts to appraise place-based policy proposals comprehensively before they are implemented.

To be sufficiently rigorous, an ex ante analysis must estimate direct and indirect quantity effects, and it must further define the *social value* of the intervention. Direct effects comprise goods and services delivered and used. Indirect effects include changes in private investment, in job creation, in regional inequalities, and in other outcomes that reflect shifts in private sector behavior resulting from the place-based policy. The combined projections of direct and indirect effects estimate the induced changes to real economic activity, compared with a scenario in which the proposed place-based policy is not adopted. Estimating the direct effects is simple in principle, but doing the same for indirect effects is a more technically complex task.

Without a systematic economic analysis, estimates of the indirect effects of spatially targeted policies and their social value are likely to be overly optimistic, leading to wasteful expenditures and disappointing outcomes. For instance, an optimistic analysis of indirect effects may overstate the likely stimulation of new private sector activity by linkages created along a new transport corridor or a special economic zone. It may exaggerate clustering effects and spillovers. And it may not anticipate the true cost of underused inputs. It can be even more difficult to predict and compare the social value of place-based policies when it involves externalities or priorities that elude

market-based analysis. Policy makers are often hopeful that place-based policies will support lagging areas and help people, but this hope can lead them to overlook risks that an economic analysis would reveal. And when place-based policies are favored by special interests—individual, industrial, or regional—policies may be adopted that are totally untethered from economic logic. To tame optimism bias, to clarify the stakes of policy choices by valuing each type of desired effect on its own terms, and to transcend purely political concerns, economic analysis is vital.

Realistic prior appraisals of place-based policy proposals are all the more urgent because countries' fiscal capacity is limited, and such interventions can have lasting implications for a country's spatial and economic development. Furthermore, as the volume illustrates, narrowing spatial economic inequalities is inherently difficult in developing countries with existing urban agglomerations. A developing country government faces many competing and insistent claims for assistance and resources. Many public investments have large upfront costs, and any assets they create are likely to exist for decades. A piece of infrastructure created as part of a place-based policy today will impose trade-offs, path dependencies, and ongoing operating costs. These legacies will continue to affect economic activity and policy options long into the future.

As a rule, until the proposed spatially targeted intervention has been vetted thoroughly for compatibility with the economic endowments of a place, it should not be treated as viable. Leaders ought to expect that every place-based policy adopted in defiance of economic fundamentals, or without a sound economic analysis, will end as a costly failure.

A New Analytic Framework for Assessing Place-Based Policies

The analytic framework presented in chapter 6 of *Place, Productivity, and Prosperity*—and developed with full technical specificity in Duranton and Venables (2018), for this volume—is dedicated to estimating the impact of place-based policies through procedures that are rigorous but flexible. The framework is sufficiently complete to measure a place-based policy's value comprehensively, assuming that data are available to measure the direct and indirect quantity effects. Yet the framework is also broad enough to be relevant and adaptable to a variety of circumstances. Even in cases where quantification is challenging, the framework can enhance decision-making by imposing discipline and consistency on the process—grounding questions about the likely impact of the proposed place-based policy and helping to buffer policy discussions against political pressure.

The critical point of departure for a place-based policy appraisal is a clear narrative of the main problem, showing whether it is the kind that can be addressed effectively with spatial targeting. Often the primary motive for place-based policies is to create new jobs through increased investment and economic activity. But places vary in their potential for economic growth and, indeed, their fundamental economic viability. It is thus imperative that policy makers reason rigorously and transparently about barriers to growth and about the best ways to address them. Even if a strong economic case can

be made for a particular place-based policy, what a developing country will need to do more broadly to realize spatially inclusive growth is to *harness market forces* for productivity and *strengthen the institutions* that enable spatial transformation.

Step 1: Explain the Economics

The analysis starts by asking whether an area is potentially viable—given its economic endowments—and is struggling chiefly because of market failures and distortions that a place-based policy can feasibly address. If a lagging area has sufficient local endowments, something must be driving its current stagnation. While some of the key drivers will have spatial aspects, not all of them will be self-evidently traceable to local gaps or constraints. Some will inevitably be shown to arise from weak market linkages elsewhere, from market failures that partly reflect provincial or national policies, or simply from a broad lack of fundamentals.

To explain the area's specific challenges, the analysis looks at how three dynamics—agglomeration, mobility of people, and economic distance—may be converging to drive spatial economic inequalities. Understanding these dynamics can clarify why a place has failed to thrive, and it can also indicate what is required for a place-based policy to succeed. While the three dynamics interact with one another, each is influenced by distinct sets of spatial and nonspatial factors.

1. *Agglomerations* are dense concentrations of people and economic activity that drive national economic productivity and growth. But they also drive spatial inequality because they have a self-perpetuating competitive advantage that prevents other areas from catching up.
2. *Mobility of people* is related in complex ways to agglomeration dynamics. High mobility, even as it adds to the growth of existing urban agglomerations, can narrow spatial inequalities in living standards. But mobility is low in many developing countries: the reasons can include skill mismatches, a lack of finance and information, a reluctance to sell land at a loss, and an emotional attachment to place. Public policy can also hinder migration, whether through explicit restrictions on mobility or through laws and regulations that distort land and housing markets.
3. *Economic distance* refers not only to physical distance but to many other variables that reduce the efficiency of connections to markets and trade hubs, limiting the ability of an area to attract investment. While hard infrastructure (such as roads) has often loomed large in policy making, many other challenges can widen economic distance. Examples include information frictions, long transit times, high logistics and trucking costs, and the market structure of the transport industry.

If a place with at least some endowments is not thriving economically, a likely reason is that these key dynamics are working against it. What is inhibiting local economic

development and job creation? The inherent competitive disadvantage of lagging areas compared with leading ones—the strong pull of existing agglomerations, as opposed to the drag of poorly endowed areas with low productivity—is probably not the whole story. The mobility of people may be limited by migration barriers. And the area's economic distance from markets may be compounded by various factors beyond mere physical distance.

After the fundamental causes of market failure have been diagnosed, the next priority is to ask which policies—whether place-based or otherwise—are best suited to addressing them. Rather than always reaching first for place-based policies, leaders can often meet challenges by expanding access to opportunities through people-based policies, or by reducing market distortions through national institutional reforms (Lall 2009). For example, if unclear titling or land rights hamper private housing and infrastructure investment, the first solution should be to clarify these rights. Too many governments are neglecting such people-based and institutional measures while embracing place-based policies, which often introduce new spatial distortions in place of old ones. A recent study of Middle Eastern and North African countries found that institutional reforms accounted for as little as 12 percent or even 1 percent of government expenditure, whereas spatially distortive place-based policies absorbed as much as 50 percent to 77 percent (World Bank 2020).

While a place-based policy seeks to narrow spatial inequalities by creating jobs where people live, economic analysis will often suggest that a more efficient approach is to build people's skills and to let them migrate to cities—the agglomerations that are most likely to offer them opportunities. This volume shows that developing country cities are underachievers: compared with cities in advanced economies, those in developing countries do little to drive national economic growth. But policy makers have several ways to lay the foundations for cities to advance toward needed structural economic transformation. One is to nurture human capital with training and skills development. Another is to lower mobility barriers, enabling markets to allocate labor more efficiently across space. Other central priorities are to invest in resilient infrastructure, to clarify and secure property rights, and to strengthen urban planning to accommodate growing city populations.

In circumstances where the consideration of a place-based policy is motivated by economic rationales, policy makers should look for proposals that build on areas that are currently dynamic. Linking lagging areas to leading ones is less risky than an effort to generate growth without any connection to existing productive agglomerations.

Step 2: Estimate the Effects—Direct and Indirect

Once policy makers have empirically understood the key challenges and have determined that a place-based policy may be warranted, the next step in assessing and comparing place-based policy proposals is to estimate the effects of each intervention,

distinguishing between direct and indirect effects. This step begins with full lists of direct quantity changes, indirect quantity changes, and social value. Itemizing all these effects—the changes that would not be likely to occur without the place-based policy—clarifies the mechanisms by which the policy is expected to work. Direct quantity effects relate to the use of goods and services, while indirect effects include any induced increase in private investment. Social value includes those effects that are deemed desirable apart from market considerations, independently of market failures or externalities that a place-based policy may alleviate (or potentially exacerbate).

Here, policy makers must develop a theory of change that relates the place-based policy to the needs of the lagging area and the wider economy, identifying the most critical outcomes and elevating them over those that matter less. Which projected effects are the most needed and desired, and which are of secondary importance? Does the place-based policy package target each outcome directly, indirectly, or both? And, how? A key part of this exercise is to determine which market failures and distortions are the most binding, as opposed to those that matter more in theory than in practice. Such determinations are easiest in cases where some markets function well, some infrastructure is already in place, and so on.

All complementary policies included in the proposed place-based policy package must be included in the inventory of direct and indirect effects. Among the needed complements to a place-based policy, the most important are likely to be those that are required for the place-based policy to induce the desired indirect effects on private investment. Firms' location and investment decisions are costly, typically incurring sunk costs and long-lasting assets. Such decisions must be based on confident expectations, supported by the presence of preconditions related to an area's natural characteristics, the policy environment, the business ecosystem, and so forth. Special economic zones are particularly subject to these preconditions—so they call for caution, and more so if located far from urban centers: good roads for exports will not make up for a lack of reliable electricity or of human capital. Such economic zones are certain to fail unless they are well integrated with large, vibrant urban economies or with wider trade systems that can reliably supply them the needed inputs. Whatever complements are needed for a place-based policy to work, their provision needs to be ensured before the combined package of spatially targeted interventions can be approved.

The account of indirect effects needs to include general equilibrium and displacement effects. General equilibrium effects are overall, long-term quantity changes—possibly in places far removed from the target area—brought about by a place-based policy's indirect effects. If changes in labor and capital amount to a spatial reshuffling, merely displacing investment from one area to another, then the policy adds nothing to the overall economy. Such zero-sum changes can occur through competition for a project, given that a factory can exist in only one of two possible places; or through a product market with inelastic demand, in which rising supplies anywhere must reduce supplies somewhere else (an effect most pronounced for nontradable goods sold only

in a local or national market); or through factor markets where a fixed supply of capital or labor implies that an expansion in one activity causes a contraction in another. General equilibrium effects cannot always be precisely identified, but the market valuation principle requires establishing both the value of a factor in its new use and the opportunity cost of using it.

This step concludes with a valuation of direct and indirect quantity changes, so far as quantification is possible. Quantifying direct effects is usually a simple matter and a central part of project appraisals. For example, assessing a proposed transport intervention would involve estimating the market value of time saved, and perhaps that of reduced wear and tear on vehicles. Quantifying indirect effects is less simple because these effects have a positive net value only where a place-based policy reduces market failures and distortions—that is, where it adds efficiency by reallocating resources from a lower-value to a higher-value use. If it does not, the result is a zero-sum displacement effect (or, worse, a negative net value). Identifying indirect benefits thus requires an understanding of the existing distortions or market failures that the place-based policy will mitigate. The task of the appraisal is to identify the relevant distortions or failures and to place a value on redressing them.

If an effect cannot be quantified, other measures should be taken to protect the policy decision from being guided by tenuous and overly optimistic assumptions about the effect and its value. Ideally, even the simplest road project would be preceded by a full appraisal, including a robust ranking of projects by their social value added. But in practice, while direct effects can often be quantified, doing the same for indirect effects is likely to be expensive and time consuming—and it may be too complex a challenge even for the governments in advanced economies. In sum, while policy makers should quantify everything possible, they can default to two rules of thumb, which are at least more attentive to fundamentals than the procedures often used by governments today:

1. *When projecting a place-based policy's direct and indirect effects, test the sensitivity of the estimated benefits to the assumptions underlying the analysis—and consider the implications if the assumptions are false.* Given the difficulty of quantifying many elements in the appraisal, testing the sensitivity of the cost-benefit analysis to assumptions, and looking at alternative scenarios can help policy makers rank potential projects. For instance, if a road project can pay for itself only through very large, indirect clustering effects on local industry, and if these effects may or may not emerge, this place-based policy probably should be ranked lower than the one with smaller attendant risks.

2. *Be brutally honest about the government's capabilities to diagnose, appraise, and implement a proposed place-based policy.* Governments have finite capabilities to appraise and execute policies, and this fact needs to be accounted for in a place-based policy assessment. Generally, the number of market failures that can affect a potentially viable area—and the resulting multiplicity of necessary policy

interventions—rises with distance from the frontier, even as the authorities' capacity to evaluate and implement policy declines. So not only is the spatial landscape subject to a vast inertia (in which certain regions simply lack viability), but the government is limited in its tools for assessing and implementing place-based policies. As a result, the design of policies that yield the highest returns if they are perfectly implemented is less important in practice than the effort to identify workable policy packages.

Step 3: Ensure That All Key Actors Will Coordinate to Deliver the Package of Place-Based and Complementary Policies

Having thoroughly assessed a place-based policy's likely effects—direct and indirect—and having identified the needed complements, policy makers must finally ensure that all the complements will be in place when they are needed. Policy makers should identify all the critical actors for implementing the complete place-based policy package, with assurances that these actors will coordinate and act.

A vital imperative is to provide explicit mechanisms for coordinating all key actors. Regional policies inevitably involve actors across government, including national government. Failures to synchronize among vertical tiers of government can result in an oversupply or undersupply of public goods and services—and horizontal failures to join forces with the federal government may lead to beggar-thy-neighbor policies (Bartik 2016) or bidding wars (Rodríguez-Pose and Arbix 2001).

International experience affords examples of various coordination approaches. First, a coordination mechanism should suit its function (broad-based or narrow). Second, territorial systems can benefit from both bottom-up and top-down cooperation instruments—though each type has risks that need to be managed. Third, because functions have different geographies, instruments should be flexible and be able to meet various needs (including the unforeseen).

Explicit protocols can prevent coordination failures that waste resources and fritter away momentum. Public expenditure reviews (PERs) have been used to track the flow of funds from different agencies, by various instruments, and to all recipients in the context of programs providing support to firms to promote innovation and the growth of small and medium enterprises. Chapter 6 of *Place, Productivity, and Prosperity* proposes a spatial version that would do the same to map resource flows to lagging regions, yielding a concrete mapping of national policy for regional development. Having proven their effectiveness at opening and grounding policy dialogue across ministries, PERs of innovation policies, for instance, provide a possible framework for analyzing the efficacy of existing spatial interventions.

Spatially targeted interventions ought to account for the limited capabilities of developing country governments. There is a spatial analog to the developing country

policy dilemma proposed in the *Innovation Paradox* (Cirera and Maloney 2017): the number of market failures that a potentially viable region suffers from—and hence the multiplicity of necessary policy interventions—increases with distance from the frontier, while policy capability to appraise and implement decreases. A prime example can be found in the Integrated Rural Development programs of the 1970s and 1980s in Colombia. These programs sought to bring together agricultural credit, extension, technical assistance, supply of inputs, and marketing assistance in a coordinated fashion, precisely to resolve multiple market failures holding back poor agricultural communities. They were appraised internationally and were asserted to pass the cost-benefit analysis. However, in the first phase of the Rural Development Investment Program, governments in some departments found it more politically compelling to give the separate components to different villages, thereby eviscerating the initial concept, and high-level bureaucratic competition impeded coordination. The second phase focused on more prosperous areas that already had several key complements well established.

Governments should partner with private sector agents—to generate information, help resolve market failures, and demonstrate the place-based policy's credibility. The agent can supply the much-needed technical knowledge and entrepreneurial expertise. It can provide a fixed point for agents to coordinate around. In addition, attracting a piece of a local or global value chain provides evidence about a region's viability: the need for missing complements, such as worker training programs, will quickly surface. In the event that a place-based policy cannot attract any private sector agent, policy makers should infer that the intervention is not viable.

Conclusion: Toward Better Prior Assessments of Place-Based Policies

For place-based policies to be used successfully, their target areas and desired outcomes must be identified through a systematic and objective prior assessment that is realistic in its goals and expectations. Policy makers must arrive at a disciplined view of a place's economic potential; they must acknowledge the limits of the government's ability to design and execute the policy; and they must fairly weigh alternatives to the proposed place-based policies (such as policies facilitating migration, skills development, social transfers, and safety nets) before adopting a spatially targeted intervention. For developing country governments with weak incentives and capacity to align actors across ministries, the number of complementary policies that can be feasibly coordinated as part of a place-based policy package—its dimensionality—may be limited.

Where lagging areas are affected by trade-related shocks or by climate change, policy makers should take a clear-eyed view of the longer-term viability of these areas—and must take special care to ensure that any place-based policies, if adopted, are supported by the needed complements. Human capital is critical: *skills and structural transformation are a requirement for successful spatial transformation*. Fundamentally, local economic development is driven by entrepreneurs—not by governments and not by infrastructure alone.

Any place-based policy package for a lagging area must therefore complement hard investments—infrastructure, special economic zones, transport corridors, or the like—with soft investments in worker skills and entrepreneurial abilities. Other vital complementary policies include financial access, trade facilitation, and fiscal incentives.

The analytic framework in *Place, Productivity, and Prosperity* can be used to assess place-based policy proposals in relation to existing spatial economic endowments and basic conditions for viability. Is the target area suitably located and endowed to link local production with the dense agglomerations that drive national economic growth? Will mobility dynamics favor or hinder the success of the place-based policy package? Will the place-based policy and its complements reduce economic distance by reducing market failures and distortions, as indicated by the projected indirect quantity effects? How much of the place-based policy's estimated value is social value, and are any negative quantity effects balanced by this social value?

Policy makers should weigh the value of place-based policy expenditures against that of migration support and social transfers. Some places lack the endowments needed to provide them with comparative advantage and attract investment in the future. For example, in countries entering an energy transition, historic coal mining areas may have little to offer today's investors, and efforts to keep such areas afloat may inflict a serious cost on other areas that are more economically dynamic. Such efforts may nevertheless be seen as socially optimal despite undermining overall economic growth.

Where place-based policies are adopted, they will not deliver all their desired outcomes unless leaders can fully align multiple sectors and spheres of government to put all policies and complements in place when they are needed. Coordinated actions at the national, the provincial, and especially the municipal levels are vital to making place-based policies successful. Without committed participation in explicit coordination mechanisms, the place-based policy package is likely to fail.

The new analytic framework and implementation approach sketched here imply a shift in mindset—a step away from wishful efforts to treat spatial symptoms directly with place-based policies, and toward a recognition that the inefficacy of place-based policies in the past is an outcome of their failure to address economic fundamentals. A more analytically consistent approach will focus on the forces that drive and sustain growth and that can sustainably increase incomes for people from lagging areas. The basic dynamics that drive economic development in any given place—agglomeration effects, migration, and economic distance—tend to be weak in developing countries. And the changing landscape of technology and trade means that many spatial pathways open to developers in earlier generations are not viable for developing countries today. Refocusing attention on development fundamentals—structural transformation, human capital, service delivery, and safety nets—needs to be the foundation for spatial transformation.

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1. Place, Productivity, and Prosperity: An Introduction

This great city of Tenochtitlán is as big as Seville or Cordoba. It has many plazas where commerce abounds, one of which is twice as large as the city of Salamanca … and where there are usually more than 60,000 souls buying and selling every type of merchandise from every land … There are as many as 40 towers, all of which are so high that in the case of the largest there are 50 steps leading up to the main part of it and the most important of these towers is higher than that of the cathedral of Seville. The quality of their construction, both in masonry and woodwork, is unsurpassed anywhere.

—Hernán Cortés, *La Gran Tenochtitlán, Segunda Carta de Relación* (1522)
(authors' translation)

Introduction

The transformation of the ancient capital of the Aztec empire into modern Mexico City offers insights about place and its role in prosperity and productivity that speak to today's debates about urban and regional development. First, the conquistador Hernán Cortés chose to build the capital of New Spain literally and figuratively on the foundations offered by Tenochtitlán, which he so vividly extolled. Then, as now, it was precisely the benefits of the concentration of skills, markets, amenities, and information—so-called agglomeration economies—that make cities and regions attractive and major drivers of national productivity. Second, Tenochtitlán's location appears to have been nearly arbitrary, and in fact, extremely disadvantageous. Allegedly revealed in a dream, it was more likely the last resort of a despised nomadic people who were relegated to a swampy area by more powerful neighbors. Yet some combination of agglomeration economies and other forces have led it to retain its perch as the central hub of Mexican economic activity for 700 years—a perch from which it would be impossibly costly to dislodge. Finally, the spatial income inequalities of the time have also persisted over the centuries: the per capita income of Mexico City is six times that of Mexico's poorest region, Chiapas.

Place remains central to prosperity, and especially so in developing countries. Sparkling new dynamic cities have emerged, particularly in Asia, that drive dramatic national growth and lift millions from poverty. On the other hand, contrary to expectations, income disparities across regions and places within a country—that is,

within-country spatial income inequalities—are high and have not been shrinking over time. As figure 1.1 shows, household consumption in the most prosperous areas of today's low-income and middle-income countries is more than twice that of similar households in the lagging areas, compared with high-income countries where this ratio is only 50 percent higher. Although large disparities in income have narrowed somewhat in some places, progress has been limited among low-income and middle-income countries. Further, these disparities are mimicked within cities, whose fragmentation, congestion, and dangerousness seem to belie the promise of growth-fomenting urbanization.

Even within advanced economies, progress has been mixed. For most of the twentieth century, incomes in poorer states in the United States had been catching up with those in richer states, but the rate of convergence halved between 1990 and 2010 and since then has fallen to nearly zero. Despite massive public expenditure to promote development in the north of England, the economic gap with the prosperous south of England has widened (Martin et al. 2016). In Europe, differences in GDP per capita across metro areas in the 15 original member states of the European Union (EU-15) converged in the 1980s, stabilized in the 1990s and early 2000s, and have been diverging since the mid-2000s (Ehrlich and Overman 2020). As a barrier to equity, these spatial contrasts in prosperity remain center stage as a policy concern. In addition, very visible changes in the fortunes of specific cities and regions due to automation, trade, and now climate change have created new pockets of poverty and variants of political stress.

FIGURE 1.1   **Spatial Income Inequalities Are Higher in Low-Income and Middle-Income Countries**
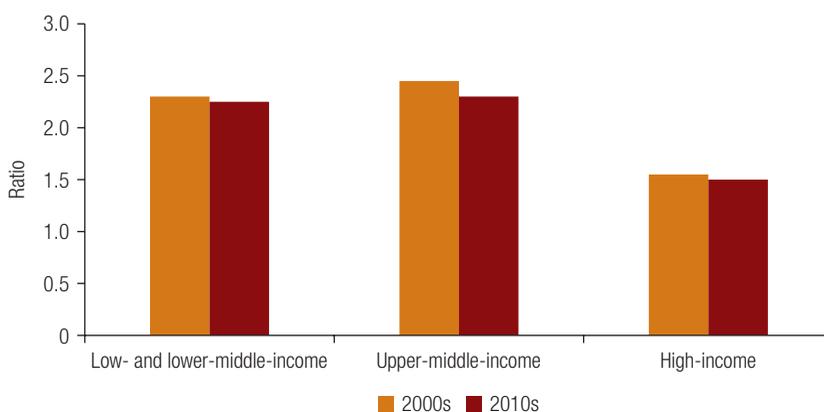
Source: D'Aoust and Lall, forthcoming, for this volume.

Note: The figure shows the ratio of the median consumption or income in the most prosperous region in the country to the median consumption or income in the least prosperous region. Regions are defined as first-level administrative divisions. Estimates are based on analysis of 13.8 million people covering 92 countries (48 low-income and lower-middle-income; 28 upper-middle-income; 16 high-income).

The Attraction of Place-Based Policies

These broad trends have given rise to increased concern, even alarm, in policy circles about low growth, dysfunctional cities, and "places left behind." Spatially targeted interventions are increasingly advanced with varying motivations. On the grounds of economic efficiency and growth, there is a desire to exploit the "untapped potential" of lagging regions, implicitly assumed to be underperforming because of market failures or barriers to a more efficient allocation of capital and technology. If distortions and inefficiencies were redressed, what might be the growth potential of lagging regions such as Brazil's Nordeste, China's Xinjian region, or India's state of Bihar? Beyond efficiency considerations, the political and social value of place-specific, job-creating policies is being championed, along with an emphasis on the intrinsic value of work that enhances a person's well-being. Finally, concerns abound that pronounced and sustained territorial inequalities can sow social discontent, tensions, and political unrest, which in turn can fuel the rise of populist movements, leaders, and parties. Place-specific consequences of free trade have been identified as contributing to the populist backlash in the United States and the Brexit vote in the United Kingdom, while armed revolts in Colombia, Indonesia, Nigeria, Peru, and Thailand have been either ignited or facilitated by territorial inequalities (Rodríguez-Pose 2018).[1] What should be done to support the populations left behind where foreign competition, new technologies, or climate change have undermined the previous basis for prosperity, contributing to, for instance, the populism in the United States and the United Kingdom?[2]

Such *place-based policies* encompass initiatives ranging from infrastructure construction and upgrades, to special economic zones that attempt to cultivate economic activity in particular locations through fiscal and regulatory incentives with infrastructure support, to a variety of urban interventions. The common feature is that they target a particular place rather than a class of individuals (as does education policy), economic sectors (as does industrial policy), or institutions (as do governance reforms). Sometimes such policies are implemented in response to revealed needs, such as infrastructure to relieve congestion in a booming region. In other cases, they are intended to be "transformative," triggering economic development in a lagging region, such as support to businesses and tax incentives in targeted deprived areas.

Vast resources are being dedicated to place-based policies. The European Union allocated €180 billion in the 2014–20 programming period on less developed regions to "reduc[e] disparities between the levels of development of the various regions and the backwardness of the least favored regions" (Article 174 of the Treaty of the Functioning of the European Union). In the United States, about $95 billion is spent annually on place-based economic development programs by federal and state governments (Kline and Moretti 2014). As another metric of increased interest, the number of special economic zones has sextupled in the last two decades, to reach 5,400 across 147 economies as of 2018 (figure 1.2). For example, zones approved by the

FIGURE 1.2 **Special Economic Zones Have Increased Six-Fold over the Past Two Decades**
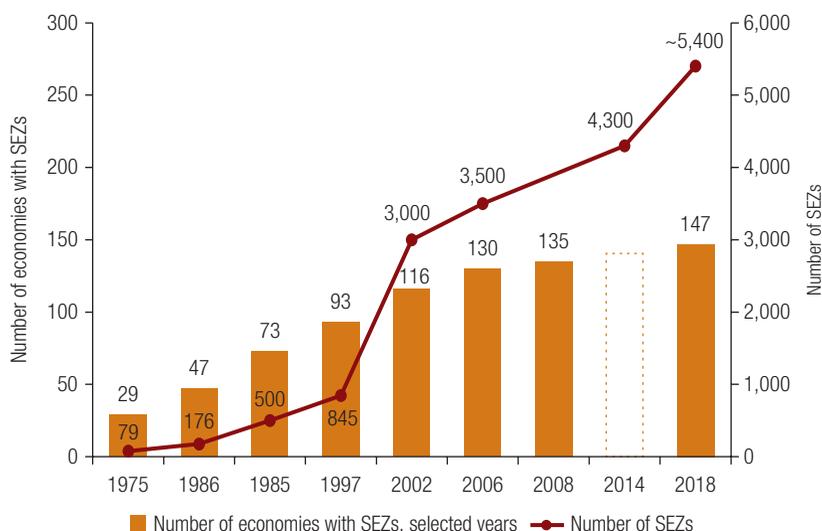
Source: UNCTAD 2019.
Note: SEZs = special economic zones.

Bangladesh Economic Zone Authority increased from 2 in 2015 to 88 at the end of 2018. The total value of expected investment in just three of Bangladesh's economic zones amounts to nearly $17 billion—more than two-thirds of the country's GDP in 2017. Likewise, Africa's first free trade zone, launched in 2018 in Djibouti, will cost $3.5 billion (UNCTAD 2019).

The record of such interventions to date has been mixed at best. Part of the disappointment is due to poor execution. But two other factors are at least as important, or even more so. The first is an incomplete understanding of the forces that lead to spatial inequalities to begin with and that eventually constrain policy. The second is the absence of a framework to structure sound cost-benefit analysis of often-complex projects. Such a framework could help counterbalance the overly optimistic predictions of success (optimism bias) (or wishful thinking) by the advocates of place-based policies or lobbying by self-interested individuals, sectors, private interests, and regions expecting to be beneficiaries.

This volume presents the most recent thinking and empirics around the determinants of the spatial allocation of economic activity, grounded in the experience of both advanced economies and developing countries, and offers such a framework to help structure thinking around place-based policies. It also seeks to help policy makers use the framework by drawing on insights from recent analytic advancements and empirical work around the economics of spatial development.

Three Forces Shaping the Economic Landscape

Agglomeration economies, labor migration, and connectivity have a strong influence on the economic geography and spatial development of countries. While concentration of activity or economic *density* gives rise to productivity-enhancing agglomeration benefits, economic *distance* results from the widening spatial inequalities between economically leading and lagging areas. While economic distance can be managed through migration and connectivity, it can be exacerbated by social exclusion, automation, trade, and climate change. Chapters 2, 3, and 4 offer new insights into these three forces and how they interact.

Agglomeration Economies and Productivity

For the reasons identified by Cortés, concentrations of skilled people, markets, and amenities tend to generate agglomeration economies that raise the productivity of businesses and the quality of life of a city's inhabitants. The benefits of bringing together Tenochtitlán's craftsmen and traders in the past are analogous to those found in Silicon Valley engineers, venture capitalists, and high-tech firms today. Hence, economic density can serve as a major driver of national productivity growth. Big productive cities importantly anchor the distribution of a nation's economic activity. These agglomeration effects, discussed in chapter 2, also lead to persistence in this distribution. Tenochtitlán offers one dramatic case, but examples abound. Many present-day North American cities—including Augusta, Georgia; Chicago, Illinois; Montreal, Quebec; Sacramento, California; and Washington, DC—were founded at river "fall lines" where traders would need to portage around water falls to continue upstream and that became places where inland and ocean traders met. These locales continued to expand as trading and industrial centers long after technology obviated the need for portaging (Bleakley and Lin 2012). *This persistence importantly constrains how much policy makers can redraw the economic map of their country*.

Yet chapter 2 poses an additional *developing country urban productivity puzzle*: Despite recent econometric estimates that suggest that agglomeration forces (measured by the elasticity of wages with respect to concentration) are multiples higher in developing countries than in advanced economies, ground-level observations and careful examination of the econometric estimates suggest less that these cities are productively dense than that they are simply crowded and dysfunctional. People are concentrating—but not because industrial dynamism is attracting them. This raises the prospect of *sterile agglomeration*—concentration without productivity gains. This state of dysfunctional cities in developing countries dictates not only an urban reform agenda, but also a nationwide productivity agenda.

The Promise of Migration

Internal migration has a major role in enhancing productivity by reducing the spatial misallocation of labor as well as managing spatial inequalities by enabling places to adjust to shocks. Historically, the inequalities and productivity differentials emerging from the process of agglomeration have been mitigated by migration from lagging regions to urban areas with high levels of productivity. However, contemporary migration rates are relatively low and declining, potentially leaving populations stranded in lagging locales or in areas experiencing adverse shocks from trade, automation, and climate change. In the United States, even long-standing job loss has generated only limited out-migration. For instance, Autor, Dorn, and Hanson (2013) find no robust evidence that shocks to local manufacturing induced by trade with China have led to substantial changes in population. Similar evidence appears for Brazil, with substantial welfare losses (Dix-Carneiro and Kovak 2017).

Chapter 3 describes the patterns, determinants, and consequences of migration. Worker mobility may be limited because of poor information on destinations with employment opportunities and the skills demanded. Even when information is available, workers may not move due to old age, lack of resources, a very strong attachment to the place or the racial or ethnic discrimination in potential destinations. The chapter also discusses the dilemma posed if cities in developing countries, unlike those in advanced economies, are not made more productive by immigration. Migration then provides less of a solution for people in lagging regions, and becomes a negative force in urban areas, creating congestion dis-economies.

The Tyranny of Distance

Reductions in trade and transport costs have the potential to stimulate economic growth and reduce economic distance between regions. There are unquestionably places with untapped potential to be realized by trade reforms and transport interventions. Lifting Spanish trade restrictions on the natural port of Buenos Aires in 1775 transformed it from a backwater to one of the world's richest cities, with arguably the premier opera house on the planet. The construction of the Uganda Railway through the Kenyan highlands, and the subsequent immigration of skilled farmers, led to the development of a dynamic tea industry and the emergence of Nairobi from swamp to great capital city.

However, reductions in domestic trade and transport costs can be disadvantageous to businesses in lagging areas that are faced with competition from producers in leading areas and international markets. In fact, infrastructure is not the only element of trade costs, or even the most important one. Chapter 4 examines the extent to which internal trade costs vary within countries as well as the mix of investments in spatial "hardware" (infrastructure) and "software" (such as worker skills, access to finance,

entrepreneurial abilities, trade facilitation) needed to effectively reduce economic distance. Improvements in infrastructure "hardware" may be necessary, but not sufficient, for reducing domestic trade costs for distant regions. Complementary investments in "software" are much needed in lagging regions to ensure the effectiveness of those "hardware" investments.

Globalization has particular implications for the spatial distribution of economic activity. Ports and international gateways as well as large metropolitan areas tend to become more concentrated as countries integrate with global value chains.

Lagging Places, Left-Behind People—and Perhaps, Missed Opportunities

These three forces interact not only to influence national productivity growth, but also to create the observed inequalities in income and productivity. They also inform the choice of tools that policy makers can use to bring productivity and prosperity to specific places. In some places development just does not seem to have happened yet. Others are recently stricken by shocks, such as trade competition, automation, or climate change. Both situations give rise to demands to "do something"—to engage in place-based policies to take advantage of missed opportunities and equalize spatial development. Thinking about such policies often proceeds by analogy to development policy for nations as a whole. However, as chapter 5 discusses, at the subnational level, this misses a critical point: The internal migration that offers individuals potential new opportunities and helps smooth income differences across regions can, through the same mechanism, make some regions fundamentally "unviable." The wage gaps that have proven so attractive for firms to relocate abroad—for instance, from the advanced economies to China, Vietnam, or Ethiopia—will be vastly reduced as migration compresses wage gaps across subnational regions. Thus, a lagging place can be permanently "priced out" as an investment destination, leaving it with no comparative advantage. Kolmanskop, Namibia, once produced 12 percent of the world's diamonds and was one of the richest towns on the planet—its hospital had the first X-ray machine in the Southern Hemisphere—yet was abandoned as its resources played out.

Conceptually, there is no market failure at work here and national welfare is maximized: factors are optimally reallocated in response to adverse shocks. However, these dynamics pose the challenge to policy makers of distinguishing between regions where a package of interventions would yield a rate of return comparable to other priorities, and those where it would not. Chapter 5 lays out these considerations, the arguments in favor and against place-based policies, and alternative policies for dealing with spatial inequality.

Chapter 6 lays out a framework for thinking through the assessment of place-based policies to guide these kinds of calculations more thoroughly and precisely. It stresses

the need to place a value on not only the direct and most easily measured impacts—such as the reduction in travel time or the costs pertaining to vehicle wear-and-tear in the case of building a road—but also the indirect effects on local economic growth, which are frequently the underlying if unassessed justification for the project. The chapter also highlights the difficulty, but absolute necessity, of incorporating the necessary complements to such policies—financial markets, education, job training, and the like—to realize these larger goals. Finally, given that multiple market failures or distortions dictate programs with multiple components, assessments need to recognize the limits of government capabilities to diagnose problems and then design and implement complex policies.

Chapter 7 applies the framework to three sets of interventions: interregional transportation corridors; economic clusters and special economic zones; and investments to manage urban congestion. It illustrates the mechanisms through which place-based policies may bring about change in private sector behavior and how appraisers can consider the value of changes by thinking clearly about the opportunity costs, the value of resources in alternative uses, and the market failures and inefficiencies that motivate the policy intervention.

Chapter 8 deals with the "softer" complements to these "hard" infrastructure initiatives within a framework that asks the broader question of what types of investments and fiscal incentives—whether to promote entrepreneurship, improve the business climate, strengthen human capital, and the like—are required for a region to take off. *A central point is that fundamentally, entrepreneurs—not governments and not infrastructure alone—drive local development.* The chapter offers a framework through which to view the interaction of the enabling environment or ecosystem and entrepreneurial capabilities.

Overall, the volume argues that while the forces of agglomeration, migration, and distance importantly constrain policies dedicated to stimulating regional growth and reducing regional inequalities, geographic history is not destiny. The dramatic examples in Asia offer clear proof that regional policies can stimulate local growth and promote equity. The rapid economic growth of the Republic of Korea was accompanied by economic concentration in the large cities as well as improvements in services and living standards across the national territory (Lall 2012). Cities in developing countries can be made more livable and productive. However, the choice of appropriate policies requires a clear-eyed appraisal of the underlying constraints to determine whether investment in place-based policies compares favorably with other policy priorities, and whether other policies that encourage migration, or those that provide income transfers or other services, make more sense. In either form of intervention, policy makers should be aware that *some seemingly spatially blind policies addressing other social ends, such as income taxation, minimum wages, or carbon taxes, can generate spatially biased distortions.*

Facilitating such comprehensive, objective, and well-grounded assessments about policy options, and helping practitioners make informed choices, is the goal of this volume.

Notes

1. New brands of populism are on the rise in several high-income countries, including Austria, Belgium, Canada, Denmark, France, Germany, Hungary, and Poland (Mudde and Kaltwasser 2012; Greven 2016). In Thailand, support for populism "is concentrated in regions of relatively high poverty and low incomes," Hewison (2014) notes, suggesting that inequality is a root cause.

2. This has been a concern in the advanced economies, where competition—particularly from China—has depressed many formerly prominent manufacturing regions (see Austin, Glaeser, and Summers 2018).

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2. Agglomeration Economies, Productivity, and the Persistence of Place

Introduction

Place remains central to productivity as well as economic growth and becomes more so as economies develop and as people concentrate in urban centers. The most obvious determinant of the spatial distribution of population is the physical setting: some places are simply more amenable to human habitation and output production than others. From prehistoric times, coastal areas have been favored for regional and international commerce. The so-called *first nature factors* can have outsized importance for the development of cities. For instance, a recent study suggests that geographical attributes explain 47 percent of worldwide variation and 35 percent of within-country variation in economic activity (Henderson et al. 2018). Shared man-made infrastructure, amenities, or institutions, as well as history (the human geography of the past)—*second nature factors*—compound these natural factors and generate persistence, even after the first nature forces fade in importance. However, in successful countries, benefits from agglomeration externalities—*third nature factors*—drive a virtuous cycle of economic concentration, higher productivity, and more prosperity.

A Virtuous Cycle of Economic Concentration, Higher Productivity, and More Prosperity

Since at least the time of Adam Smith (1776) and Alfred Marshall (1890), it has been acknowledged that well-functioning cities bring people and businesses together, where they benefit from the sharing of ideas. Social and economic interactions are the hallmark of city life, making workers more productive and often creating a vibrant market for innovations by entrepreneurs and investors. In fact, no country in the industrial age has ever achieved significant economic growth without well-managed urbanization or geographic concentration (World Bank 2009). In the late 1900s, four-fifths of Chicago's jobs were compactly located within four miles of the city center of State and Madison Streets—near residences and infrastructure (McMillen 2003). The World Bank's urbanization reviews suggest that more than 80 percent of global GDP is generated in

cities.[1] More than a decade ago, the *World Development Report* also found that the top 30 cities in the world, ranked by GDP, generated around 16 percent of the world's output in 2005 and the top 100, almost 25 percent (World Bank 2009). In the United States, three coastal cities (New York, Los Angeles, and Chicago) covering 1.5 percent of the land mass account for 20 percent of the country's GDP; Mexico City alone accounts for 17 percent of Mexico's GDP with only 0.1 percent of the area; Luanda contributes a similar share while occupying only 0.2 percent of Angola's land. The largest cities in Hungary, Kenya, Morocco, Nigeria, and Saudi Arabia—Budapest, Nairobi, Casablanca, Lagos, and Riyadh—also contributed about 20 percent of their country's total GDP while taking up less than 1 percent of land (World Bank 2009).

More generally, economic activity increases with city size and population density. This is shown in figure 2.1, which uses night light intensity as a proxy for economic activity. Most industries in China, the United Kingdom, and the United States are geographically concentrated; in France, extractive, traditional, and high-tech industries are highly localized (Ellison and Glaeser 1997; Devereux, Griffith, and Simpson 1999). In Thailand, industry and enterprise are clustered in and around Bangkok and in a central national corridor (Felkner and Townsend 2011). Even in the least developed countries, industry tends to be concentrated in the largest cities. Around the world, productivity rises with the density of economic activity. For example, 90 percent of the establishments in Côte d'Ivoire are concentrated in places accounting for the top decile of the population density. This share is over

FIGURE 2.1 **Economic Activity Is Highly Concentrated, Even in the Lowest-Income Countries**
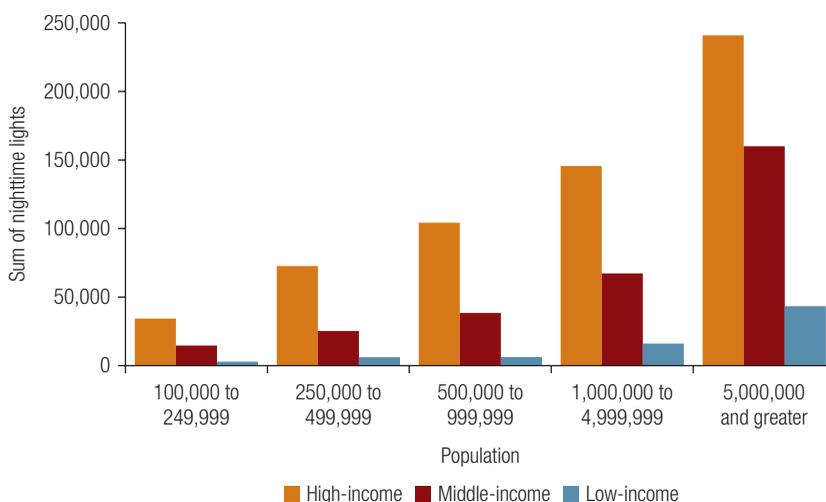
Source: Data are accessed from NASA (https://earthdata.nasa.gov/earth-observation-data/near-real-time/download-nrt-data /viirs-nrt).

Note: The figure shows the distribution of very high-resolution nighttime lights as a proxy for economic activity, and plots nighttime light intensity against population. Data for 1,185 cities across the globe with more than 100,000 people are used. The sum of nighttime lights is based on the monthly composites (from March to May 2019) of VIIRS Nighttime Day/Night Band (DNB). The DNB radiance values were calculated based on the 20 km buffers from each city center.

Place, Productivity, and Prosperity

FIGURE 2.2   Establishments, Employment, and Value Added Are Concentrated in Densely Populated Areas

a. Establishments

b. Employment

c. Value added

Top decile   90–50 percentile   50–10 percentile   Bottom decile
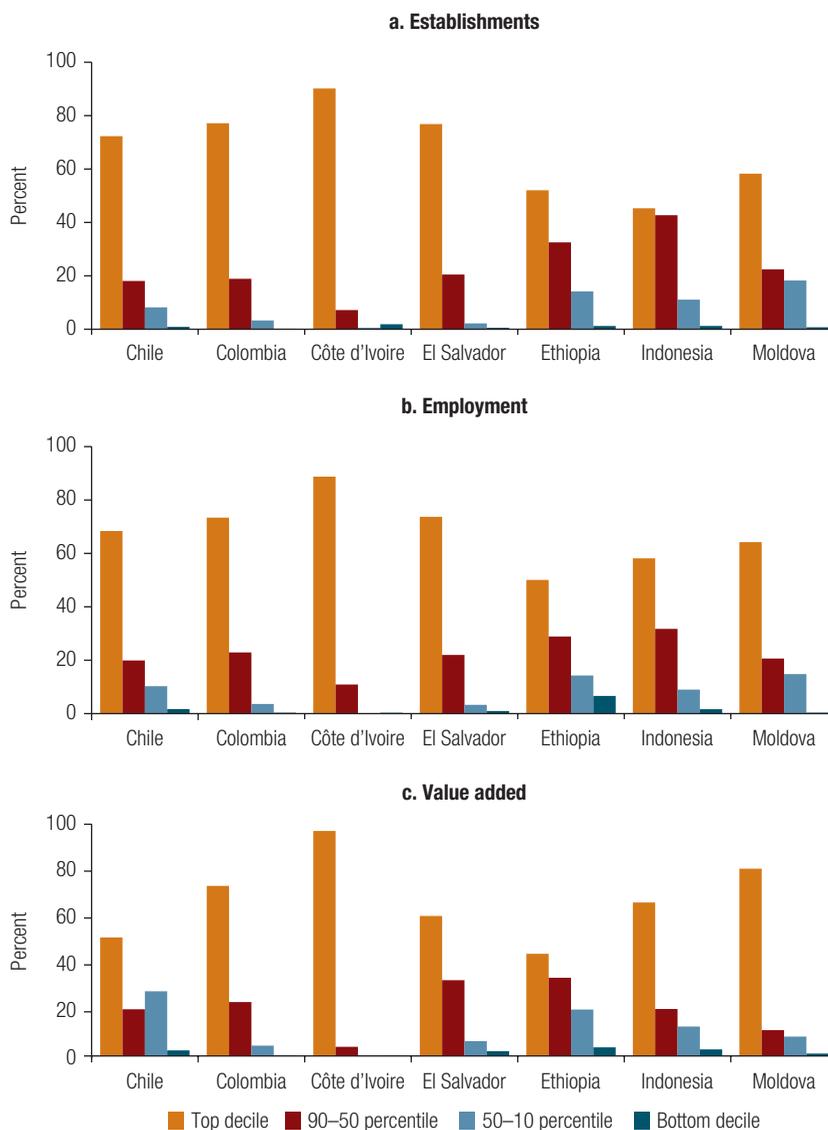
Source: World Bank staff calculations derived from firm-level data from each of the seven countries.

Note: The figure is based on calculations for this volume using nationally representative firm-level data from each of the seven countries. Panels a, b, and c, respectively, present the distribution of manufacturing plants, employment, and value added for firms with 10 or more employees from each of the seven countries into four categories of population density distribution—the top and bottom deciles, and those between the 90th and 50th percentiles and 50th and 10th percentiles.

70 percent in El Salvador, about 60 percent in Moldova, and over 40 percent in Indonesia (figure 2.2, panel a). Employment is concentrated (figure 2.2, panel b), and value added (figure 2.2, panel c) even more so. Regions in the top decile of population density account for more than 90 percent in Côte d'Ivoire, 70 percent in Colombia, and over 60 percent in Indonesia of overall value added (figure 2.2, panel c).

FIGURE 2.3 Urbanization, Economic Growth, and the Transition from Slow to Fast Growth Occur Together

a. Urban population and GDP per capita in China, the Republic of Korea, and Vietnam

b. Urban population and GDP per capita in China (before and after liberalization)
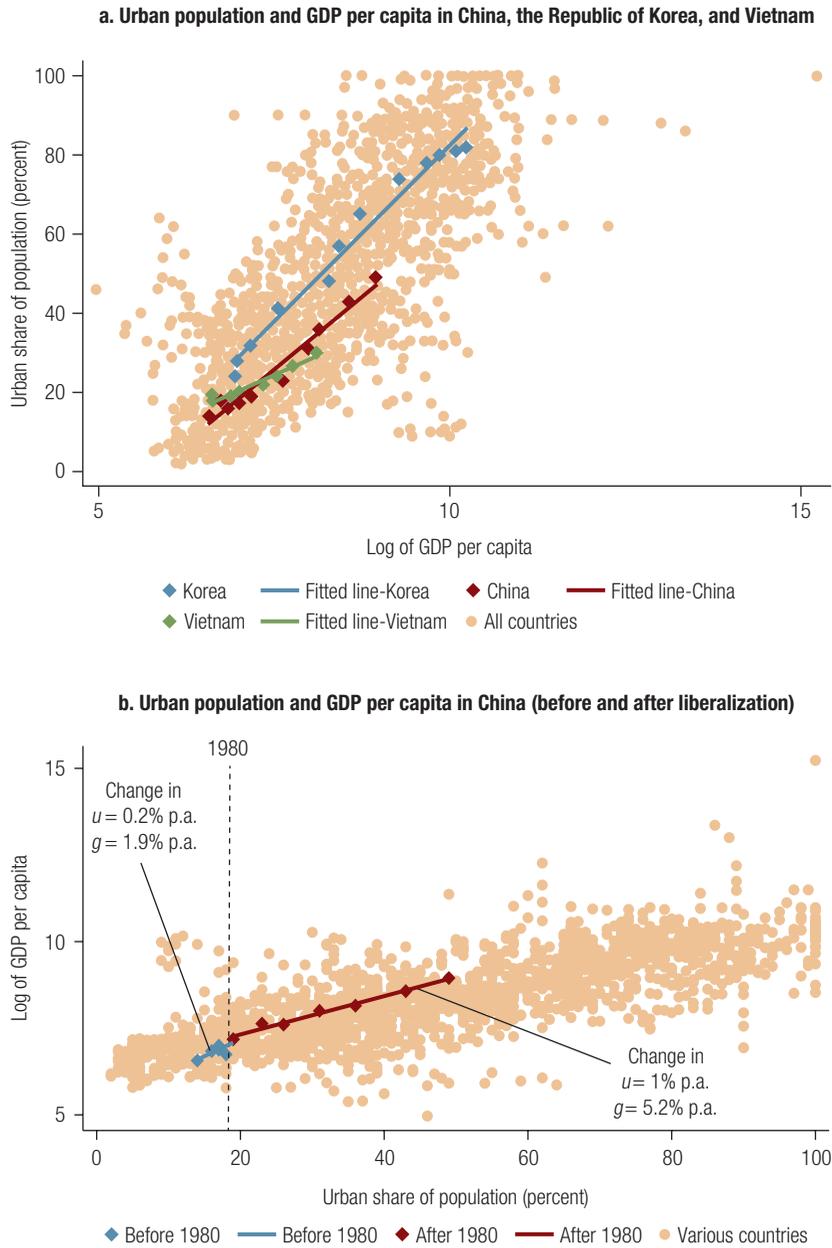
Source: World Bank World Development Indicators.

Note: g = growth of GDP per capita; p.a. = per annum; *u* = change in urban share of population.

Further, urban density increases with development, as evidenced in China, the Republic of Korea, and Vietnam (figure 2.3, panel a). Comparing the pre-1980 period to the post-liberation period in China suggests that countries that shift into high gear in growth urbanize at a higher pace (figure 2.3, panel b).

The growth of cities has been strongly associated with the structural transformation of the economy (figure 2.4). From Japan to the Asian tigers, export-led development has proceeded hand in hand with the concentration of economic activity in urban hubs that were as connected with the rest of the world as with their hinterlands. In the 1980s, the Tiger Cub Economies (Indonesia, Malaysia, and Thailand) followed their lead. Not only did their volume of economic activity grow, but it became geographically more concentrated. Leading areas benefited the most. As Thailand rapidly industrialized, GDP per capita increased six-fold between 1974 and 2004, while Bangkok's economy expanded ten-fold during the same period. In Brazil, the economy in the São Paulo area expanded eight-fold as the country's GDP per capita almost tripled between 1960 and 2004 (World Bank 2009). For most countries, manufacturing as a share of GDP rises with urban shares until about 60 percent of the population lives in cities and manufacturing accounts for about 15 percent of GDP (Lall, Henderson, and Venables 2017).

FIGURE 2.4   The Rise of Cities and Structural Transformation Have Gone Hand in Hand in Asia
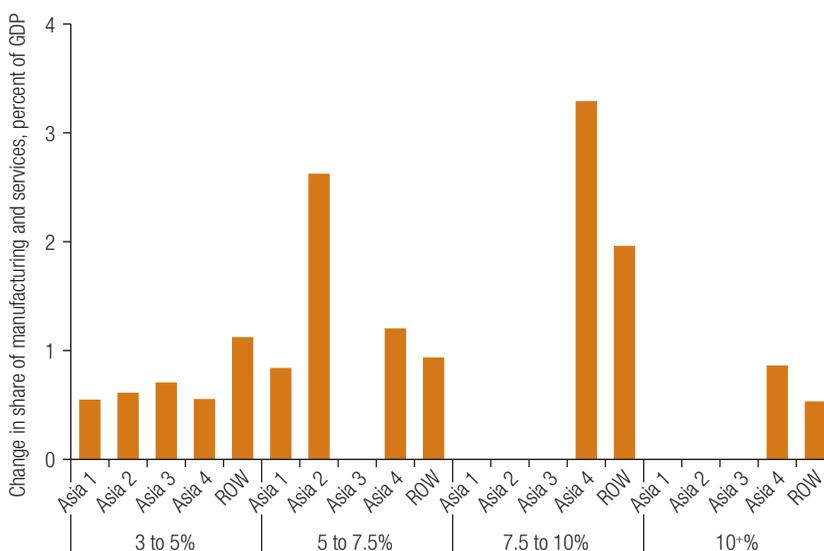
Source: World Bank staff elaboration based on World Development Indicators (accessed 2021).

Note: The figure shows the percentage change in the share of manufacturing and services in GDP during the period of rapid urbanization for Asia versus the Rest of the World (ROW). Asia 1 = Republic of Korea; Singapore (Tigers); Asia 2 = Indonesia (Cub); Asia 3 = China, India, Vietnam (today's rapid urbanizers); Asia 4 = 15 other Asian nations (Afghanistan; Bangladesh; Bhutan; Iran, Islamic Rep.; Jordan; Maldives; Mongolia; Nepal; Pakistan; Papua New Guinea; Philippines; Saudi Arabia; Syrian Arab Republic; Thailand; United Arab Emirates). Data are not available for all categories.

The Developing Country Urban Productivity Puzzle

The canonical measure of these agglomeration forces is the elasticity of wages with respect to density. Measured values are large: 0.043 in the United States, 0.03 in France, and 0.025 in Spain. This means that a 10 percent increase in density increases productivity by 0.3 percent to 0.5 percent. Strikingly, some recent estimates for developing countries are multiples higher: 0.19 in China, 0.12 in India, and 0.17 in Africa. That is, a 10 percent increase in density increases productivity by 1.7 percent in Africa.[2]

However, these measures and magnitudes seem somewhat implausible and call into question exactly what these measures mean. For example, the night time light intensity in the largest cities of low-income countries is around the same level as the smallest cities of high-income countries (see figure 2.1). Satellite and geographic information system data covering large cities across the Sub-Saharan Africa region suggest that they are crowded and disconnected—a far cry from the dense packing of educated workers sharing ideas in Chicago.

Investments in infrastructure and industrial and commercial structures have not kept pace with the concentration of people in many cities in developing countries, nor have investments in affordable formal housing, making it costly to do business. Whereas Kinshasa, the capital of the Democratic Republic of Congo, and Hong Kong SAR, China, have similar density, the vertical stacking of population, while expensive, is exactly what makes Hong Kong SAR, China, livable and connected, Lall, Lebrand, and Soppelsa (2021) show.[3] While building taller is partly a question of finances, cities in developing countries often have inefficient land markets, overlapping property rights regimes, suboptimal and ineffective zoning regulations, and limited infrastructure, including transport—all of which hinder efficient concentration and raise costs (Lall, Lebrand, and Soppelsa 2021; Fujita and Ogawa 1982; Heblich et al. 2018). Heavy congestion, high rates of walking, informal collective transportation, and the spatial distribution of jobs and residents lead to low accessibility to employment in Nairobi and the misallocation of labor, Avner and Lall (2016) find. Those who travel on *matatu* (privately owned minibuses) can access only 4 percent of jobs within 30 minutes, on average, compared with almost double that share in Buenos Aires (Peralta-Quirós 2015). In Ugandan cities, 70 percent of work trips are on foot (Uganda Bureau of Statistics 2010), with only 19 percent of jobs reachable within one hour, on average (Bernard 2016). The gains that Adam Smith and Alfred Marshall identified for cities are just not obviously there. People are concentrating—the share of Africa's urban population rose from 31 percent in 2000 to 41 percent in 2019—but not because industrial dynamism is attracting them or because they are attaining the productivity benefits of urbanizing. Developing country cities are not so much densely productive as simply crowded. We term this urbanization without productivity gains "sterile agglomeration."

This evolution is more consistent with what has been called "premature urbanization" (Gollin, Jedwab, and Vollrath 2016). Figure 2.5 shows that while urbanization has accompanied economic transformation in most parts of the world, it has not in Africa. In Nigeria and South Africa, for example, the shares of manufacturing in GDP have been declining as those countries have urbanized. Even within cities, 25 percent of the urban population in Sub-Saharan Africa, and about 30 percent in Mozambique, Sierra Leone, and Tanzania, is still reported to be employed in agriculture.[4] The share of tradables in Asian cities, at about 70 percent, is 20 percentage points higher than in African cities (Lall, Henderson, and Venables 2017).

These findings raise the question about why firms and workers would move to the city in the first place if they are not getting productivity-enhancing benefits. It first bears noting that the equation of urbanization with industrialization and even increased productivity is a historically recent one. Bairoch (1988) points out that urbanization began with the emergence of surplus arising from sedentary agriculture, and cities served as a provider of services and distribution of rents long before the arrival of industrialization. In his most negative take, he sees Rome, the largest city in the ancient world, as an exactor of tribute, a "parasitic" city that had little in the way of industry, and sees many developing country cities as "Romes without empires" (Bairoch 1988). Gollin, Jedwab, and Vollrath (2016) echo and update this mechanism by arguing that developing country agglomerations are distribution points for

FIGURE 2.5 **Urbanization and Economic Transformation Have Not Gone Hand in Hand in Africa**
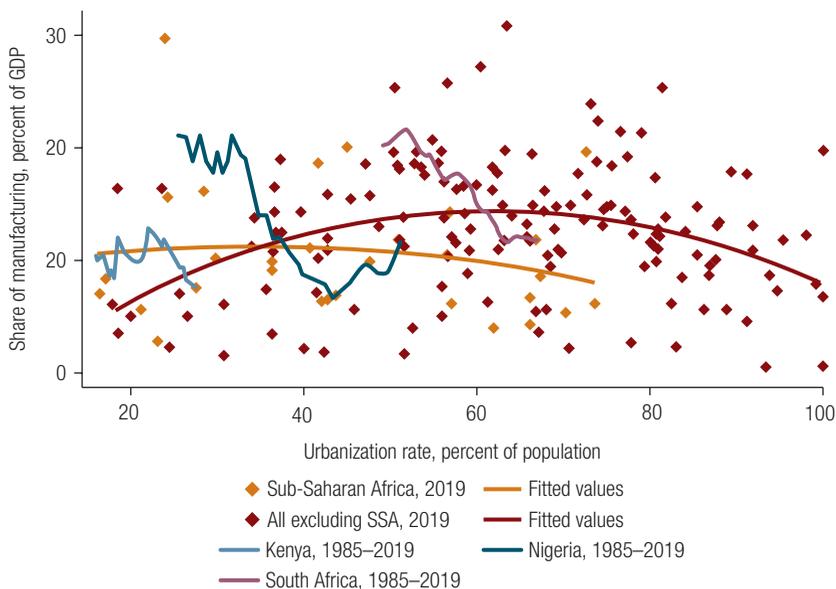
Source: World Bank staff elaboration based on World Development Indicators (accessed 2021).
Note: SSA = Sub-Saharan Africa.

natural resource wealth—they are consumption not production cities.[5] International aid, whose first stop is generally the capital, could also serve to support consumption. Ethiopia, for instance, receives roughly 4 percent of GDP in foreign aid—a large share considering that Chile's entire mining sector constitutes 9 percent of GDP. In a similar vein, migrants seek out government-financed health and education services and amenities unavailable in the rural areas. Finally, Ades and Glaeser (1995) stress the political reasons for urbanization, particularly in single big cities, because spatial proximity to power increases political influence or economic rents. They find that dictatorships have central cities 50 percent larger than democracies. In these rent-distributing or consumption cities, *utility* derived from these sources—not firm productivity—needs to exceed congestion costs. As Krugman and Elizondo (1996) note, high internal transport costs will lead domestic producers to locate close to income sources rather than produce in less costly venues. Locally concentrated income drives up real estate prices, requiring higher wages for local labor and higher marginal costs for firms. In this view, the wage elasticity captures little of the productivity of local industry or the city.

Where fertility rates are not declining quickly or are stalling, natural growth has become an increasingly important factor in driving urban population growth in Africa. Although the picture varies by subregion, the overall trends for Sub-Saharan Africa, from the least urbanized East to the more urbanized South, show a decline in the contribution of net in-migration to urban growth in favor of the natural growth component. In the least urbanized East African subregion (which was about 25 percent urbanized in 2015), migration contributes the most to urban population growth and is about twice as much as natural growth. In contrast, in the more urbanized Southern African subregion (which was 60 percent urbanized in 2015), starting around 1995, more urban residents began leaving cities for rural areas than rural residents were leaving for cities (that is, the contribution of net migration to urban population growth became negative).

Yet in the face of all these factors, urban incomes in Sub-Saharan Africa are significantly higher than rural incomes, even in the absence of significant spatial economic transformation. Poverty is also declining fastest in large cities (Nakamura, Paliwal, and Yoshida 2018). Low rural productivity growth, rather than large agglomeration effects, partly explains why urban incomes are comparatively so much higher than rural incomes in the region (Henderson, Nigmatulina, and Kriticos 2019). Further, provision of services is lagging in rural areas: moving from a rural area to an urban one is associated with improved access to water, sanitation, and electricity by about 45 percent, 35 percent, and 50 percent, respectively (Hommann and Lall 2019). Both these patterns put agricultural productivity and rural development squarely on the agenda for policies aimed at urban areas as well as lagging regions—and indeed, national growth policy (see Fuglie et al. 2019). These findings clearly support the ongoing agenda to make

cities function better and reduce congestion costs. But more profoundly, they point to the need to undertake the necessary economywide reforms to promote growth and structural transformation, including those in the agricultural sector.

Forces of Nature, the Weight of History, and the Power of Persistence

The three "natures" factors—natural geography and intrinsic factors; human-built infrastructure, amenities, and institutions; and agglomeration externalities—together prove so advantageous that once cities are firmly established, they tend to persist. The persistence of place, however arbitrarily initiated, and the weight of history (the human geography of the past) constrain the best laid plans to reshape economic geography. As with Mexico City, modern Latin American spatial patterns of income track the precolonial (1500) patterns of meso-American settlement (Maloney and Valencia Caicedo 2016). In Colombia, Bogotá and Antioquia had the highest population densities in 1500 and are among the richest and most industrialized today (figure 2.6). In Africa, cities formed along the colonial railroads persisted even after these locations lost their initial relative advantage, as discussed in box 2.1 (Jedwab and Moradi 2016). Cities such as Cairo and Tunis trace their origins back millennia. The current distribution of Japanese cities goes back even further, broadly tracking those of settlements 10,000 years ago (Davis and Weinstein 2002). The three dominant US cities (New York, Los Angeles, and Chicago) began their economic lives as a Dutch fur trading post, a Spanish trading pueblo, and a meeting place at a river mouth known to Algonquin residents for its distinct wild garlic (Allen and Donaldson 2018). Many North American cities—including Augusta, Georgia; Chicago, Illinois; Montreal, Quebec; Sacramento, California; and Washington, DC —were founded as trading posts at river portage sites where inland and ocean traders met, but grew to be major cities long after technology obviated the need for portaging (Bleakley and Lin 2012).

FIGURE 2.6   Cities and Departments That Were the Most Densely Populated in 1500 Are among the Wealthiest Now in Colombia
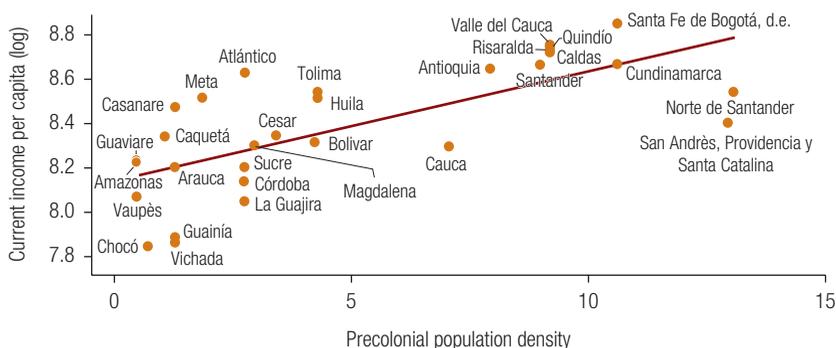
Source: Maloney and Valencia Caicedo 2016.

The Persistent Effects of Colonial Railroads on Regional Development in Kenya

British colonizers built the Uganda Railway from the port of Mombasa, Kenya, on the Indian Ocean to Lake Victoria, to link the coast to Uganda. This decision triggered complementary investments in infrastructure, human capital, and social facilities and set Kenya on a path of economic prosperity long after the railway line became obsolete.

The Uganda Rail Leveraged Geopolitical and Natural Advantage

The "iron snake" connected landlocked Uganda's rich resources and high-potential market to the coast, for use in various colonial-era engineering and wartime projects benefiting Britain. Kenya was just a transit territory; while more than 600 miles of the route traversed Kenya, it was named the Uganda Railway. Rail access lowered freight costs from 11 shillings per tonne mile (at the 1902 freight rate) to 0.09 shillings per tonne mile. It allowed heavy equipment to be transported inland and raw materials to be extracted and sent out.

Nairobi was chosen as an intermediary node because it supplied workers to build the railway and water from its then-swampy location to operate the steam locomotives. The requirements of 200,000 individuals; 1.2 million sleeper wagons; 200,000 fish plates; 400,000 fish bolts; and 4.8 million steel keys, causeways, and other parts had to be imported. This necessitated the creation of a modern port at Kilindini in Mombasa.

Most importantly, supporting the Uganda Railway was a strategic decision taken by the British government to expand British domination in the area. Lake Victoria, the source of the Nile, was vital for British interests in Egypt. The British planned its construction through Kenya to take control of Lake Victoria. As Miller (1971) wrote, "Whatever power dominates Uganda masters the Nile, the master of the Nile rules Egypt, the ruler of Egypt holds the Suez Canal," which would give the British control of trade between Europe and the rest of the world. The railway shielded the region against competing European powers and allowed faster transportation of troops. Uganda's wealth, with further trade potential, would open trade opportunities.

The Impact of the Railways Was Immediate and Persistent in Shaping Kenya's Economy

The backers of the railway sought a connection to Nairobi at the least possible cost. The decision turned Nairobi, at the time a poor outpost on a swamp, into a railway headquarters and a capital soon after. The main train line also established the initial urban pattern of the city.

The railway placement connected sparsely settled areas. European settlement was attracted to create an agricultural export industry, which increased rail traffic. Labor for railway construction was brought from India and employed in the private nonagricultural and commercial sector, but laborers were not allowed to own land. Non-Africans also got access to good schools, while Africans were limited to primary school attendance.

Human capital matters for persistence. After Kenya's independence from Britain in 1963, Europeans sold their land to Kenyans, and noncitizens were required to get work permits. Kenya persisted and thrived despite the demise of railways and exodus of Europeans and Asians. The railway locations did not lose their access to transportation when replaced with roads. The high-skilled European and Asian workers were replaced by Africans trained at the schools that existed at independence.

(Box continues on the following page.)

Patches of wild garlic and waterfall bypasses long ago became irrelevant, but the agglomerations they seeded persist due to some combination of second and third nature factors. Being "set" in space can mean achieving a good spatial equilibrium (San Francisco, Sydney, Cape Town) or being dealt a bad hand by history and geography. Mexico City's weather was, from the beginning, bad for agriculture; the fetid Lake Tenochtitlán was a breeding ground for disease; and later, the gelatinous dried lakebed foundations amplified tremors, making recurrent earthquakes devastating (Maloney and Valencia Caicedo 2016). Similarly, the collapse of the Roman Empire allowed Britain to take advantage of declining maritime trade costs to pivot to a more efficient coastal spatial allocation of activity, while French towns remained unmoved, with all roads leading to a dying imperial center (Michaels and Rauch 2016). The bottom line is that policy makers need to be clear-eyed about this inertia as they move to reshape their national space.

Changing Drivers of Spatial Activity: The Future Isn't What It Used to Be

While the inheritance of the past is strong, the forces shaping the economic landscape are different for developing countries than they were for countries that are now advanced. In the age when agricultural productivity drove development, the location of final consumers and trading centers close to producers was driven by transport costs: shipping grain using animal-drawn carts at distances around 260 kilometers

would double prices (Bairoch 1988)—yielding a relatively even distribution of towns and cities. The decline of transport costs frees people from the necessity to live where food is grown, and allows firms to locate where they can best access workers and global markets. This means that the sequencing of the decline in transport costs with respect to structural transformation matters for the spatial distribution of activity within countries. Transport costs had fallen significantly by 1950 in India, for instance, long before its structural transformation, with the building of colonial railways (Donaldson 2018). Hence growth was accompanied by concentration: urbanization rose rapidly, from 17 percent in 1950 to 30.9 percent in 2010. Transport costs fell similarly in Africa (Teravaninthorn and Raballand 2009). Interior areas such as the Congo Basin and the Ethiopian Highlands would have had higher concentrations of economic activity than they actually did if they had been "early developers," simulations by Henderson et al. (2018) show. Cheaper, faster, and better transport—not only physical but digital, through information and communication technology—prior to structural transformation has facilitated the emergence of global value chains in megacities such as Shenzhen and other Chinese coastal cities, while the inland western provinces remain underdeveloped.

These same forces are changing the shape of cities as well, allowing firms to leave the expensive urban core while still benefiting from agglomeration effects. The high-tech hub around Route 128 in the US state of Massachusetts is in fact a constellation of firms populating a 25-mile radius outside Boston. China's investment in rail and road networks has led to the suburbanization of industry out of large metropolitan cores. Better transportation and digital technologies could reduce information and other transaction costs, making development of cities less challenging. The COVID-19 (coronavirus) pandemic also suggests how these advances permit working at a distance, reducing the need for greater concentration in city centers.

In sum, the centripetal forces to agglomeration have strengthened as firms now orient toward the global rather than local market. As a result, the economic landscape is likely to become even more lumpy and unequal than before. On the one hand, this has allowed some firms to aspire to global scale and drive rapid industrialization, as is the case in China. On the other, those same forces have pushed cities in countries such as Côte d'Ivoire and Ghana to breed "consumption cities" where a larger fraction of workers are employed in nontradable services (such as personal services), rather than manufacturing or tradable services (such as finance) (Gollin, Jedwab, and Vollrath 2016). The growth literature (Lucas 2002; Duarte and Restuccia 2010; Rodrik 2013) suggests that convergence is faster in industrial sectors than in nontradable services, implying that "consumption cities," while comparable in their level of urbanization to "production cities," may have a different long-term growth trajectory. Shanghai and Lagos, for example, are cities in countries with similar urbanization rates, but it seems unlikely at this point that Lagos contains the same potential for growth as Shanghai.

Unpacking the Association of Density with Productivity

Figure 2.7 presents a schematic that unpacks the benefits and costs of agglomeration. It also provides a guide to understanding a key piece of the productivity puzzle: how to interpret the standard measure of agglomeration effects—the elasticity of wages with respect to the size of agglomeration, calculated as the percentage rise in wages with a percent rise in either population or population density. These agglomeration effects appear at the far left of the figure. Moving right, the figure explores the benefits of agglomeration. The typology of "sharing," "matching," and "learning" at the far right follows Duranton and Puga (2004):

- *Sharing* effects include the gains from a greater variety of inputs and industrial specialization, the use of local indivisible goods and facilities, and the pooling of risk.
- *Matching* effects correspond to improvement of either the quality or the probability of matches between firms and workers. The sheer size of labor markets improves the probability of matches, while the evidence on sorting of more talented workers in larger cities suggests that the quality of matches is also likely to be better in cities.
- *Learning* effects involve the generation, diffusion, and accumulation of knowledge. There are both static and dynamic benefits of interacting with more talented employees who are working in the most productive firms.[6]

FIGURE 2.7   **Agglomeration Elasticity Is a Composite of Agglomeration Benefits and Costs**
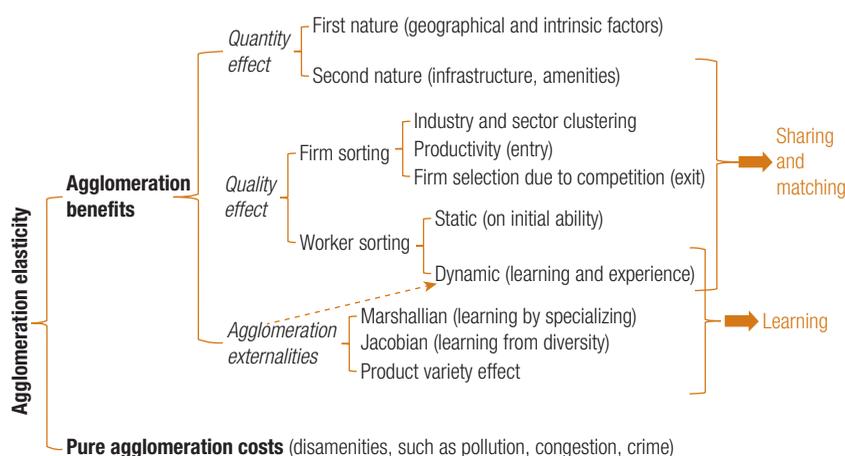
Source: World Bank staff elaborations using the typology of sharing, matching, and learning in Duranton and Puga 2004.

Note: Marshallian refers to gains from being together with similar firms (often called *localization economies*). Jacobian refers to spillovers across diverse sectors (often called *urbanization economies*).

These three effects in turn drive measured agglomeration effects through quantity effects, quality effects, and externalities (Combes et al. 2010).

Unpacking Agglomeration Benefits: Quantity Effects, Quality Effects, and Externalities

Quantity effects refer to the fact that more productive places tend to attract *more* workers and firms, building on natural geography (first nature) such as ports and natural resources, as well as the human geography of the past, and sunk factors such as installed infrastructure or amenities or institutions that are shared (second nature). This includes not only public utilities or other infrastructure, but also access to a dense network of specialized input suppliers and business support services, and a deeper pool of labor that enhances specialization and productivity.

The ability to outsource locally, for example, helps firms lower production costs by maintaining leaner inventories; workers and firms can specialize. "Thicker" labor markets facilitate matching skilled workers with job opportunities, an effect that becomes more important as skill levels rise (see, for example, evidence for the United States in Anderson, Burgess and Lane [2007]; evidence for Portugal in Figueiredo, Guimarães, and Woodward [2014] and Andini et al. [2013]; and evidence for Italy in Di Addario [2011]). Workers and firms in large cities can be more selective in forming matches because the opportunity cost of waiting for a prospective match is lower (see, for example, evidence on the United States in Wheeler [2008]). For advanced economies, various studies show that, among sharing motivations, the pooling of input suppliers is the most important (see, for example, evidence for the United Kingdom in Overman and Puga [2010] and for the United States in Ellison, Glaeser, and Kerr [2010]). For developing countries, labor pooling appears to be more important in explaining coagglomeration patterns (see, for example, evidence for Indonesia in Amiti and Cameron [2007] and for India in Roy and Li [2020]; see also Becker and Murphy [1992] and Duranton [1998]). All these effects raise the possibility that the elasticity is measuring the reverse causality: places are dense *because* they are more productive. Econometric estimates attempt to deal with this by instrumenting density with historical density or geological variables that may have historically been important for clustering.

Quality effects arise from the fact that cities attract *better* firms (see, for example, Combes et al. 2012) and workers. More able workers may sort into cities because cities offer more opportunities or amenities (static benefits). Once they are there, they will learn more (dynamic benefits), either because they must compete or because cities offer more learning opportunities. This higher level of human capital will make firms and workers more productive and raise wages. What an urban worker learns over a span of 3 to 10 years potentially adds another 23 percent to the urban wage premium

in advanced economies such as Spain (De la Roca and Puga 2017). Over a working life, these gains could amount to between 50 percent and 125 percent, Duranton (2015) estimates. Access to inputs (labor, finance, materials, energy), a more conducive business environment, or cultural amenities will attract better and more entrepreneurial firms.

Figure 2.8 uses data from the World Bank Enterprise Survey to show that as countries urbanize, the density of new firms increases. In the United States, larger cities are found to offer more jobs in start-ups: the elasticity of employment in new start-ups per capita with respect to city scale is estimated to range from 0.07 to 0.22 (Glaeser and Kerr 2009). Urban regions in most member countries of the Organisation for Economic Cooperation and Development (OECD) also have higher levels of business dynamics, in terms of the rates of both business creation and destruction—particularly those urban regions that are at the frontier of national productivity (OECD 2017).[7]

Agglomeration externalities refer to gains in productivity arising from "learning" benefits intermediated outside (external to) the market related to knowledge creation and spillovers from new technology and innovation, networking, collaboration, and information sharing (Duranton and Puga 2004). For example, a firm may benefit from knowledge "in the air"—as Alfred Marshall called it. There is no market for this knowledge, and it has no price. Benefits can include the gains from being together with similar firms (often called *localization economies*), as stressed by Marshall (1890). They can also

FIGURE 2.8   Urban Density Is Associated with Higher Firm Entry
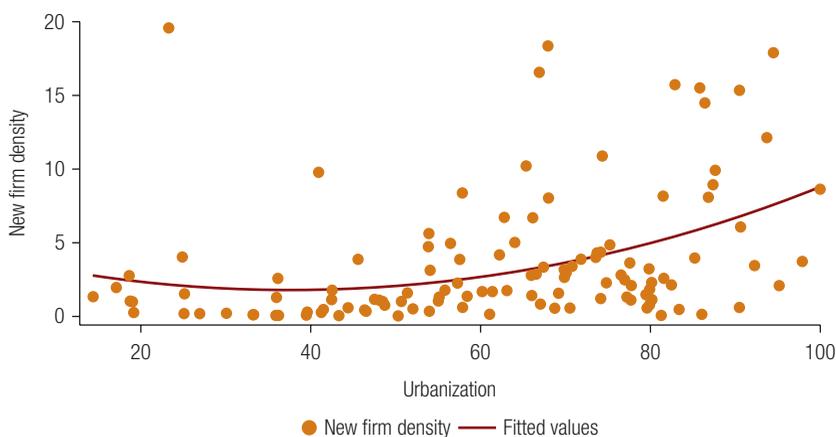
Source: World Bank staff elaboration based on data on the density of new firms from the World Bank Enterprise Survey and database and urban density from the United Nations Population Division, World Urbanization Prospects: 2018 Revision.

Note: New firm density is defined as the number of new businesses and new limited liability corporations registered in the calendar year. Urbanization refers to people living in urban areas per unit area, as defined by national statistical offices.

include the spillovers across diverse sectors (often called *urbanization economies*), as emphasized by Jacobs (1961). Workers may gain human capital by interacting with a larger number and higher quality of workers, thus contributing to the dynamic learning effect (see dashed diagonal line in figure 2.7). US cities that experience higher growth in the number of college graduates also see a rapid increase in average wages, beyond the obvious compositional effects, than those with stagnating stocks of human capital, suggesting important knowledge spillovers (Moretti 2004). More recently, researchers have recognized that improving benefits from agglomeration is not only about bringing more and better "clones" to the city but also a greater variety of them—which is arguably an aspect of agglomeration externalities (see Duranton 2016; Diamond 2016; Atkin, Faber, and Gonzalez-Navarro 2018; Handbury and Weinstein 2015). For instance, the higher prices in cities are offset by the accessibility of products and the extensive varieties of goods and services available, meaning that actual prices are not any higher than that in other locations, Handbury and Weinstein (2015) observe.

Cities also allow for learning among firms through spillovers in knowledge-intensive activities, such as innovation in products and processes, and research and development (R&D). R&D is much more spatially concentrated than economic activity in general,[8] partly due to the sharp attenuation with distance of such sharing.[9] More than 90 percent of the patents in the United States have been granted to residents of metropolitan areas, and virtually all venture capital investments have been made in major cities. The core of Silicon Valley contains three-quarters of the industrial patents filed from the San Francisco Bay area and 18 of the top 25 regional zip codes in terms of patenting (Kerr and Kominers 2015; Chatterji, Glaeser, and Kerr 2014). In Germany, patents tend to be concentrated in 11 of the 97 regions (Fornahl and Brenner 2009). Similarly, venture capital investment within the biotech sector is particularly concentrated in areas of a 10-mile radius or less (Audretsch and Feldman 1996; Gompers and Lerner 2001; Kolympiris, Kalaitzandonakes, and Miller 2011). In France, six regions account for 75 percent of all corporate R&D workers, compared with 45 percent of the production workers (Carrincazeaux, Lung, and Rallet 2001). The departments of the three main cities in Colombia that host 40 percent of the population generate more than 70 percent of innovation in the country (Nieto Galindo 2007). Higher integration of technology-intensive manufacturing or knowledge-intensive services in global value chains is associated with enhanced concentration (Grover and Lall 2021) (see detailed discussion in chapter 1).

Agglomeration costs refer to the fact that concentrating populations have costs as well as benefits, including higher crime; congestion in transport, land, and housing; and disease. Indeed, COVID-19 has spread most rapidly in the major cities, raising questions about their future in an era in which the internet permits working from the suburbs. Such costs—and the compensation and remedies for such costs—are often not considered in interpreting estimates of the wage elasticity. For instance, attracting a worker to a higher crime urban area may require employers to offer a higher wage without any presumption that productivity will increase.

Measuring the Benefits of Spatial Concentration

Estimates of the elasticity of productivity—customarily measured by nominal wages with respect to city density—range between 4 percent and 5 percent for advanced economies.[10] For developing countries, consensus is elusive: estimates range between 6 percent and 16 percent for Latin American countries (Quintero and Roberts 2018; Duranton 2016); stand at around 17 percent for six African countries (Ethiopia, Ghana, Malawi, Nigeria, Tanzania, Uganda) (Henderson, Nigmatulina, and Kriticos 2019); and reach 19 percent and 12 percent for China and India, respectively (Chauvin et al. 2017).

Meta-Analysis of Existing Estimates

To cast the net more broadly and begin to understand what drives these numbers, Grover, Lall, and Timmis (2021) examine more than 1,200 estimates from 70 studies covering 33 countries over the period 1973 to 2020. Panel a of figure 2.9 presents estimates from that exercise for selected countries that seem to confirm that developing countries have huge benefits from agglomeration. The elasticity is nearly 5 points higher than the elasticity for developed countries. Panel b shows a refinement of the estimates based on studies that instrument current density with historical density to mitigate reverse quantity effects (that is, productive places attracting more people and firms). The unweighted mean estimate is 7.1 percent for non–high-income countries, compared to 3.9 percent for high-income economies.

The meta-analysis by Grover, Lall and Timmis (2021) confirms that these aggregate estimates hide substantial heterogeneity across various dimensions: countries, sectors, and skills (see figure 2.9 for country-level differences and figure 2.10 for additional differences by sector and productivity measure). While there are positive returns in China, India, and countries in Africa, estimates from Chile actually have negative wage elasticity estimates. The meta-analysis suggests that these elasticity estimates are on average 3.5 percentage points higher than the overall estimates. Skilled workers disproportionately benefit from density—the elasticity being 1.7 percentage points higher in studies that estimate this separately relative to those that do not (figure 2.11 summarizes the results of the meta-analysis). This is consistent with findings in the literature of a higher skilled (nominal) wage premium in denser cities (see, for example, Ahlfedt and Pietrostefani 2019; Moretti 2013). For example, cognitive and social skills and those relating to non-routine jobs are better rewarded in large cities, while rewards to motor skills and physical strength are lower (Bacolod, Blum, and Strange 2009; Andersson, Klaesson, and Larsson 2014).

Looking at studies using distinct elasticities yields further insights into the contribution of agglomeration. Estimates using nominal wages or labor productivity are 6.3 percentage points and 4.3 percentage points higher than those using total factor

FIGURE 2.9 **Meta-Analysis: Raw Elasticities Suggest Strong Agglomeration Economies in Developing Countries**

a. Raw ordinary least squares estimates

b. Controlling for endogeneity (instrumental variables estimates)

■ Non–high-income ■ High-income
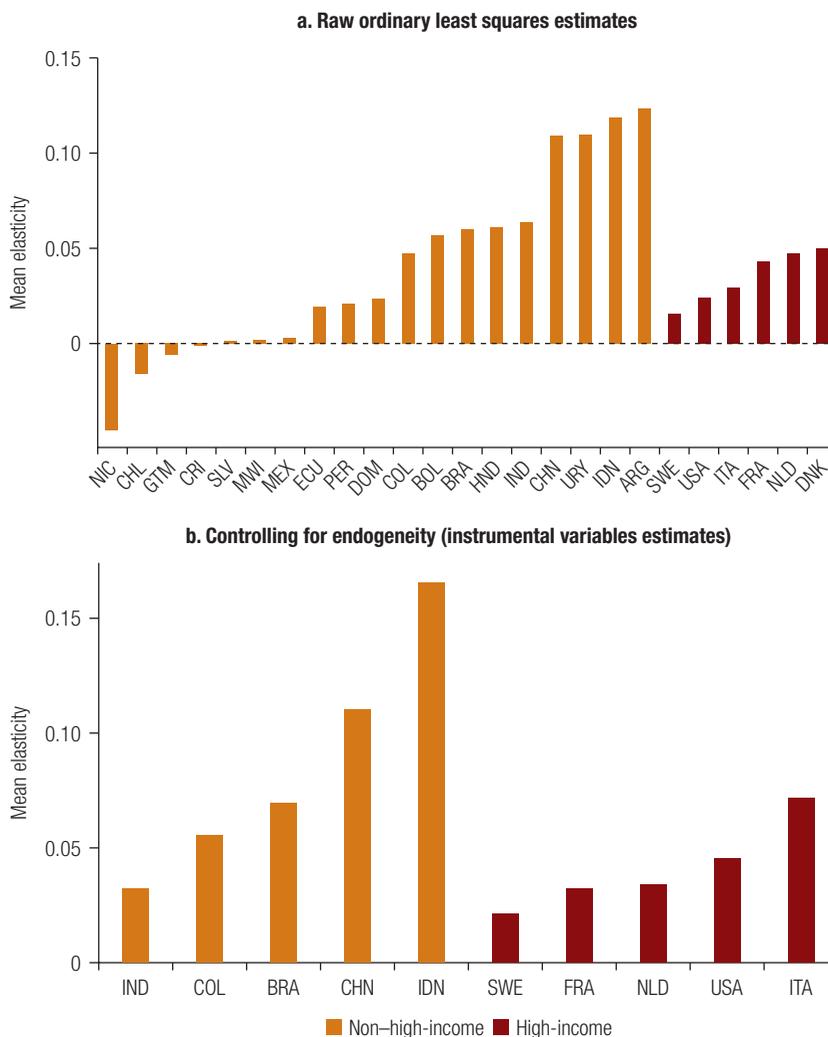
Source: Grover, Lall, and Timmis 2021.

Note: This figure computes unweighted average wage elasticity estimates for each country using individual worker data for the non-services sector (reflecting either manufacturing or the entire economy). This comprises two-thirds of the developing country estimates. Panel a reflects 271 raw elasticity estimates (144 in non–high-income countries). Panel b comprises 162 raw elasticity estimates (107 in non–high-income countries). These panels aggregate different studies with different methodologies, so caution should be taken in comparing results. Various instruments are used in studies, ranging from historical population density to geological variables such as temperature or terrain. The panels use International Organization for Standardization country codes.

productivity (TFP) (see panel b of figure 2.10 with illustrative raw elasticities and figure 2.11 with a rope-ladder representation of coefficient estimates). This suggests that part of the wage premium in urban areas is driven by higher capital intensity—perhaps a result of thicker capital markets—rather than efficiency or spillovers per se. In addition, studies that control for sorting of skilled workers either at the local level or

FIGURE 2.10 **Estimated Elasticity in Developing Countries Is Lower in Services and When Using Total Factor Productivity Data**

a. Agglomeration elasticity in services

b. Agglomeration elasticity using TFP

■ Non–high income   ■ High income
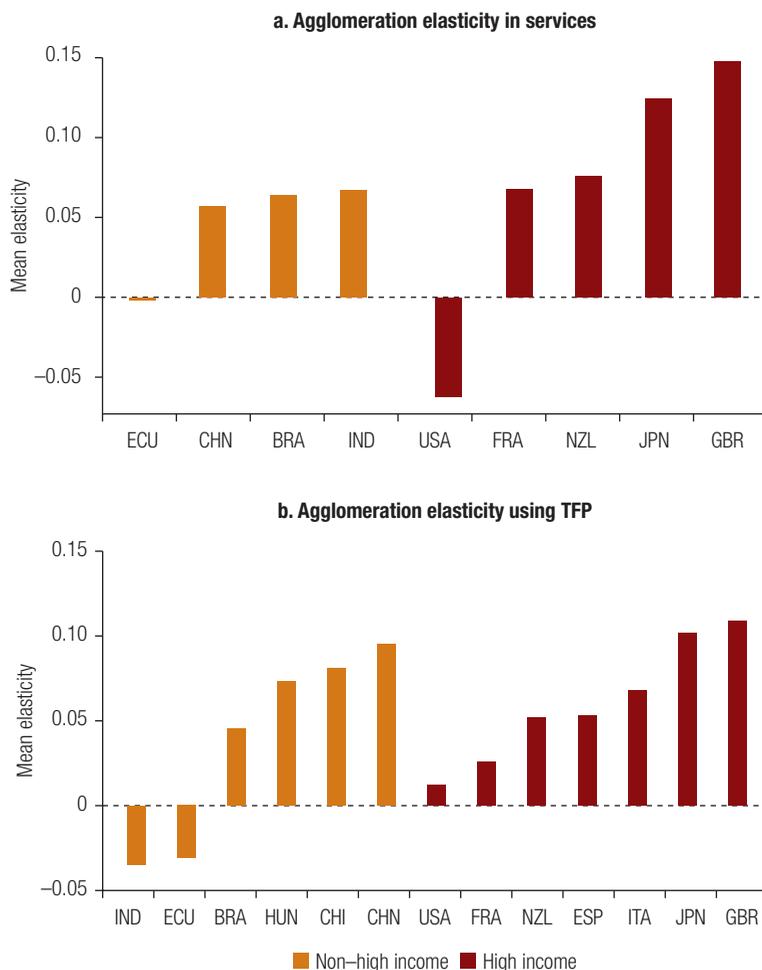
Source: Grover, Lall, and Timmis 2021.

Note: Panel a computes unweighted average productivity elasticity estimates for each country using services sector data—encompassing both micro and spatial data, and wages, labor productivity, and total factor productivity (TFP) estimates. This reflects 193 raw elasticity estimates (of which 58 come from non–high-income countries). Panel b computes unweighted average TFP elasticity estimates for each country—encompassing both micro and spatial data and any industry. This is derived from 467 raw elasticity estimates (of which 64 come from non–high-income countries). The panels use International Organization for Standardization country codes.

using individual's education—a result of either static sorting or learning on the job—reduces agglomeration premiums by 1.0 percentage point and 1.1 percentage point respectively, suggesting that estimates are also picking up human capital. Finally, controlling for selection of better workers or firms by employing panel fixed effects that strip out all time-invariant worker or firm characteristics lowers estimates by about 1.8 percentage points relative to studies that do not control for such effects—consistent with the findings in the literature (figure 2.11).

FIGURE 2.11 **The Agglomeration Premiums on Labor Productivity Nearly Disappear after Controlling for Urban Costs**
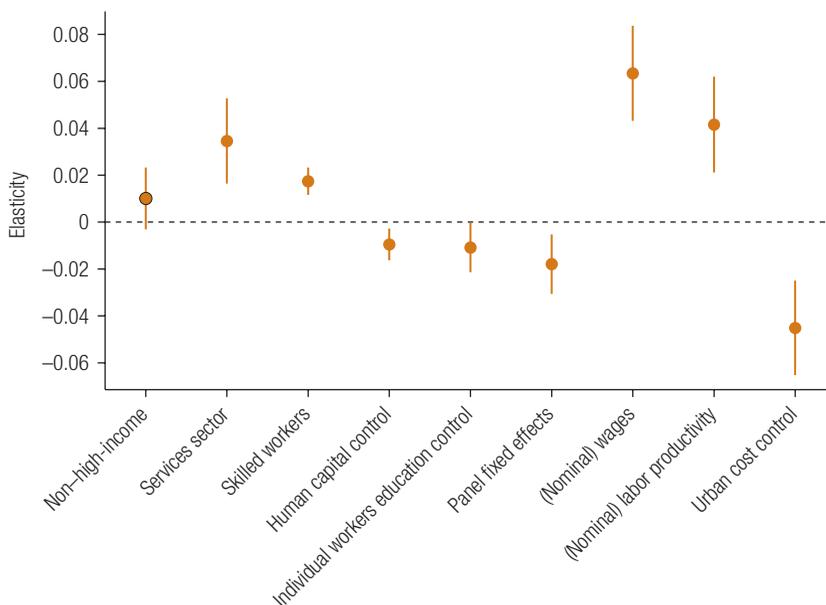
Source: Grover, Lall, and Timmis 2021.

Note: The figure uses a rope-ladder representation of a subset of the estimated coefficients from the meta-analysis model. The meta-analysis probes into the factors—methodological, data related, controls—that influence agglomeration elasticity estimates. The methodology for the meta-analysis minimizes the Bayesian information criterion. Using the standard errors of the coefficients, it also plots the 90 percent confidence intervals, where standard errors are clustered at the study level. Similar estimated coefficients are obtained by model selection using the Akaike information criterion or Bayesian model averaging methods.

Isolating True Efficiency Gains: Physical Total Factor Productivity

A final conceptual and methodological issue is that total TFP is the residual of revenue—the *value* of output—once controlling for capital, labor, and perhaps human capital.[11] The most commonly used measure of productivity, revenue total factor productivity (TFPR), backs out physical quantity measures by deflating firm revenues by industry-level price indexes. However, these measures are contaminated by residual firm-level price effects that capture firm-specific input costs, product quality, and market power considerations, all of which may be correlated with policy changes as much as efficiency is. New techniques applied to databases with firm-level prices allow a true measure of efficiency—physical (or quantity) total factor productivity (TFPQ)—to be extracted. Productivity analysis that does not account for industry market structure may lead to false inferences about the benefits of agglomerations. This is problematic because firms charging higher output prices will appear to be more productive, even if these gains are actually representing higher costs or market power. If prices also rise with density, then it is impossible to isolate the true efficiency gains from agglomeration. Thus, it is important to disentangle the relationship between density and TFPR into its components: output prices and TFPQ.

Grover and Maloney (2021) do so for this volume for a set of four developing countries (Chile, Colombia, Ethiopia, Indonesia) whose surveys permit isolating firm prices from physical output. Results for Indonesia and Ethiopia are presented in figure 2.12 (see annex 2A for an exposition of the methodology used in Grover and Maloney [2021]). The traditional wage gains are confirmed: 5.7 percent for Indonesia, and 5.2 percent for Ethiopia. Also consistent with the meta-analysis, the elasticity associated with TFPR is much smaller than that for wages, falling to 2.2 percent in Indonesia and becoming negative 2.3 percent but insignificant in Ethiopia, reflecting that firms in cities use more capital.[12] Efficiency gains disappear altogether or become negative when the analysis controls for output prices. Using the method in Foster, Haltiwanger, and Syverson (2008) to construct a measure of technical efficiency where TFPQ = TFPR/(Aggregate Price Index)—as well as an alternative measure following Gandhi, Navarro, and Rivers (2020) extended to account for the input price bias, as in De Loecker et al. (2016)—the elasticity for Indonesia and Ethiopia is *negative:* −1.1 percent and −6.1 percent for the former; and −0.2 percent and −0.7 percent for the latter, although both measures are statistically insignificant in most cases.

Both types of estimates suggest that prices also rise with agglomeration.[13] In Indonesia, the output price elasticity is 3.3 percent, and the marginal cost elasticity is 4.7 percent. There is no evidence of increased markups, suggesting that costs are the principal driver of the price elasticity. In Ethiopia, although output prices are higher in dense locations (with an elasticity of 3.8 percent), marginal costs are significantly higher (with an elasticity of 11.1 percent), with markups falling. In theory, prices could also be capturing gains in productivity arising from firms in urban locations producing better quality goods, in which case the TFPQ estimates offer a lower bound and the TFPR estimates the upper bound. The results, however, suggest that increased costs are driving the traditional elasticities to a great degree and hence the benefits of sharing, matching, and learning are smaller than often thought.

These findings, of course, cannot be extrapolated to higher-income countries: preliminary evidence from Chile shows falling prices and, in fact, rising TFPQ, consistent with the standard story. But the solution to the urban productivity puzzle appears to be that developing country cities have higher costs that must be compensated for—such as in the form of higher wages—thereby yielding a higher wage elasticity. However, the actual efficiency of these cities corresponds with what is found on the ground: fragmented, poorly designed cities.

But this raises the question of why firms locate in cities if, as in the Ethiopian and Indonesian cases, they appear to bear costs to do so in terms of efficiency. It may be that is where the customers or necessary inputs and capital are. For a serious entrepreneur in a developing country, cities—however costly—are the only game in town. In Indonesia, the elasticity of sales with respect to density is 9 percent, while that with respect to

FIGURE 2.12   Efficiency Gains from Agglomeration Disappear Altogether or Become Negative after Controlling for Output Prices

a. Indonesia

b. Ethiopia

● Agglomeration elasticity point estimate in %   ⊢——⊣ 95% confidence interval
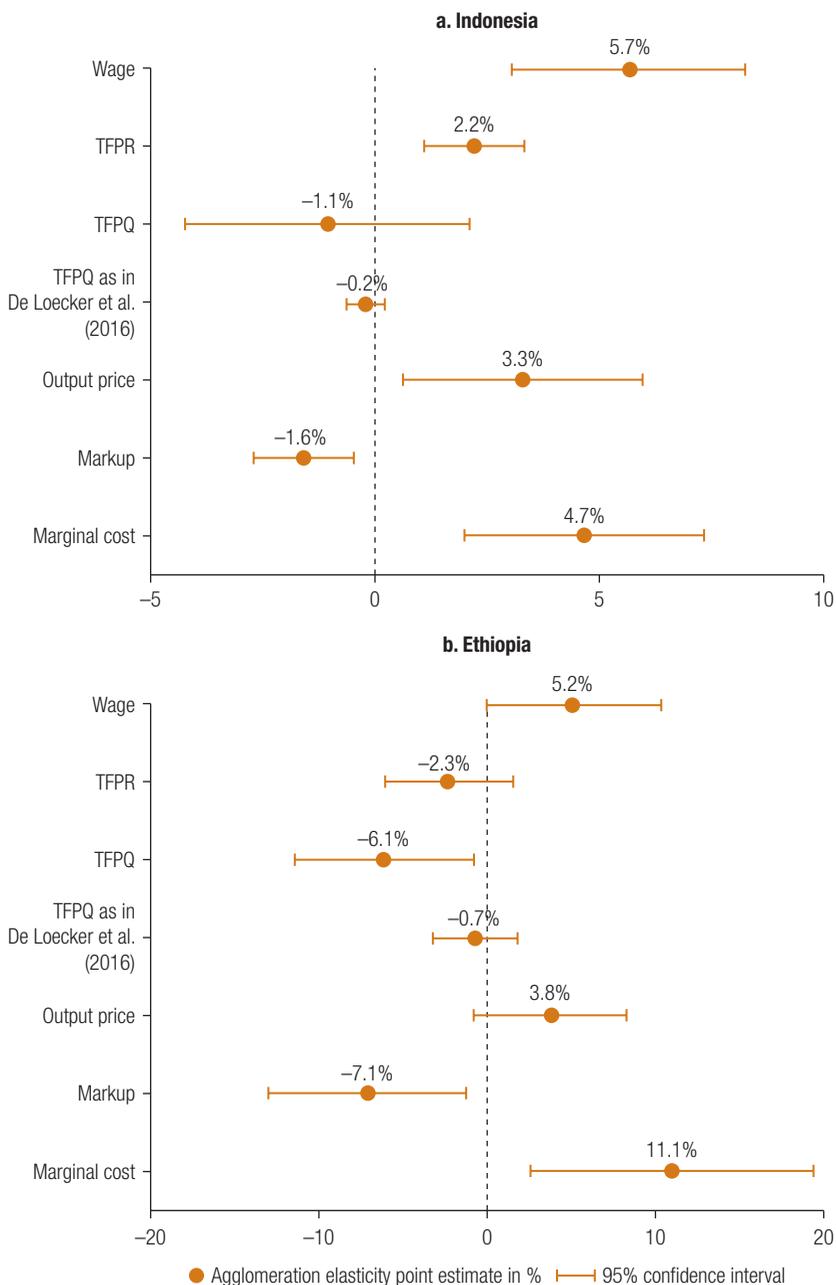
Source: Grover and Maloney 2021, for this volume.

Note: Each dot presents the point estimate from regressing the log of firm-level nominal wages (Wage), revenue total factor productivity (TFPR), and physical total factor productivity (TFPQ), estimated following De Loecker et al. (2016), and output prices, price-cost margins (markup), and marginal costs on the log of population density at the district level. All regressions include firm age and four-digit-industry-year fixed effects. Regressions on Wage and Price include the natural logarithm of the number of workers at the firm level as an additional control. Population density is the population in each administrative location over its area. The tick-marks around the point estimates represent the 95 percent confidence intervals.

capital intensity is about 12 percent. That is, cities offer the opportunity to expand the scale of production and potential access to the necessary finance and capital.

Firms may also locate in cities for improved access to skills. When the analysis controls further for location-level availability of skills, the wage and TFPR elasticity estimates are lower, while the TFPQ elasticity continues with a negative sign, but with higher magnitude, suggesting that the previous estimates of technical efficiency gains could possibly be attributed to better skills. Better access to factors of production may also motivate more productive firms to sort into denser cities. The analysis finds that premiums associated with wages are lower, while prices and input costs are wiped out when firm fixed effects are introduced in the base specification. This implies that indeed, certain time-invariant firm capabilities affect output prices and cost efficiency because more capable (or more productive) firms presumably employ more skilled labor and may pay higher wages. Firm output prices no longer show any density premiums in this specification (Grover and Maloney 2021).

As a way of summarizing the key results across the four countries investigated, figure 2.13 shows that for Chile, Colombia, Ethiopia, and Indonesia, the elasticities of wages with respect to density are somewhat higher (and decreasing by country's

FIGURE 2.13 **Evidence of Sterile Agglomeration: Physical Measures of Total Factor Productivity Decline with Population Density, While Costs Rise in Lower-Income Countries**
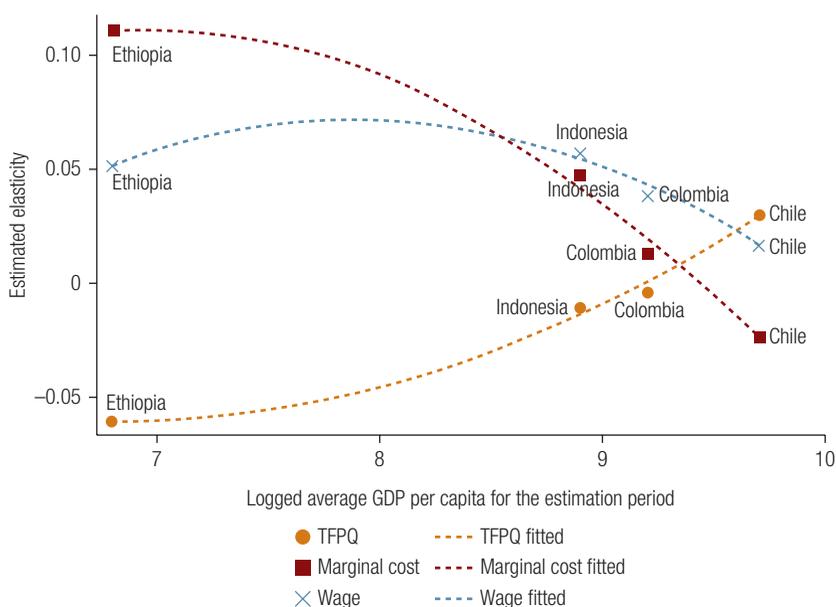
Source: Grover and Maloney 2021, for this volume.

Note: Estimates using industrial census data. Estimates of TFPQ presented in the figure use Foster, Haltiwanger, and Syverson (2008) method, although results also remain robust using alternative methods along the lines of De Loecker et al. (2016). Each dot presents the point estimate from regressing the log of wages, firm-level physical total factor productivity (TFPQ), and marginal costs on the log of population density at the district level. All regressions include firm age and four-digit-industry-year fixed effects. Population density is the population in each administrative location.

income per capita) than those of the advanced economies. However, they appear to be driven largely by higher costs of congestion and prices in urban agglomerations. The elasticity of TFPQ with density is in fact *negative* for all but Chile—the only country for which productivity gains rise faster than costs. With development, productivity gains rise, and marginal costs fall, suggesting that developing country cities are not functioning as expected in the advanced economies.

Measuring the Full Costs of Agglomeration: Accounting for the Extra Expense of Working in Developing Country Cities

The preceding exercises demonstrate how controlling for prices importantly changes the conclusions about agglomeration benefits generated from the canonical measures of wage and TFPR elasticities. These price measures partially reflect the direct costs of working in cities (such as higher housing costs or time lost in transport) or compensation for cities' disamenities (such as pollution and more crime). These costs have received far less attention than agglomeration benefits in the literature, but the results of this volume are consistent with the few studies that have appeared. Combes, Duranton, and Gobillon (2019) find a cost elasticity slightly larger than the agglomeration elasticity even in cities in an advanced economy (France), suggesting that the net benefits from city size are close to being flat. Duranton (2016) obtains comparable results for cities in Colombia. The meta-analysis in Grover, Lall, and Timmis (2021) suggests that studies controlling for urban costs find the elasticity to be 4.2 percent lower than studies that do not. For example, if elasticity is measured using labor productivity and wages, then the net elasticity controlling for urban costs would be 0.1 percent for high-income countries, while the corresponding estimate would be 1 percent for non–high-income countries.

Breaking apart these costs, Duranton and Puga (2020) show that a typical elasticity of the price of housing at the center of a city with respect to city population in advanced economies such as France and the United States is about 0.1 and the typical elasticity with respect to land prices is about 0.3. With housing representing one-third of household expenditure in large cities, the cost of living in a city that is 10 percent denser is about 1 percent higher. These costs seem to rise in developing countries. This volume collected data from hundreds of cities around the world to construct estimates of urban disamenities with respect to pollution, congestion, and crime (see Grover, Lall, and Timmis 2021).[14] Population density is estimated from the built-up area per person using the Global Human Settlement Urban Centre Database for 2015, the latest year for which the necessary data are available.

The analysis in this volume suggests that urban disamenities are higher in levels in developing countries (see figure 2.14). For the average city density in the data, in high-income countries 19 percent to 30 percent fewer hours are spent in traffic congestion, pollution is 16 percent to 28 percent lower, and the homicide rate is around four times lower. Relative to high-income countries, the agglomeration elasticity of disamenities

in developing countries is higher for crime, but similar for pollution and congestion. The elasticity of pollution and congestion for the full sample of cities examined in Grover, Lall and Timmis (2021) with respect to built-up density is 45 percent and 16 percent. In fact, in low-income cities, high densities often reflect crowding. People are packed in slums and live in squalid conditions (Lall, Henderson, and Venables 2017; Ellis and Roberts 2016). The streets are congested, and the air and water are polluted. Even at low levels of pollution, there may be a negative association between air pollution and firm performance, measured by productivity and employment growth, Soppelsa, Lorenzo-Gracia, and Xu (2020) find.

Furthermore, the elasticity of the homicide rate is positive and very high (24 percent) in developing countries and negative (56 percent) in developed countries, Grover, Lall, and Timmis (2021) find (see figure 2.14 for an illustration). This suggests that if urban costs pertaining to crime are accounted for, the magnitude of net agglomeration elasticity in developing countries would be smaller or even negative.

FIGURE 2.14 **Urban Costs Are Higher in Developing Countries than in Advanced Economies**

a. Pollution disamenity elasticity

b. Congestion disamenity elasticity

c. Crime agglomeration elasticity

● Non–high-income ● High-income
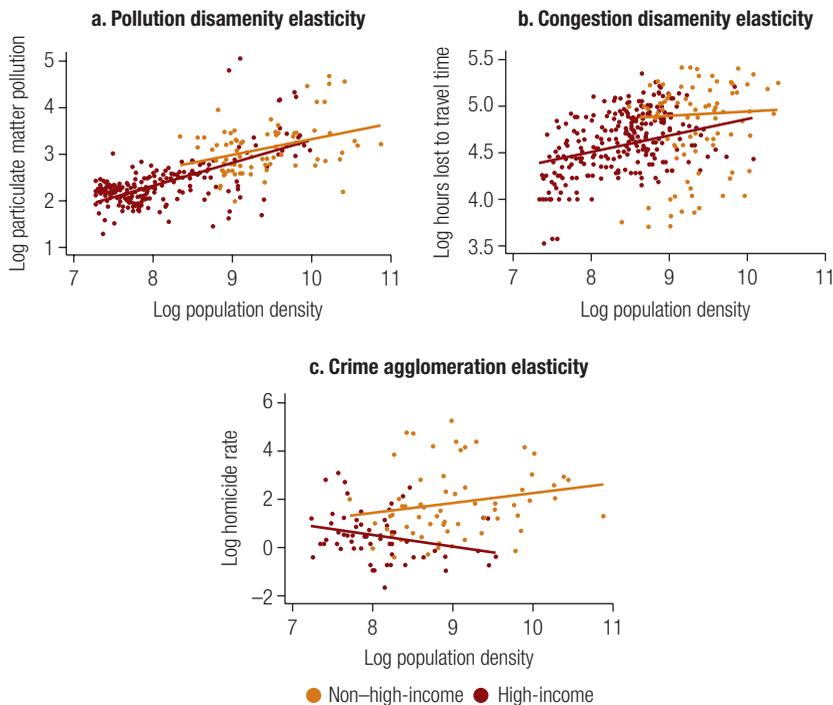
Source: Grover, Lall, and Timmis 2021.

Note: In panel a, city-level pollution reflects particulate matter ($PM_{2.5}$) data for 2014 for 298 cities (78 in non–high-income countries). In panel b, congestion reflects the annual additional hours spent driving in rush hours, measured in 2018, and contains data for 337 cities (69 in non–high-income countries). In panel c, homicide rate data reflect 124 cities (63 in non–high-income countries) in 2015. In all three panels, population density is calculated from built-up area per person in 2015. The top and bottom 1 percent of population density observations are dropped for clarity.

Conclusion

The concentration of population has occurred for millennia and generally for similar reasons: firms and individuals tend to be more productive and happier living more densely together. This has important implications for spatial policy.

First, the destiny of places is very much embedded in history and geography. This persistence induces inertia into spatial locations of economic activity. Whether driven by natural conditions, man-made structures, or agglomeration externalities, today's cities often have their roots centuries or millennia ago. Thus, policy makers are not working with a blank slate. Moreover, working against this inertia can be costly and frequently fails. Artificially created capital cities, such as Brasilia, Brazil; Springfield, Illinois; Naypyidaw, Myanmar; and Abuja, Nigeria, benefit from being the seat of government and related industries, but often struggle to diversify their economic base and generate the dynamism of other cities in their countries, such as Rio de Janeiro, Chicago, Yangon, or Lagos. This is even more the case with, for example, the Siberian island cities.

Second, the drivers of patterns of agglomeration are changing rapidly. High transport and communication costs in the past dictated the proximity of markets and consumers to producers, giving rise to many small cities. This is no longer the case. In many industrializing countries, firms agglomerate in places where they can access global markets easily, leading to much less equitable spatial patterns—although arguably megacities can potentially export at scales and with efficiencies unimaginable a century ago.

However, the widely popularized high estimates of agglomeration elasticities present a puzzle because the dysfunctionality of many developing country cities is apparent after a very short stay. High densities often reflect crowding, where people are packed in slums, which are short on housing and amenities, where streets are crowded and moving anywhere takes hours, and where air and water are polluted.

To resolve this puzzle, this chapter first presents a framework for thinking through the components of the canonical efficiency measures. The discussion uses that framework to both interpret the existing estimates and generate the first estimates of true productivity and costs in developing country agglomerations. The analysis confirms the very high wage elasticities with respect to density, but finds no evidence for efficiency gains, and further finds that the high and increasing costs of working in these cities ultimately make them sterile agglomerations. This is partly driven by bad design and lack of capital investment in cities, but also by the fact that today their growth is not driven by the process of structural transformation, which would create a mass of industrial or service firms that benefit from sharing, matching, and learning, but often by migration of people coming from stagnant agricultural areas with poor services, or fleeing environmental damage or conflict. These cities are not densely productive—they are just crowded.

The conclusion here is twofold. First, progress needs to continue on the existing agenda to make cities more efficient by lowering the cost of congestion in transport and

housing, while clarifying property rights, land markets, and zoning, and addressing local environmental externalities. While it may be appealing to consider place-based interventions that directly improve transportation and housing supply, care must be taken to address the underlying land markets, zoning, and property rights, and enact a complementary set of policies to make such interventions more valuable to local businesses and local residents. Chapter 7 provides an assessment of transportation and housing programs using the framework outlined in the overview and expanded upon in chapter 6.

Second, the productivity benefits will only arise with the necessary transformation of the economy. Hence, a broader reform agenda is necessary to make that happen. This relates as much to cultivating shares of value chains in manufacturing as in promoting higher-end services and, for the least developed countries, including transformation within agriculture. Chapter 5 discusses these steps in the context of lagging regions. Chapter 7 focuses on special economic zones. But in the long term, the agenda must be national.

Annex 2A. Estimating Productivity, Marginal Cost, and Markups

To estimate agglomeration elasticities, Grover and Maloney (2021) use a standard specification:

$$y_{it} = \gamma\, den_{l(i)t} + \theta\, X_{it} + FE_{jt} + \varepsilon_{it} \qquad (2A.1)$$

where y_{it} represents the set of firm-level productivity measure: wages, w_{it}; revenue total factor productivity TFPR, $tfpr_{it}$; and physical (or quantity) total factor productivity TFPQ, $tfpq_{it}$ or other related outcomes of interest: price, p_{it}; marginal cost, mc_{it}; and markup, μ_{it} The population density in location (l) is represented by $den_{l(i)t}$, where firm (i) is located at time (t). X_{it} includes firm-level controls, such as firm age and size (measured by the number of workers l_{it}, included in wage and price regressions only). All variables, except firm age, are in natural logarithm. FE_{jt} are pair-wise four-digit-industry-year fixed effects to help factor in any sectoral or time trend. Base estimations apply an ordinary least squares technique, and standard errors are clustered at the level of the spatial unit.

Firm-level average wages (total wages/number of workers) and prices are directly observed in the data. The firm-level price index, P_{it}, is the aggregated index computed using a weighted average of a firm's product-level price data.[15] $TFPR_{it}$ is the Hicks-neutral measure of firms' efficiency, commonly used in the literature to capture the residual output variation after controlling for tangible inputs of production. $TFPR_{it}$ is unobserved to the econometrician but known to the firm when making its periodic input decisions. This induces a correlation between productivity and inputs resulting in the well-known "simultaneity" or "transmission bias" (Marschak and Andrews 1944). To solve for this endogeneity, the production function for each two-digit industry is estimated following the structural approach in Gandhi, Navarro, and Rivers (2020).[16]

Since the output and input variables used in the production function are based on monetary values (deflated at the industry-year level), the resulting estimated measures of efficiency are revenue based (Klette and Griliches 1996).

Observing output prices allows us to compute physical quantity produced by the firm and hence isolate demand factors from revenue-based productivity (Foster, Haltiwanger, and Syverson 2008). $TFPQ_{it}$ is the Hicks-neutral measure of physical total factor productivity we are interested in estimating. Using the method in Foster, Haltiwanger, and Syverson (2008), a simple measure of technical efficiency is constructed: $tfpq_{it} = tfpr_{it}/\ln p_{it}$. Although firm-level prices are observed and output is in physical quantity, capital and material inputs are still based on expenditure deflated with an industry-specific price index. This implies that for any deviation from a perfectly competitive input market, capital and material inputs would also include unobserved idiosyncratic input price variation. To correct for the "input price" bias arising from the correlation between input prices and quantities, Grover and Maloney (2021) rely on Blum et al. (2018), which extends the Gandhi, Navarro, and Rivers (2020) method to recover estimates of markups using output price data. Following De Loecker et al. (2016), this methodology is extended to address the input prices bias stemming from unobserved firm-level input prices, henceforth $TFPQ_{it}$, along the lines of De Loecker et al. (2016).

After estimating the production function parameters, firm-level markups (μ_{it}) can be recovered from marginal costs (mc_{it}) and output prices. Specifically, markups are calculated based on the expression derived from the first order condition of the firm's cost minimization of the flexible material inputs:

$$\mu_{it} = \ln \alpha_{it}^m - \ln S_{it} - \varepsilon_{it} \tag{2A.2}$$

where α_{it}^m is the output elasticity of materials estimated from the production function; S_{it} is the share of material inputs expenditure (M_{it}) over total sales (R_{it}); and ε_{it} is the ex post shocks to the estimated production function. As markups are the wedge between prices and marginal costs, $mc_{it} = \ln P_{it} - \mu_{it}$.

Notes

1. See https://www.worldbank.org/en/topic/urbandevelopment/overview#1.
2. See Chauvin et al. (2017) for the United States, China, and India; Combes, Duranton, and Gobillon (2008) for France; De la Roca and Puga (2017) for Spain; and Henderson, Nigmatulina, and Kriticos (2019) for Africa.
3. They use building heights to develop a measure of density adjusted for floor area and show that by not taking into account the quality of built structures, naive measures of population density end up conflating crowding and livable densities.

4. In contrast, in Brazil, India, and Malaysia, shares of urban farmers are all less than 7.5 percent (Henderson and Kriticos 2017; Henderson and Turner 2020). In many African countries, this share has been rising rather than falling (Hommann and Lall 2019).

5. Some studies, however, find little correlation with resource sectors and argue that it is the unusually low agricultural productivity and poor service provision that propels migrants to the cities (see Henderson and Turner [2020] and chapter 3 on migration and labor mobility in this volume).

6. For a survey of the overall channels of sharing, matching, and learning effects, see Combes and Gobillon (2015).

7. These worker and firm quality effects can be identified econometrically by controlling for human capital explicitly and controlling for firm-specific fixed effects.

8. See Audretsch and Feldman (1996), Buzard and Carlino (2013), and Buzard et al. (2016) for evidence on the United States, and Carrincazeaux, Lung, and Rallet (2001) for evidence on France.

9. See Rosenthal and Strange (2008); Carlino and Kerr (2015); Ellison, Glaeser, and Kerr (2010); and Kerr and Kominers (2015) for evidence on the United States, and Capello and Lenzi (2014) for the European Union.

10. For reviews, see Rosenthal and Strange (2004) and Melo, Graham, and Noland (2009).

11. For a complete discussion, see an earlier volume in the Productivity Project series, *Productivity Revisited* (Cusolito and Maloney 2018).

12. TFPR is computed using a Hicks-neutral total factor revenue productivity after estimating a gross-output production function, following the nonparametric estimation strategy of Gandhi, Navarro, and Rivers (2020). While both wages and TFPR estimates are interpreted as a productivity premium of density, their magnitudes are not directly comparable. In wage equations, all the effects should be rescaled by the share of labor in the production function (Combes et al. 2010). One key reason for this difference is the presence of urban costs, which are expected to increase nominal wages through local input markets, housing costs, and urban disamenities, and thus yield larger estimated wage elasticities.

13. This result is in line with that of Handbury and Weinstein (2015), who use detailed barcode data and find a positive elasticity of price with respect to population.

14. The elasticity estimates of urban disamenities in this chapter is somewhat higher than those of Ahlfeldt and Pietrostefani (2019), who find a pollution elasticity of +22 percent, using ordinary least squares estimation with OECD data. They also find a congestion elasticity of +8 percent using a different measure of congestion and average travel speeds. Their meta-analysis of 13 studies estimating elasticities of crime (not focusing on homicides, as in Grover, Lall, and Timmis [2021]) in high-income countries has a mean elasticity of −24 percent.

15. Prices in Grover and Maloney (2021) are computed following standard literature: De Loecker, Fuss, and Van Biesebroeck (2014); Dhyne et al. (2017); Amiti, Itskhoki, and Konings (2019); and Lenzu, Rivers, and Tielens (2019). Nonetheless, quality effects may be underestimated. As a result, the prices may overestimate the quality-adjusted prices in dense locations. For Colombia, the authors use alternative indexes to control for quality, following the approach in Eslava and Haltiwanger (2021). The quality-adjusted prices are positively correlated with density, implying that TFPQ is highly negative and significant in cities.

16. For more details on this issue, see Mendershausen (1938); Marschak and Andrews (1944); Bond and Söderbom (2005); Ackerberg, Caves, and Frazer (2015), and a formal discussion by Gandhi, Navarro, and Rivers (2020). This approach has two key advantages compared with standard proxy variable methods. First, it solves for identification issues when the production function contains at least one flexible input, such as materials. Second, it imposes no restrictions on the elasticity of substitution between inputs by modelling the production function nonparametrically.

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3. The Promise of Labor Mobility

Introduction

People move to take advantage of better economic opportunities. Within countries, labor migration can increase the earnings prospects of people and contribute to aggregate growth by improving the spatial distribution of labor. It drives economic concentration of skills and talent and thereby supports agglomeration spillovers (Andrews, Clark, and Whittaker 2008; Desmet and Fafchamps 2006). An extensive literature documents these improvements (see box 3.1).

Migration within a country from rural areas to cities plays an important role in enhancing productivity by increasing the density of employment and driving up local workers' wages (Combes, Démurger, and Li 2015).[1]

The power of unrestricted internal migration to increase economic efficiency is illustrated by the Republic of Korea. By 1994, after more than three decades of reform, Korea's urban-rural wage gap had entirely disappeared—indicating that workers had migrated to their optimal locations (Knight, Li, and Song 2006). By contrast, China's barriers to migration contribute to the persistence of regional and urban-rural wage gaps, and they indicate inefficiency (World Bank Group and Development Research Center of the State Council 2013).

China might have garnered large payoffs if it had permitted migration at rates close to that in Korea, allowing faster wage convergence: By following Korea's example, China's economy would be nearly 25 percent larger today (World Bank Group and Development Research Center of the State Council 2013). Household income as a share of GDP would be 5 percentage points to 8 percentage points higher, while consumption as a share of GDP would be 3 percentage points to 5 percentage points higher (depending on the growth rate from additional migration). In sum, China would be richer—and could rely more on domestic demand to fuel further economic growth.

Mobile labor also provides options for people when places face adverse shocks—from trade, automation, climate change, or environmental disasters. Migration offers the possibility of a better life to those willing to uproot and move elsewhere, as seen in the case of the boom and bust in Kolmanskop, Namibia. It once produced 12 percent of the world's diamonds. As fortune seekers moved in, it became one of the richest towns on the planet. As the mines were depleted, it was quickly abandoned as people moved on to other opportunities.

BOX 3.1

The Central Role of Migration in Long-Term Economic Growth

A long-standing and wide-ranging literature shows that migration is central for long-term economic growth (Hsieh and Klenow 2009; Morten 2019). In developed countries, workers in bigger cities earn more than workers in smaller cities and rural areas. For instance, workers in Madrid earn €31,000 annually on average, which is 21 percent more than workers in Valencia (the country's third biggest city), 46 percent more than workers in Santiago de Compostela (the median-sized city), and 55 percent more than workers in rural areas, De la Roca and Puga (2017) show. In France, workers in Paris earn on average 15 percent more than workers in other large cities, such as Lyon or Marseille, 35 percent more than those in medium-sized cities, and 60 percent more than in rural areas (Combes, Duranton, and Gobillon 2008). In the United States, workers in metropolitan areas with more than 1 million people earn 30 percent more than workers in rural areas on average (Glaeser 2011). Differences remain large even when comparisons are limited to workers with the same education and years of experience and in the same industry.

Employers offer higher wages when specialized workers are scarce, and the higher wages in growing sectors incentivize workers to move to places where their skills offer the highest returns. A key advantage of being in a big city is that it provides workers with opportunities for learning and experimentation, amplifying knowledge spillovers and human capital accumulation (Glaeser 1999; Duranton and Puga 2001). In fact, agglomeration and migration of skilled workers complement each other.

Clearly, from the perspective of migrants and city businesses, migration enhances earnings and productivity. One of the pioneering proponents of the growth literature, Robert Lucas Jr., highlights the positive spillovers from clustering human capital; while the returns to scale in agriculture are constant, the returns to scale in manufacturing and services are increasing (Lucas 2004).

This chapter describes contemporary migration patterns and examines whether people are being left stranded in lagging locales or in areas experiencing adverse shocks.[2] It also examines why some people move while others do not. Many workers may be too old, lack information on destinations with employment possibilities, the resources or access to credit to move, or the skills demanded in leading regions. They may suffer from racial or ethnic discrimination in potential destinations, or may be reluctant to leave vastly depreciated real estate, or simply have a very strong attachment to place. In addition, public policy may also actively discourage labor mobility. Finally, the chapter discusses the dilemma posed in chapter 2 that if developing country cities are not made more productive by immigration—as has been the case in advanced economies—migration provides less of a solution for people in lagging regions and becomes a force creating congestion dis-economies.

The Evidence on Internal Migration

The Intensity of Internal Migration Increases with Economic Development

People move more readily within national territories than across borders. Nearly three times as many people (763 million) move within national boundaries compared with

214 million across borders (Bell and Charles-Edwards 2013). Despite the dominant role of domestic migration, comparable data on its magnitude, composition, and drivers are hard to come by. Censuses are the most common source of data about internal migration around the globe, with 142 countries collecting information on internal migration in the United Nations 2000 round of censuses (1995–2004). Globally, 50 countries compile internal migration data from a population register or other administrative collection, while 111 countries draw data from a survey (Bell and Charles-Edwards 2013). The IMAGE (Internal Migration Around the Globe) project at the University of Queensland has established an inventory of internal migration data collections across the 193 UN member states (Bell et al. 2015), together with an extensive data repository (Bernard et al. 2014).

Measurement challenges need to be considered in the use of migration data from various sources (Bell and Charles-Edwards 2013). Most research on migration concerns two types of population movements: events and transitions. Event data are usually present in population registers and shed light on when a migration event took place. Transition data, which measure migration by comparing place of residence at two points in time, are most commonly derived from censuses (Bell et al. 2015). Events and transitions count different things: population registers count migrations, while censuses count migrants. The difference is relevant because transition data fail to capture return and onward moves that occur within the time interval observed and therefore undercount the number of migration events.

Even where countries collect the same type of data over equivalent time intervals, comparisons of migration within domestic regions are confounded by differences in the number of spatial units into which countries are divided. Because countries differ widely in size, statistical geography,[3] and patterns of settlement, simple comparisons across nations of internal migration intensities referenced to each country's particular statistical geography are not meaningful. For example, internal migration in the 2000 US Census was measured across more than 3,000 counties, and in the 2001 UK Census between more than 10,000 wards. In Mongolia, on the other hand, the data trace movements between just 21 *aimags* (provinces), and in Nepal, between 74 districts.

In the 2009 *World Development Report* on economic geography, the World Bank (2009) assembled a set of estimates drawn from national household surveys conducted between 1992 and 2005 and confined to people of working age who had moved between districts. The report shows that migration intensities in Africa are extremely low, partly in response to slow structural transformation. Other factors such as lack of resources to move or lack of tradable property rights to land also contribute to sluggish mobility. The pace of migration tends to be higher in countries experiencing robust growth, as well as in countries that have recently experienced conflict, where people are fleeing violence or the threat of violence (such as Bosnia and Herzegovina, the Democratic Republic of Congo, Rwanda, and Sierra Leone).

This volume conducted new analyses of migration, which are summarized in figure 3.1. These analyses are based on a measure of lifetime internal migration (per 100 adults), which compares the place of current residence with the place of birth (within the same country). These estimates suggest that mobility in high-income countries is twice that of middle-income countries. These estimates are consistent with the estimates from the data on the incidence of one-year and five-year migration reported in Bell et al. (2015). In their results, migration incidence increased with economic development (they find a correlation with GDP per capita of 0.69 for one-year moves and 0.61 for five-year moves). They also show that migration increases with urbanization, human development, and access to mobile phones.

Jobs, Skills, and Amenities Attract Migrants to Towns and Cities

People respond to economic opportunities, and barriers to migration can be costly, especially when imposed within a country. A study by D'Aoust and Lall (forthcoming) zeroes in on the Middle East and North Africa region and estimates the cost of such barriers. It finds that migration can yield large benefits: consumption per capita could increase by 37 percent on average through additional migration to leading regions. Residents' endowments (health, education, and so on) yield higher returns in leading regions.[4] This pattern explains two-thirds of the consumption gap between leading and lagging regions. The other third is explained by lower endowments. The study finds that local development efforts to improve endowments in lagging areas to reach the level of residents in leading areas would increase consumption by 17 percent—only half the benefits of migrating.

Figure 3.2 shows the estimated welfare gap between the leading region against the others for each consumption decile of the welfare distribution in the country.[5] Panel a

FIGURE 3.1 Internal Migration Increases with Economic Development
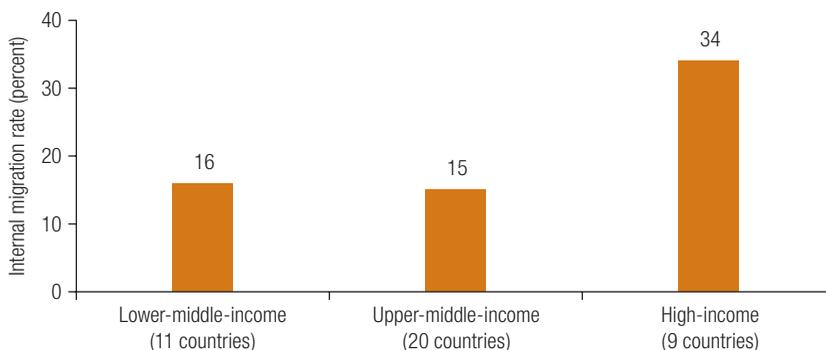
Sources: D'Aoust and Lall, forthcoming, for this volume. Elaborations based on Arab Barometer Wave IV (2016–17) data; University of Minnesota's Integrated Public Use Microdata Series (IPUMS) International database.

Note: The figure shows lifetime internal migration at different stages of economic development, using World Bank classifications of country income groups.

a. Consumption gaps between
leading and lagging regions

b. Differences in endowments and
returns to endowments between
leading and lagging regions
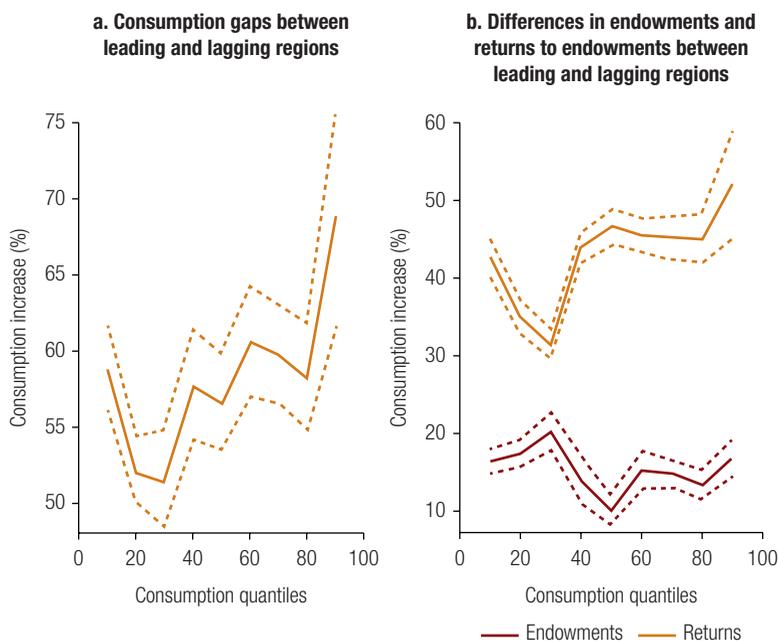
Source: World Bank 2020.

Note: Consumption expenditures are per capita, spatially deflated and converted in terms of US$ (2011) purchasing power parity. Solid lines designate point estimates; dashed lines designate 95 percent confidence intervals. In panel a, the total consumption gap is the sum of consumption effects from endowments and returns shown in panel b.

shows that the welfare gap increases with consumption decile: that is, relative to their consumption group, richer people are worse off from living in the nonleading regions than poorer people, perhaps due to lower income opportunities in other regions. Income differences across the different consumption deciles are strongly driven by returns to endowments rather than the endowment itself (figure 3.2, panel b), suggesting the importance of existing barriers—and the potential gains to migration. The gains and implied barriers to migration are highest for the richest (most productive) people.

In South Africa, where flows of people across areas were severely regulated under the apartheid regime, the demise of apartheid was expected to result in massive movement of people (Shilpi et al. 2018). Consistent with expectations, South Africa experienced massive population movement in the period immediately after apartheid was dismantled. More than one-quarter of the population is reported to have moved within the five-year period from 1996. Analysis of census data indicates that areas close to homelands established under apartheid experienced large net outmigration and areas in and around urban areas gained net migrants. The large urban areas in the Western Cape and Gauteng have been prime attractors (Shilpi et al. 2018). These urban

destinations are especially valued by skilled black Africans and whites, as they prefer moving to areas with higher stocks of skilled people.

More broadly, workers migrate to places where their skills are rewarded. Rural-to-urban migrants have substantially higher education levels than those who were raised in rural areas and stayed there, a study drawing on data from 170 surveys from a diverse set of developing countries reveals (Young 2013). Value added per worker is 3.5 times as high in the nonagricultural sector as in agriculture, according to a study drawing on sectoral value added data for 151 countries from nationally representative surveys (Gollin, Lagakos, and Waugh 2014).

To address potential underreporting of agriculture production in national accounts data, Gollin, Lagakos, and Waugh (2014) construct value added using household income and consumption data for 10 countries from the World Bank's Living Standards Measurement Surveys, which contain detailed questions about agricultural production. The gaps remain significant. For example, the urban-rural gap in Ghana is 2.2 according to the national income accounts and 2.3 using the household surveys. Côte d'Ivoire has a gap of 4.7 according to the national income accounts and 4.0 using the household surveys. Data from Brazil reveal that nonagricultural workers earn a premium of 9 percent for manufacturing and 4 percent for services (Alvarez 2020). In most countries, nonagricultural workers have higher average schooling levels, averaging twice as many years of schooling as those working in agriculture. However, recent evidence from Brazil, China, Ghana, Indonesia, Kenya, Malawi, South Africa, and Tanzania suggests that observed gains from rural-to-urban migration are much smaller relative to the level of gaps that exist between urban and rural areas (Hicks et al. 2017; Lagakos et al. 2020).

In addition to the pull to urban areas from higher wages, people may be pushed from the countryside when they lack public services or when they face violent conflict or the vagaries of climate change. The lack of basic infrastructure such as schools, health care centers, and hospitals, as well as access to basic services and other public amenities in rural and economically backward areas, is a big push factor for migration to urban areas.

In rural areas of the Middle East and North Africa, for instance, an estimated 28 million people lack access to electricity (Krishnan et al. 2017). Only 22 percent of the region's rural population live within 2 kilometers of an all-weather road (World Bank 2010). In many parts of Africa, schools and health facilities are nearly absent in outlying areas, contributing to disparities in school enrollment and neonatal care across cities, towns, and villages (Henderson et al. 2019). Many sectoral measures of access to infrastructure in developing countries follow a density gradient where overall access increases and rural-urban gaps decrease with rising levels of development, Henderson et al. (2019) find, using data from Demographic and Health Surveys. Figure 3.3, for instance, shows that levels of access to safely managed drinking water are highest

FIGURE 3.3 Denser Areas Have Better Access to Safe Drinking Water and Electricity

a. Access to safely managed drinking water by degree of urbanization, 2010–16

b. Access to electricity by degree of urbanization

▲ Cities ● Towns and semi-dense areas ■ Rural areas

Sources: European Commission Degree of Urbanization Methodology and Demographic and Health Surveys covering 2010 to 2016, reported in Henderson et al. 2019.

in cities, second highest in towns and semi-dense areas, and lowest in rural areas in almost all the countries covered by the survey. Similar patterns are seen in access to electricity.

Lagging coverage in infrastructure such as electricity, roads and water and sanitation, as well as in services such as education and health care, exacerbates inequality of opportunities and creates poverty traps with lifetime and intergenerational consequences. Differences in access to public amenities matter more for the less educated. Henderson et al. (2019) find that a 1 percent increase in the share of well-water coverage between the origin and the destination increases the likelihood of moving by 0.5 percent. Imbert and Papp (2020) also find that the nonmonetary costs of harsh living and working conditions in the potential host (urban) region and the nonmonetary value of rural life may also serve as significant barriers for lower-income people.

In Sri Lanka, for instance, the lack of public services such as water and electricity also influences migration decisions, a World Bank (2010) study shows. Analysis using data from the Sri Lanka Integrated Survey for working-age people between the ages of 15 and 49 years finds that migration decisions in the 1990s were influenced by district-level differences in access to well water and electricity, particularly for the less educated. Differences in endowments of education services, health care, and other public services between rural and urban areas are substantial and explain regional differences. In Nepal, migrants choose destinations with better access to schools, hospitals, and markets, Dudwick et al. (2011) find in an examination of the 2001 population census. The greater the transport barriers—proxied by a variable capturing the elevation of the surrounding terrain—the less likely people are to migrate.

Poorer migrants in Brazil place a high value on improved services and are willing to accept lower wages to get access to better services, while richer migrants are influenced only by income differences, Lall, Timmins, and Yu (2009) find. For example, a Brazilian minimum wage worker earning 7 Brazilian reais (R$) an hour reported a willingness to pay R$420 a year to have access to better health services, R$87 for a better water supply, and R$42 for electricity. In Nepal, migrants prefer a destination that is closer to a paved road. Fafchamps and Shilpi (2013) find a statistically significant and numerically large effect of access to paved roads on migrants' choice of destination.

Unskilled black Africans in South Africa are willing to pay much more for an improvement in local conditions than skilled black Africans and whites, Shilpi et al. (2018) show (table 3.1). To increase the coverage of electricity by 1 percentage point, unskilled black

TABLE 3.1 Unskilled Black South Africans Are Willing to Pay Substantial Amounts for Improvements in Some Local Conditions

	Black South Africans		Whites
	Unskilled	**Skilled**	
Willingness to pay (percent of income)	**Percent of average monthly income**		
Roads	7.31	0.57	0.29
Electricity	85.43	5.36	1.74
Reduction in unemployment	165.96	6.13	1.22
Willingness to pay (rand)	**Amount in rand**		
Roads	194	44	65
Electricity	2262	415	394
Reduction in unemployment	4394	474	276
Summary statistics			
Monthly income (rand), 2001	2,648	7,743	22,667
Percent of households using electricity for lighting, 2001	76	90	99
Unemployment rate (percent), 2001	52	45	6

Source: Shilpi et al. 2018.

Africans are willing to pay 85 percent of their monthly income. They are willing to pay much less for improved roads (7.3 percent) compared with reduction in unemployment or improvement in electricity coverage. In fact, unskilled black Africans who face a very high unemployment rate (52 percent) are willing to sacrifice more than a month and a half's income (165 percent of monthly income, or 4,482 rand) to reduce the local unemployment rate by 1 percentage point, compared with 6.1 percent of monthly income by skilled black Africans, and 1.2 percent of monthly income by whites.

In addition to the influence of public service and amenity differentials on migration, environmental factors are also pushing people to move. According to the Intergovernmental Panel on Climate Change (IPCC 2014), climate change will degrade the environment considerably during this century, with the impacts felt more in developing than in developed countries because of both geography and a more limited scope for policy intervention. The UN Food and Agriculture Organization (FAO 2016) estimates that climate change will hit agriculture hard; for every 1-degree C increase, average global cereal yields are expected to decline 3 percent to 10 percent. In addition, a deteriorating natural resource base reduces the resilience of the production system to climate variability and depresses future productivity (Fuglie et al. 2020). Environmental conditions are likely to play an increasingly important role in threatening the livelihoods of rural residents, pushing them toward towns and cities. Mobility is likely to be an important strategy to cope with climate change but is challenging because climate change appears to have two opposing influences: deteriorating economic conditions might motivate migration while undercutting household resources needed to migrate. The net effects are mixed and the wide-ranging climatic effects on migration remain an area of active investigation (Hoffmann et al. 2020).

A careful analysis of migration across countries induced by climate change provides information on environmental push factors at individual country levels (Reuveny 2007). It finds that 20 million to 30 million people moved from Gansu and Ningxia provinces to urban centers in China during the 1980s and 1990s because of floods, land degradation, desertification, and water scarcity. Similarly, Reuveny (2007) shows that 600,000 to 900,000 people migrated from the rural areas of Mexico to urban centers and the United States because of environmental degradation combined with other factors. Finally, about 70,000 people moved from the Arctic region in the Russian Federation to urban centers because of extreme weather conditions and socioeconomic decline in the 1990s. Hunter, Murray, and Riosmena (2013) also find that dry years cause a migration push from rural Mexico, while wet years dampen migration from rural areas. Barrios, Bertinelli, and Strobl (2006) find that the high dependence of Sub-Saharan African economies on rainfall makes the region vulnerable to variations in rain and affects rural-to-urban migration patterns.

Timmins (2007) calculates costs from climate change in Brazil and shows that migration constraints play an important role in determining the size and distribution

of these costs. Less educated residents of Brazil's poorer northern states, in particular, suffer more because they are unable to move easily in response to climate change. On the other hand, those in the southern states (educated and uneducated alike) benefit from those constraints, which inhibit southward migration flows that would otherwise depress wages and raise the prices of locally traded commodities.

The Barriers to Internal Migration

If moving from rural to urban areas or from lagging to leading areas provides options for individuals, are people adequately levering the potential of migration? This section sheds light on four factors limiting migration flows: skills mismatch; information barriers and social networks; market distortions; and public policy distortions.

Skills Mismatch

The growing demand for specialized skills creates a mismatch whereby workers in declining industries and regions may not have the skills profile to be absorbed in dynamic urban economies where cognitive and social skills command a premium (Lall, Henderson, and Venables 2017). A striking example is Brazil. The country faces a competitive challenge: a not very well educated workforce, low investment in research and development, and poor infrastructure quality. The spatial dimensions of these constraints were exacerbated by trade liberalization in the 1990s. Tariffs fell from an average 30.5 percent to 12.8 percent between 1990 and 1995, disproportionately affecting some industries such as rubber and apparel where tariffs declined nearly 25 percent (Dix-Carneiro and Kovak 2017).

The number and average size of formal establishments and employment declined steadily in regions that faced higher tariff reductions. While standard economic models would predict that workers from the depressed areas would move to places with better job opportunities and labor mobility would equalize the differences across regional economies, such readjustments were sluggish in Brazil. Out of 475 labor markets, only 11 experienced a fall in population between 1991 and 2000. Further, the effect of tariff reductions on reducing regional earnings increased over time: it was three times larger 20 years after liberalization than 10 years after (Dix-Carneiro and Kovak 2017). The costs of this immobility in terms of aggregate national welfare are large.

A recent study (Artuc, Bastos, and Lee 2021) examines the dynamic transmission of international trade shocks on the Brazilian labor markets via labor mobility. The study recognizes that trade shocks affect labor mobility beyond the traditional wage channel by changing job opportunities and thus workers' options. Thus, in the study, worker welfare and mobility depend on a new channel created by the shock: that is, the number of job opportunities within each labor market (region-sector pair). The simulations for an export shock in Brazil suggest that the higher the cost of labor mobility, the

lower the changes in lifetime utility of workers (figure 3.4, panel a) and the fewer the changes in external labor market opportunities (that is, job options outside the region) (panel b).

Based on this research on Brazil, Artuc, Bastos, and Lee (2021) suggest that a 20 percent increase in migration could boost the aggregate national welfare gain from a positive export shock to a particular region by 14 percent.

In the United States, a country traditionally celebrated for its domestic labor mobility, the slowdown in convergence between lagging and leading areas has been driven in part by a decline in migration over the past 40 years (see Ganong and Shoag 2017).[6] Autor, Dorn, and Hanson (2013) find no robust evidence that shocks to local manufacturing induced by trade with China have led to substantial changes in population. There is a tendency for low-skill workers to migrate away from high-income areas partly because their return to migration in high-income states has eroded in recent years. Such "stuck" labor is increasingly becoming a major issue for public policy because it exacerbates spatial inequalities and fuels populist sentiment.

Even in China, migration intensity and productivity gains hinge on the entry of migrants into higher-skilled jobs. Even with zero migration costs, Gai et al. (2021) show that migration shares would increase by only 20 percent and aggregate productivity would increase by 2.6 percent; the modest productivity gains are partly due to the fact that most migrant workers in China work in low-skill manufacturing and service industries.

FIGURE 3.4 **Frictions in Labor Mobility Are Associated with Lesser Changes in Lifetime Utility and Fewer Job Options in Other Job Markets Following an Export Shock in Brazil**
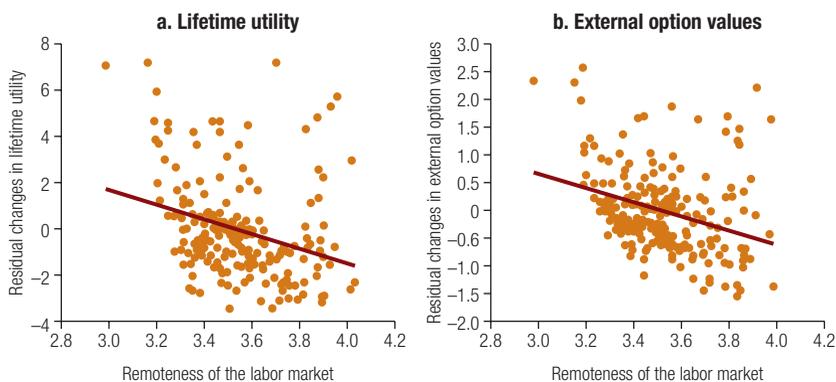
Source: Artuc, Bastos, and Lee 2021.

Note: Panel a plots the residual changes in lifetime utility of each labor market as a percentage of the annual wage against the remoteness measure of each labor market measured as the cost of moving from the labor market of one region to the other. Panel b plots the residual changes in external option values (job opportunities) of each labor market as a percentage of the annual wage against the remoteness measure of each labor market.

Information Barriers and Social Networks

In addition to skills mismatch, inadequate information can hold people back from moving. An experiment in Kenya found that a simple intervention providing information about average food prices and wages in Nairobi to a set of Kenyan village households raised expectations about average urban wages and increased migration to Nairobi from 20 percent to 28 percent of rural households. Two years later, migration rates were still higher among those getting the information treatment, and migrants reported higher subjective well-being on average. Information also travels through social networks. Bryan, Chowdhury, and Mobarek (2014) and Akram, Chowdhury, and Mobarek (2017) find that rural individuals with strong networks in cities face a relatively lower cost of finding work and housing after migrating, while those with greater ties to risk-sharing networks in villages have relatively higher costs of leaving those behind.

Mobility across certain administrative boundaries can be costly, especially if these boundaries reflect differences in societal characteristics—such as language, culture, laws, and institutions—or geographic barriers (Belot and Ederveen 2012). Border costs across regions further impede migration (Helliwell 1997; Poncet 2006). For example, migration between Canadian provinces is almost 100 times more likely than migration to Canadian provinces from the United States, Helliwell (1997) suggests.

Social networks and cultural norms also influence migration decisions. Munshi and Rosenzweig (2016) explore the relationship between the caste networks in rural areas in India and migration incentives. They argue that emigration of an income-earning individual reduces the family's access to the caste network as a social safety net and subsequently reduces the incentives for internal migration considerably (box 3.2).

Network effects are also critical and vary by area and culture. In Tunisia, families frequently identify one member to move, and only those with strong networks will move (Zuccotti et al. 2018). In the Syrian Arab Republic, individuals who move are more likely to receive help from relatives (Khawaja 2002). The presence of other household members at a destination encourages migration to it, Mora and Taylor (2006) find for Mexico.

This network effect is also studied by Akay et al. (2014), using data from China. They distinguish between the presence at the destination of immediate family members (strong ties) and the presence of other residents from the same village (weak ties). A theoretical model predicts a larger migration effect from weak ties, and the Chinese evidence supports this prediction. Marre (2009) shows that family size and home ownership are important factors reducing the incentive to migrate because they are strongly and positively associated with the costs of moving.

The presence of previous migrants at the destination may also have an influence; they can help migrating individuals adapt and find jobs, hence inducing them to migrate (Brueckner and Lall 2015). For Mexico, Munshi (2003) finds that an individual

How Caste Boundaries Act as a Barrier to Migration in India

India has potentially high returns to internal migration, but the rate of labor mobility from rural to urban areas has been quite low. A recent study (Munshi and Rosenzweig 2016) identifies the role of strong caste-based rural insurance markets in dampening migration flows in the absence of adequate formal insurance and information networks.

Caste networks in India have been present, deeply rooted, and binding for more than 1,900 years, as is evident through marriage networks and genetic evidence. Frequent social interactions within caste groups, spanning thousands of people and multiple villages, create an exceptionally strong insurance network, which plays an outsize role in the country, substituting for formal insurance networks.

Although banks are a dominant source of credit, accounting for 65 percent of all loans, they account for only 25 percent of loans received for consumption expenditure and contingencies (Munshi and Rosenzweig 2016). The preferred financial sources to rely on for consumption smoothing and emergency funds are gifts and loans from caste members—which account for almost one-quarter of within-caste transfers.

When an insurance network is active and functioning well, members pool their incomes and distribute funds based on internal sharing mechanisms to those who need them most. These informal networks rely on strong internal accountability. Those in the in-group cannot dishonor the obligations of the network. When family members—predominantly men—migrate permanently to work, they (and their rural households) cannot credibly commit to honoring their future obligations at the same level as households without migrants. Migrants also have an incentive to misreport their urban income. Caste networks thus treat migrants as outcasts because caste members who remain in rural areas can no longer observe migrants' decisions or punish their mistakes as easily. Moreover, migrants' incomes are harder to monitor. Therefore, only migrants with established destination networks move with ease, while other potential migrants who lack alternatives to the insurance provided by the network lack the social support they need to move. These factors contribute to higher-paying job opportunities in urban areas going unexploited.

Households in India with members who migrate to other areas of the country would more than double from 4 percent to 9 percent if the presence of formal insurance systems improved by 50 percent, Munshi and Rosenzweig (2016) estimate.

Source: World Bank staff elaboration, drawing on Munshi and Rosenzweig 2016.

is more likely to be employed and to hold a higher-paying job when his or her network is larger. Aroca and Maloney (2005) also find that networks with previous migrants are significant drivers of migration between Mexican states; in addition, greater exposure to foreign direct investment and trade deters migration.

Network effects seem especially strong in India. Kone et al. (2018) also find that while migrants represented 30 percent of India's population in 2001, two-thirds are migrants within districts, more than half of whom are women migrating for marriage. Variables related to life-cycle events, such as marital status or changes in status,

influence migration decisions as well. Additional variables at the community level include transportation access to commercial centers, in the belief that good access raises the incentive to migrate.

Market Distortions: Financial, Housing, and Land Markets

Land market distortions also hold back rural urban migration and deprive rural households of higher income levels. Few Africans or South Asians hold a tradable title to their land. Those without a formal title may be unlikely to migrate for fear of losing their land. The land-titling system in Mexico that began in the 1990s gave official ownership of land to rural households that had previously farmed the land informally. Those receiving a land title were 28 percent more likely to send migrants to urban areas (de Janvry et al. 2015). Improving markets for land would raise aggregate productivity in Ethiopia by 9 percent because previously misallocated agriculture workers would move into more productive nonagricultural activities, Gottlieb and Grobovsek (2019) find.

Another dimension of migration constraints is housing costs and supply rigidities. A study of housing costs in the United States finds that high-productivity areas like New York and San Francisco have restricted housing supply, thus limiting workers from entering local markets (Hsieh and Moretti 2019). These constraints lowered aggregate US growth by more than 50 percent between 1964 and 2009, their spatial equilibrium model finds. The high-productivity cities have implemented land use restrictions, which prevent any construction of new housing, thus limiting housing supply. As Glaeser (2014) notes, "In the 1960s, developers found it easy to do business in much of the country. In the past 25 years, construction has come to face enormous challenges from any local opposition. In some areas it feels as if every neighbor has veto rights over every project." Limited housing limits employment opportunities and creates barriers to in-migration for any high-productivity workers from neighboring states or internationally. In addition, the supply constraint pushes up housing prices and nominal wages.

Policy Distortions

Regulatory barriers can prevent people from migrating despite the potential economic gains from migration.

Government Regulation on Mobility: Hukou in China, Ho Khau in Vietnam, and Propiska in Central Asia

The early 1950s in China was a period of relatively free movement in and out of cities. The constitution in 1954 guaranteed free movement and choice-based migration. But as the influx into cities from rural areas escalated, the central government decided to limit the entry of peasants. It put in place different measures to control what it called "blind flows" of rural labor (Chan and Zhang 1999). This formed the first set of *hukou* legislation enacted by the National People's Congress in 1958. This institution granted

the State greater agency in controlling the geographical mobility of citizens using migration permits, recruitment, and enrollment certificates. The hukou card served as an internal passport that allowed the government to sort individuals by geographic determinants. In addition to mobility, the system controlled residency and access to benefits, and restricted labor mobility (Bengoa and Rick 2020).

Based on their hukou classification, the citizen or household received access to social benefits—worker rights, education, health care, and social security. As a result, Chinese urban residents have access to better social benefits and education than rural citizens, which allows urban residents to apply for better and higher-paying jobs than those available in rural areas. Changing hukou registration from rural to urban has been accessible only to the most privileged, either because those migrants start working for the government or are highly educated (Chan and Buckingham 2008). Ge (2018) estimates that rural migrant workers have fewer characteristics associated with higher earnings than urban workers. Their monthly earnings are approximately 70 percent that of urban workers, even though they work longer hours (Bengoa and Rick 2018).

Recently, national policies have begun encouraging hukou reforms, followed by provincial and prefecture reforms. Since 2014, residence hukou is no longer distinguished according to agricultural or nonagricultural hukou. In 2016, a national framework for a resident permit system was introduced. Also in 2016, the State Council announced an opinion to adopt a goal for settling 100 million migrants into cities (World Bank Group and Development Research Center of the State Council 2019).

Another example of managed migration comes from Vietnam. A system called *ho khau*, similar to hukou dating from 1950s China, registered people and controlled their mobility. Until 1986, it managed and drove access to food rations, land, housing, education, employment, and health care (Seitz 2020). In rural areas, farmers were registered with cooperatives through ho khau that linked workers' membership with access to food and rural employment (Liu and Dang 2019; Demombynes and Vu 2016).

Many Central Asian countries have remnants of the Soviet *propiska* systems, which are internal passport requirements and limit mobility and access to services. Obtaining registration is particularly difficult in the largest cities (Tashkent, Astana, Almaty, Bishkek, Dushanbe, Ashgabat, and so on). In most cases, people living in a city without propiska registration cannot be officially employed there, nor are they authorized to access most government services, including health care and public education. Uzbekistan, with highly restrictive migration policies, has one of the lowest internal migration rates in the world.

Welfare Schemes Tied to Residency

While China's hukou policy explicitly erects greater barriers to internal migration for low-skilled labor compared with high-skilled labor, in other countries policies affect migration more indirectly. Kone et al. (2018) find that mobility between states in India

is inhibited not by explicit mobility laws but by state-level entitlement schemes, ranging from access to subsidized goods through the public distribution system to bias for the states' own residents in access to tertiary education and public sector employment.

Most social benefits are not portable across state boundaries. For example, access to subsidized food through the Public Distribution System (PDS)—which covers more than half the population—and admission to public hospitals are administered on the basis of "ration cards" issued and accepted only by the home state government. Many universities and technical institutes are under the control of state governments, and state residents get preferential admission.

Individuals moving across state boundaries risk losing access to the PDS, and a host of other public services linked to the PDS, for a substantial period until their destination state issues them a new ration card. The loss of access to subsidized PDS food could be a significant challenge for most households. According to household survey data, 27 percent of all rural households and 15 percent of all urban households are fully dependent on PDS grain (Kumar et al. 2014). A survey of seasonal migrant workers in the construction industry in Delhi suggests that the lack of identity documents also makes it difficult for low-skilled interstate migrants to claim the benefits that they are entitled to under labor laws (Srivastava and Sutradhar 2016).

Does Migration Enhance Welfare or Increase Crowding and Congestion?

Previous sections of this chapter discuss why some people move while others do not, as well as the benefits to migrants in terms of incomes, jobs, and amenities. A policy maker who recognizes the external benefits of human capital is likely to facilitate migration and clustering, particularly of workers with skills. However, given externalities in city growth, the size of cities developed by market forces may not be economically efficient for reasons described next.

There are three issues here. First, when moving to a city, a worker considers the prevailing wage in this city. This reflects the average productivity of labor, not the marginal productivity, because workers do not account for (that is, internalize) their own positive agglomeration effects on others (Duranton and Venables 2018). Correcting for this externality would bid up the productivity curve for the city, and also bid up real incomes.

Second, a similar argument applies to urban costs. In their location decision, workers consider the average cost and not the marginal cost; for instance, they ignore the effect on their choice of residence on traffic congestion. Correcting for this inefficiency would raise the urban costs workers face when moving into a city. Migrants would also need to consider land prices and land ownership. Having more workers in a city makes land more expensive. While workers perceive this as a cost, economically this is only a transfer. Efficiency requires rebating land rents to the local population.

Finally, the efficient real income will embed all the changes needed to make urban productivity and urban costs efficient. It will also need to account for the fact that correcting for agglomeration and urban costs externalities requires some transfers that eventually need to be financed locally.[7] Importantly, making the city "efficient" with regard to its agglomeration and urban costs externalities is not sufficient to obtain an efficient city population in equilibrium. Reaching full efficiency still requires solving the coordination failure for the creation of new cities (Duranton and Venables 2018).

Now turning to the developing country context, the benefits to individuals and families from migration are large. The productivity of labor in nonagriculture activities is between two and three times as high as it is in agriculture (Gollin, Lagakos, and Waugh 2014). However, with low levels of skills and human capital, sluggish structural transformation, and "sterile agglomeration," is migration welfare enhancing or congestion aiding overall? First, it is important to recall—as shown in figure 3.1—that the intensity of internal migration increases in tandem with economic development.

African cities go against this trend. The rapid increase in Africa's urban population in recent years is largely attributed to natural population growth (more births than deaths); rural-to-urban migration is estimated to contribute less than 40 percent (Jedwab, Christiaensen, and Gindelsy 2017). With Sub-Saharan Africa's fertility rates declining only slowly, most urban growth comes from a natural dynamic—not an economic one. Rural-to-urban migration in low-income countries would be expected to *increase* with structural transformation because better prospects of income and living conditions would pull people toward urban centers.

Second, the labor reallocation between agriculture jobs in rural areas and modern sector jobs in urban areas matters a great deal for the distribution of costs and benefits of rural-to-urban migration. Consider figure 3.5, where the length of the horizontal axis is the total labor force, divided between urban employment at productivity w^* and agricultural employment with value productivity w_A, measured from the left and right axes, respectively. The initial division of the labor force between sectors is at point L. What is the value of creating ΔL new urban jobs? If workers come from existing urban jobs with similar productivity, then there is 100 percent displacement, total urban employment remains at L, and no surplus is created. If workers come from agriculture, then agricultural output lost is B and urban output gained is $A + B$, yielding a net surplus of A.

This raises the question, Why is there a productivity gap in the first place? What determines the quantity response (such as the number of rural-to-urban migrants)? For example, the classic Harris-Todaro (1970) model diverges from a standard model with full employment and flexible wages by introducing a politically determined minimum urban wage, which exceeds the agricultural wage and generates urban unemployment. The model reconciles migration and a productivity gap by having a pool of urban un(der)-employed workers. In this model, creating ΔL more urban jobs pulls

FIGURE 3.5   The Value of Labor Reallocation between Agriculture and Modern
             Sector Jobs Is Contingent on Initial Productivity
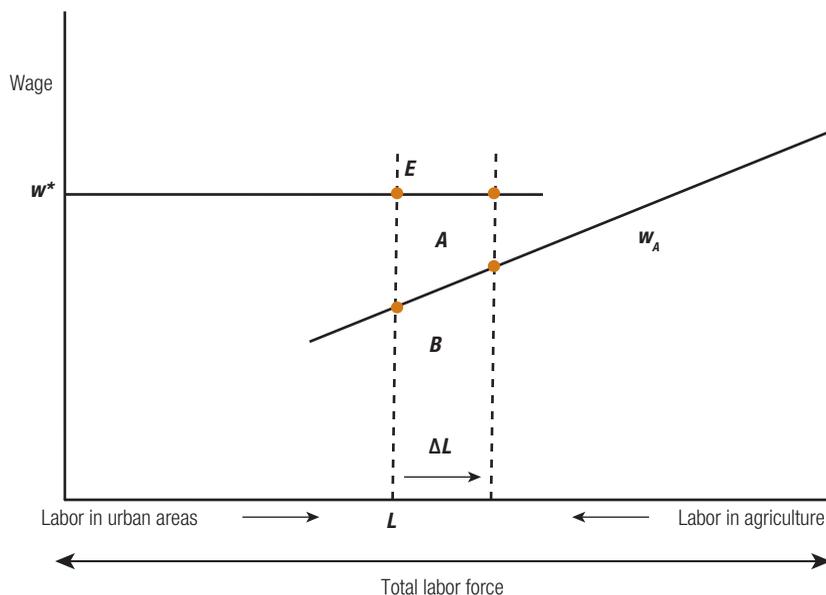
Source: Duranton and Venables 2018.

more than ΔL workers out of agriculture and into urban unemployment (attracted by the probability of securing an urban job), in which case the loss of agricultural output is greater than B and the net value could be positive or negative.

The model generates a potential paradox: one extra minimum-wage job could induce more than one agricultural worker to migrate to the urban area, hence increasing the unemployment rate. Todaro (1976) asks whether the conditions leading to this paradox hold empirically. To this end, he analyzes developing country data and estimates rural-to-urban migration elasticities, finding that their values are in a range where the paradoxical result seems to hold. On the basis of this evidence, Todaro (1976) concludes that "there would thus appear to be no strictly urban solution to the urban unemployment problem. Rural development is essential."

Even today, 45 years after Todaro's work, it appears that the aggregate productivity benefits of rural-to-urban migration may be limited for countries struggling with structural transformation and stuck in low-development traps. Skills and structural transformation are likely to raise benefits from the spatial reallocation of labor. The challenge is exacerbated by differentials in public service such as health care and education that may further push people from rural areas. In many developing countries, places with more job opportunities also tend to have better public services. People moving to access services may end up contributing more to urban congestion than to productivity.[8]

Conclusion

The mobility of people from lagging regions to prosperous ones has the potential to mitigate spatial inequalities in living standards while encouraging productivity-enhancing economic concentration. It allows people stuck in nonviable regions or regions hit by negative shocks to find better opportunities elsewhere. Whether the emphasis is on internal migration or international migration is the main conceptual difference between development policy oriented toward the regional level versus the national level. National policies have the leeway to adjust wage and unit costs when a country's sectors are hit by a negative shock. Such a downward adjustment can continue until other sectors become competitive. However, if a *region* within a country suffers a negative shock, there may be little flexibility for adjusting relative wages between regions because labor markets are relatively more integrated. Within-country mobility of labor and capital equalizes real wages across regions. In the absence of such adjustment, regional inequalities could persist, and moving labor out would be a main way to reduce spatial inequalities (Duranton and Venables 2018).

This chapter shows that although the magnitude of internal migration is three times that of international migration, this force has not been adequately levered. In developed and middle-income countries, there are substantial gains to individuals from moving. However, skill mismatches, and lack of finance and information, can be constraints; people may also be reluctant to leave vastly depreciated real estate, or simply have an exaggerated attachment to a place. Public policy may also hinder mobility. Some countries have explicit restrictions on mobility, while others have distorted land and housing markets.

In low-income countries where structural transformation is sluggish, the process of urbanization has not delivered widespread economic benefits. While the pace of rural-to-urban migration is tempered by sluggish urban economies, mobility is nonetheless likely to exacerbate urban unemployment. The paradox identified by Todaro in the 1970s may still be relevant for today's low-income countries. The challenge for most of Sub-Saharan Africa and parts of South Asia is that human capital is low, and many people are also moving to cities in search of public services and amenities not available to them in the countryside. Such movements may add more to congestion in receiving urban areas than to agglomeration benefits.

This points to a broader agenda of promoting economywide productivity growth, with a particular emphasis on raising agriculture productivity and human capital, as well as improving public services and amenities in rural and urban areas alike.

Notes

1. Combes, Démurger, and Li (2015) find that migrants complement, rather than crowd out, local workers because they are concentrated in low-end labor-intensive industries that feed other local industries, contributing to an overall improvement in urban productivity.

2. A detailed treatment on the migration effects of rainfall shocks is provided in the World Bank report *Ebb and Flow: Water, Migration, and Development* (World Bank 2021).

3. Statistical geography is the study and practice of collecting, analyzing, and presenting data that have a geographic or a real dimension, such as census or demographics data. It uses techniques from spatial analysis, but also encompasses geographical activities such as the defining and naming of geographical regions for statistical purposes.

4. Leading regions considered in the study are Djibouti city in Djibouti; Alexandria, Cairo, Port Said and Suez in the Arab Republic of Egypt; the Kurdistan governorates in Iraq (Duhouk, Erbil, and Suleimaniya); Tehran in the Islamic Republic of Iran; Amman in Jordan; the Casablanca-Settat area in Morocco; Grand Tunis in Tunisia; and Sana'a in the Republic of Yemen.

5. The sum of endowments and returns effects gives the total welfare gap.

6. Only 13.8 percent of Americans moved to another county, state, or country in the previous five years in the 2010 Census, compared to 21 percent in the 1990 and 2000 Censuses.

7. Under some conditions, the net tax rebate will be zero as it will just offset the net transfers needed to correct for the urban externalities. This result is referred to as the Henry George Theorem (see Arnott 2004).

8. By failing to control for public-service differentials, econometric estimates may thus overstate a migrant's willingness to move in response to wage differences (Brueckner and Lall 2015).

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4. Globalization and Digital Development: Bridging Distances within Countries

Introduction

With rapid declines in trade and transport costs across countries, the spatial development and structural transformation paths followed by many European countries and parts of North America over the past two centuries may no longer be available to today's developing countries. When the advanced economies were young, transport costs were still relatively high, so urban agglomerations and nascent local industrialization arose in multiple agricultural regions and the high costs of trade protected local industry (Henderson et al. 2018). Today, in developing countries, transport and communication costs have fallen well before structural transformation has advanced, so economic activity tends to agglomerate in relatively few locations, often on the coast.

In China, the decline in international trade costs and rise of information and communication technology (ICT) have enabled export-oriented industries to emerge close to ports at the expense of other regions (Coşar and Fajgelbaum 2016) and have pushed remote regions to specialize in agricultural products (Baum-Snow et al. 2017). India's rapid trade liberalization in the 1990s has widened inequality between the primary regions connected with international ports and the secondary regions (Dasgupta and Grover 2021). Similarly, in Ethiopia, trade-related industrial policy reforms have increased economic concentration in the capital city, Addis Ababa (Grover 2019). More broadly, greater integration with the global economy may come at the expense of domestic market integration and more equitable allocation of growth within regions of a country.

Technological progress is also a double-edged and disruptive sword. On the one hand, accelerated automation may displace unskilled labor across the globe, and increased connectivity may facilitate rapid offshoring—again, leaving pockets of unemployment and poverty (Maloney and Molina 2019; Hallward-Driemeier and Nayaar 2019). On the other hand, the fall in connectivity costs through digital development is permitting new forms of national integration. The telegraph cables of the 1860s, the mobile phone revolution in developing countries during the 1990s, and the advent of Amazon fulfillment and delivery and e-commerce in the 2000s have progressively

lowered trade costs, with dual effects. They permit dispersion of routine activities, while encouraging agglomeration of complex productive activities by improving matching between producers and consumers.

For instance, merchants in the 3,202 "Taobao villages" across 24 provinces, municipalities, and autonomous regions of China sell clothing and other consumer items, mostly obtained from small local factories, on Alibaba platforms. Broadband access is viewed as a new source of productivity and jobs for displaced workers, from coal miners in the US state of West Virginia to the farmers in the Sahel region. The COVID-19 (coronavirus) experience has shown the potential of new technologies to enable teleworking from regions that were previously excessively remote—such that some observers have even forecast the demise of the city.

However, the "dislike of distance" remains a potent force. For instance, the banks of servers undergirding the digital network in the United States remain concentrated around established cities, even though they could be more economically located near cheap energy and in colder climes, Greenstein and Fang (2020) show.

This chapter first examines the implications of globalization for the allocation of growth within regions of countries (what this chapter calls regional growth). It next examines the role of trade costs, infrastructure conditions, and supporting institutions within countries in limiting the extent to which gains from trade can reach distant places. Finally, the chapter considers the role of digital connectivity in mitigating spatial disparities.

Globalization and Regional Growth within Countries

As discussed in chapter 2, even in the least developed countries, industry and services tend to be concentrated in dense metropolitan areas, and productivity rises with the density of economic activity. The centripetal forces of agglomeration economies can drive a virtuous cycle of economic concentration and higher productivity (Duranton and Puga 2020). In this context, globalization has powerful, and varied, impacts on agglomeration forces within countries.

This section examines the implications of globalization for the spatial allocation of activity within countries. In particular, it discusses recent evidence developed as part of this project, centering on global value chains (GVCs) (Grover and Lall 2021). Anecdotal evidence suggests that cross-country cooperation in GVCs may provide opportunities for secondary cities and help disperse economic activity. For instance, collaboration on integrated supply chains in manufacturing, whereby each city is assigned a specialized role in production, could boost the global competitive advantage of secondary cities. The successful cooperation between Singapore and secondary cities in Malaysia (Johor Bahru) and Indonesia (Batam and Bintan) offers one such example (Toh 2006).

In this context, new research for this volume by Grover and Lall (2021) examines regional growth opportunities using the lens of participation in GVCs. Their focus is on trade in intermediates. This process has gone by different names: "trade in middle products" in the 1980s (Sanyal and Jones 1982); "fragmentation" (Deardorff 1998; Venables 1999) and "production sharing" (Yeats 2001) in the 1990s; "vertical specialization" (Hummels, Ishii, and Yi 2001), "offshoring," and "trade in tasks" (Grossman and Rossi-Hansberg 2008) in the 2000s; and "trade in value added" or "global value chains" (Baldwin 2011a, 2011b) in the 2010s.

Grover and Lall first estimate a measure of the distribution of city size for each country and year using demographic data on urban agglomerations. By regressing the log rank of each urban agglomeration in a given country on the log of the agglomeration's population size, they estimate the country's Zipf coefficient, a parameter generally used as a summary statistic of city size distribution. Next, they examine the determinants of city size distributions, with a focus on participation in GVCs. Data on GVC participation come from the Trade in Value Added database compiled by the Organisation for Economic Co-operation and Development (OECD).

Grover and Lall (2021) find that participation in GVCs is negatively correlated with spatial dispersion; that is, as countries become more globally integrated, economic activity within the country becomes even more concentrated. Specifically, a unit standard deviation increase in domestic value added (DVA) in exports of intermediate products is associated with a 0.1 standard deviation decline in the Zipf coefficient, a statistical index measuring spatial dispersion. Spatial concentration is even more strongly and positively correlated for GVCs involving high-tech manufacturing (figure 4.1, panel a). As for low-tech manufacturing, the correlation with spatial dispersion is negative, albeit not statistically significant, implying that participation in GVCs does not help with the spatial dispersion of economic activity. The correlation of participation in services GVCs, especially the knowledge-intensive services (such as other business services and R&D services), with spatial concentration is larger in magnitude (panel b). Using re-imported DVA as a measure of participation in GVCs,[1] Grover and Lall (2021) find that in aggregate a unit standard deviation increase in GVC participation is associated with a 0.033 standard deviation decline in the Zipf coefficient, while the corresponding decline for services is even higher, at 0.042.[2] These findings are particularly important for public policy given the rising shares of services in GVCs.

These findings are consistent with an emerging body of evidence showing that economic integration across borders is associated with greater spatial concentration within national borders (Fajgelbaum and Redding 2018; Coşar and Fajgelbaum 2016). For instance, in India, trade liberalization in the early 1990s enhanced economic concentration in intermediate secondary cities (defined as those located between 200 kilometers and 400 kilometers from the nearest ports) relative to those in primary regions closer to ports. However, it had no effect on interior hinterland districts located farther than 400 kilometers from the ports, Dasgupta and Grover (2021) show (figure 4.2).

FIGURE 4.1 **Participation in Technology or Knowledge-Intensive Global Value Chains Is Associated with Higher Spatial Concentration**

a. GVCs and spatial concentration in manufacturing

● DVA in exports of intermediates (% gross exports) ▬ CL-Low ▬ CL-High

b. GVCs and spatial concentration in services

● Re-imported DVA (% gross exports) ▬ CL-Low ▬ CL-High
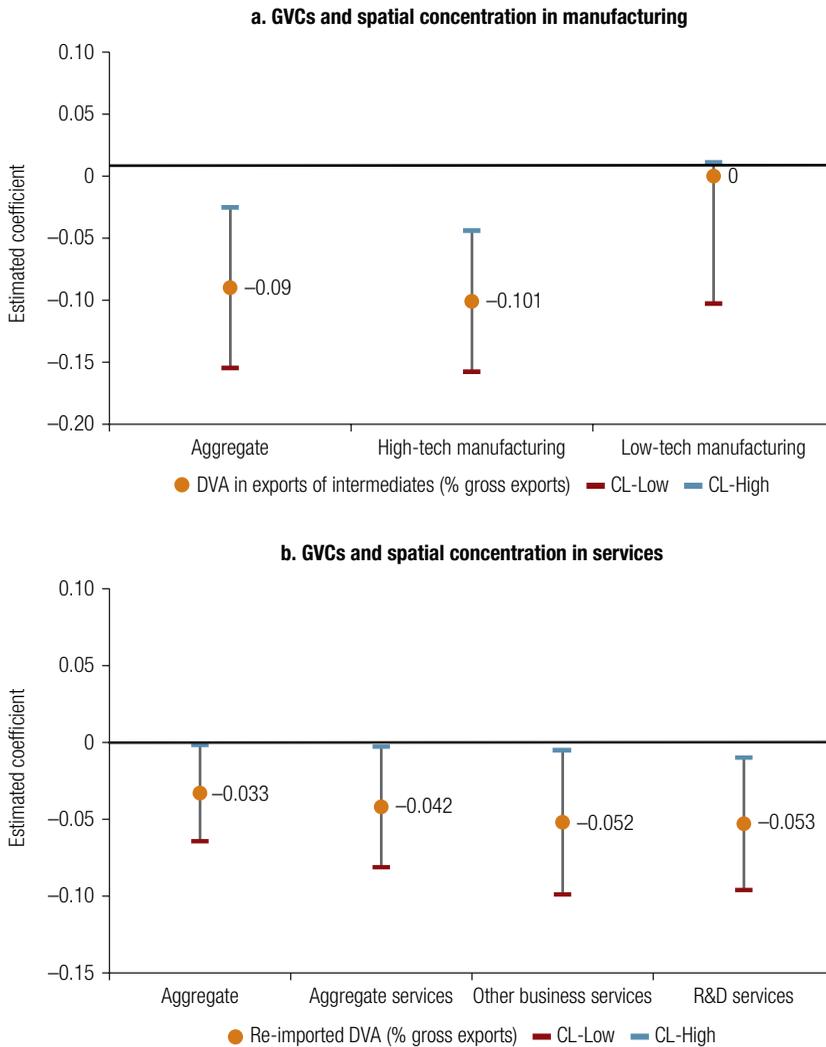
Source: Grover and Lall 2021.

Note: The figure shows rope-ladder plots of regressions of an absolute measure of spatial dispersion (Zipf coefficient) on an index of participation in global value chains (GVCs) and other controls. Panel a uses domestic value added (DVA) exports of intermediates as a measure of participation in GVCs, while panel b uses re-imported DVA. The data for estimating spatial dispersion in population through the Zipf coefficient comes from http://www.citypopulation.de/. The measure of participation in GVCs is sourced from the 2015 edition of the Trade in Value Added database compiled by the Organisation for Economic Co-operation and Development (OECD), which covers 61 countries (33 OECD economies and 28 non-OECD countries) for the years 1995, 2000, 2005, and 2008–11. CL = confidence level; R&D = research and development.

By comparison, in the period following massive infrastructure investments in the Golden Quadrilateral (GQ) highways that passed mainly through ports and coastal districts connecting the nodes of Delhi, Chennai, Kolkata, and Mumbai, activity in secondary locations along the GQ highway that were closer to ports and urban hubs

FIGURE 4.2 Trade Liberalization Is Associated with Changes in Activity in Secondary Regions but Has No Effect on Interior Regions in India

a. Change in output

b. Change in employment

increased during the period when the highways were being upgraded (2000–09). However, remote locations were largely unaffected, irrespective of their distance from the GQ network (figure 4.3), suggesting that neither trade openness nor infrastructure connectivity by themselves changed their growth prospects or competitiveness (Dasgupta and Grover 2021).

FIGURE 4.3 **The Impact of Improved Domestic Connectivity Is Contingent on Proximity to Ports in India**
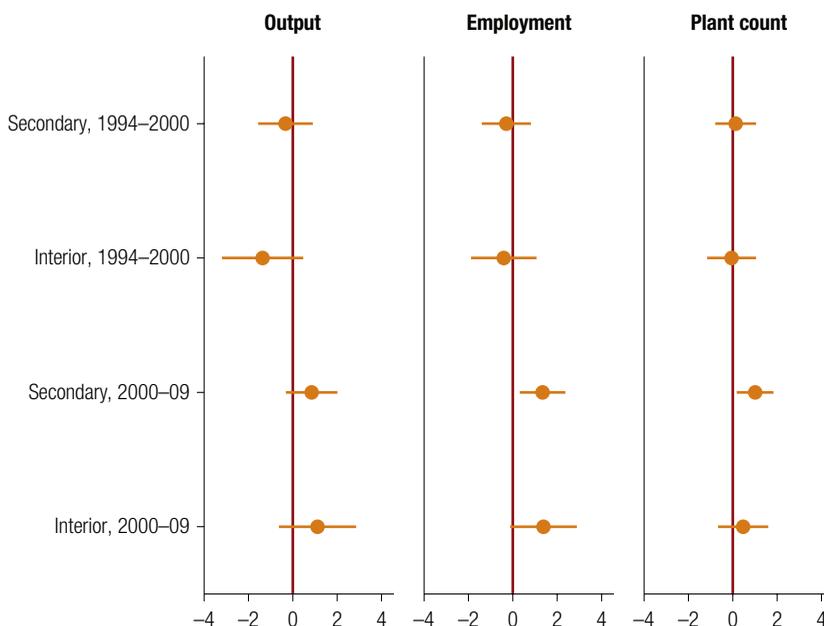
Source: Dasgupta and Grover 2021, for this volume.

Note: 1994–2000 is the period before treatment. 2000–09 is the period during treatment. Secondary refers to districts located within 200–400 km from the nearest port. Interior refers to districts that are more than 400 km from the nearest port.

Evidence from China suggests that the disparity between inland and coastal regions increased with trade openness (Fan, Kanbur, and Zhang 2011). Moving inland by 275 miles in China (the median distance from the coast across prefectures) decreases industry employment by 32 percent for an export-intensive industry and by 21 percent for a labor-intensive one, compared with the nationwide average of roughly 15 percent (Coşar and Fajgelbaum 2016). In Mexico, the assembly of parts through the *maquiladora* program boosted Mexico's participation in global production networks that accounted for half of Mexico's exports in 2006— yet most exporting firms remain clustered around the US-Mexico border (Mia and Austin 2008; Hanson 1996). In Canada, detailed data on trucking rates suggest that industries with low transport costs display significantly more geographic concentration and that falling transport costs agglomerate industries. More specifically, the fall in trucking rates between 1992 and 2008 led to a 20 percent increase in geographic concentration on average (Behrens, Brown, and Bougna 2018).

Likewise, Vietnam's participation in GVCs is driven by firms located around Ho Chi Minh City, which account for nearly 83 percent of apparel and textile exports. Even after several decades following their establishment, these activities of global production networks are confined to the city and its nearby hubs (Pham et al. 2013). More broadly,

the evidence suggests that a decline in international trade costs increases the returns from spatial characteristics that facilitate trade, such as being on a coast or a navigable river. Globalization has the potential to spatially concentrate economic activity within countries.

How Trade Costs, Infrastructure, and Institutions Affect Growth within Countries

While the previous section discusses evidence on spatial reallocation of economic activity following globalization and integration in GVCs, this section discusses the extent to which domestic trade and transport frictions fragment domestic markets and disconnect farther-off regions from ports and metropolitan hubs. In fact, internal trade costs vary widely within countries. In India, internal trade barriers (such as corruption and local taxes) are estimated to make up to 40 percent of all barriers (Van Leemput 2016).[3] In China, bilateral trade costs between cities that are not primates—the city that is disproportionately larger than any other in its jurisdiction—can be five times higher than that between Beijing and Shanghai (Yang 2018). Higher trade costs reduce domestic accessibility and value added and inhibit the ability of economically distant regions to specialize and trade.

Based on recent empirical work on trade costs, this chapter proposes the following four stylized facts:

1. Infrastructure is not the only element of trade costs, or even the most important one.
2. The interaction of scale economies in transport and production spatially concentrates trade.
3. Improvements in infrastructure "hardware" may be necessary, but are not sufficient to reduce domestic trade costs for distant regions.
4. Complementary investments in "software" are needed so that a decline in trade costs does not widen spatial inequality.

Stylized Fact 1. Infrastructure Is Not the Only Element of Trade Costs, or Even the Most Important One

Time in transit, information barriers, and market structure have important bearings on domestic trade costs. The cost of distance is 2.5 times higher in Ethiopia and 4.0 times higher in Nigeria than in the United States, even when controlling for the fact that the United States has more and better-quality roads (Atkin and Donaldson 2015). It is not only the poor quality of roads but also of logistics and trucks, as well as long queues at border crossings, that contribute to higher transport costs in developing countries (Redding and Turner 2015; Donaldson 2018).[4] The higher costs of trade in Africa are partly explained by the use of old truck fleets that are fuel inefficient, the

terrible road conditions that require frequent truck repairs, and poor logistics (Teravaninthorn and Raballand 2009).

Time in transit poses a large trade barrier (Harrigan 2010; Hummels and Schaur 2013). It has been estimated that each day in transit is equivalent to an ad valorem tariff of 0.6 percent to 2.3 percent (Hummels and Schaur 2013). Enforcement of laws regarding issues such as piracy, corruption, and tax administration (Besley, Fetzer, and Mueller 2015; Van Leemput 2016) can be equally important in determining the regional differences in trading outcomes.

Information frictions can also be an impediment to trade (see, for example, Jensen 2007; Steinwender 2018; Allen 2014). Reducing search costs through e-commerce platforms can play a crucial role in reducing transaction costs. In Japan, for instance, the entry of Rakuten increased interregional price convergence for goods traded online (Jo, Matsumara, and Weinstein 2019).

The market structure of the transport services industry is an important contributor to transport costs, which is largely assumed away in the New Economic Geography approach. For example, transport costs in France fell by more than 38 percent between 1978 and 1998, largely because of the deregulation of the trucking industry (Combes and Lafourcade 2001).

Stylized Fact 2. The Interaction of Scale Economies in Transport and Production Spatially Concentrates Trade

Distance matters! In the United States, a 10 percent increase in distance leads to a 14 percent decrease in trade. Nearly three-quarters of all shipments of physical goods begin and end in the same zip code (Hillberry and Hummels 2008), while in Japan, the median distance to a supplier is 30 kilometers (Bernard, Moxnes, and Saito 2019). Although banking deregulation and technological change have reduced the transaction costs in financial services, distance still counts even in the United States, where most banking relationships between firms and banks remain local, with a median distance of 5 miles (Brevoort and Wolken 2008). For Colombia, Duranton (2015) estimates that a 10 percent increase in travel distance leads to a 6 percent decrease in trade flows. The estimated decline for Colombia is lower than in the United States, possibly driven by the fact that internal trade is dominated by agricultural goods and natural resources, which are typically traded over long distances. Short-haul trade also influences the geography of production. In Rwanda, 75 percent of the transactions are among firms that are within 10 kilometers of one another (Stoelinga, Rajashekar, and Richard 2019).

To take a recent example, consider the government-imposed nationwide lockdown in India to limit the spread of COVID-19. This nonpharmaceutical measure significantly affected transportation prices, domestic trade, and the fortunes of the

economically and physically distant Northeast states. Although the lockdown exempted the movement of essential goods, transport of essential goods fell by more than 80 percent, perhaps because the cost per ton per kilometer of freight transport nearly doubled. Recent research by Lall, Sinha Roy, and Shilpi (2021) shows that the loss of shipment value due to transport frictions—the so-called iceberg cost, whereby a fraction of the value of a good "melts" with distance—is relatively large in India. Losses average about 24 percent, which translates into an increase of iceberg costs by 7 percent for trips originating or ending in the largest metropolitan areas and 10 percent for the other origin-and-destination pairs. If these price changes persist, it could lead to a reduction in trade flows in the range of 35 percent to 50 percent relative to the prepandemic period The effects are heterogeneous by region: nearly all states in Northeast India would be cut off from the two main centers of economic activity (Delhi National Capital Region and Mumbai), and end up being economically disconnected from the national economy (figure 4.4).

Much of the economics literature, along the lines of Samuelson (1954), considers trade costs as an "iceberg", where a fraction of the value of a good "melts" with distance. In reality, transport prices are determined through the strategic behavior of carriers, competition between transport modes, and interactions between transport and producers. Using data on the cost to ship a standardized container from the United States to foreign ports, Asturias (2020) finds a weak relationship between transport costs and distance. These costs are lower in larger markets because they have more and

FIGURE 4.4 **The Distant Northeast Region in India Faces an Outsized Share of Loss in Shipment Value Following the COVID-19 Lockdown**
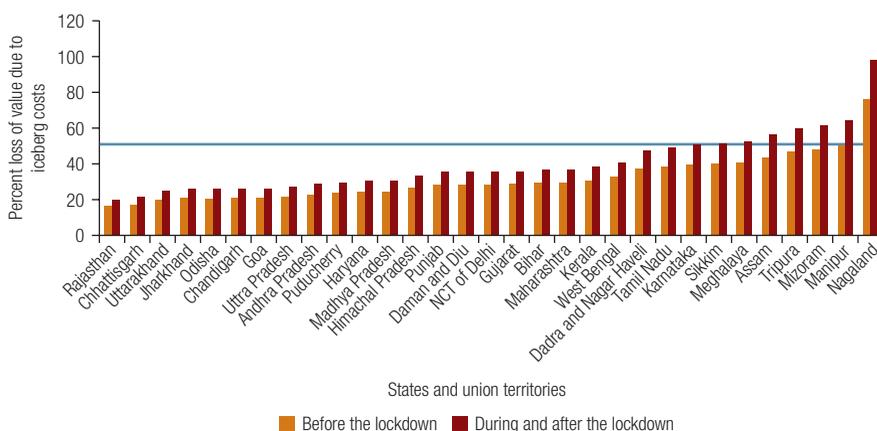
Source: Lall, Sinha Roy, and Shilpi 2021, for this volume.

Note: Iceberg costs refer to trade frictions whereby a fraction of the value of a good "melts" with distance. NCT = National Capital Territory.

larger shipping firms. On average, a 1 percent increase in trade volumes is associated with a 0.85 percent increase in average shipper size, a 0.16 percent increase in the number of shippers, and a 0.25 percent decline in transport costs from the United States to foreign ports.

A recent study of India develops a novel strategy to connect trade volumes and transport prices. Lall, Sinha Roy, and Shilpi (2021) use data obtained from a trucking and logistics company for more than 450,000 transactions. They find that transport prices (per ton per kilometer) vary depending on the direction of trade flow. The cost of shipping boxed consumer goods on a 32-foot truck with multiple axles is lower when the destination is a larger city and higher if the origin is a smaller city. The probability of ensuring a backhaul is important for the transport price (figure 4.5).

A global study of maritime shipping finds that at any point in time, a staggering 42 percent of ships are traveling without cargo (Brancaccio, Kalouptsidi, and Papageorgiou 2020). This natural trade imbalance is a key driver of trade costs, which discourages trade between regions. Transportation prices are largely asymmetric and depend on the trade imbalance with the destination: all else equal, the prospect of having to fill a ship with ballast after offloading cargo leads to higher prices. For instance, shipping from Australia to China is 30 percent more expensive than the reverse: because China mostly imports raw materials, ships arriving there have limited opportunities

FIGURE 4.5 **Trade Volume Influences Trade Costs**

Rupees per ton per kilometer
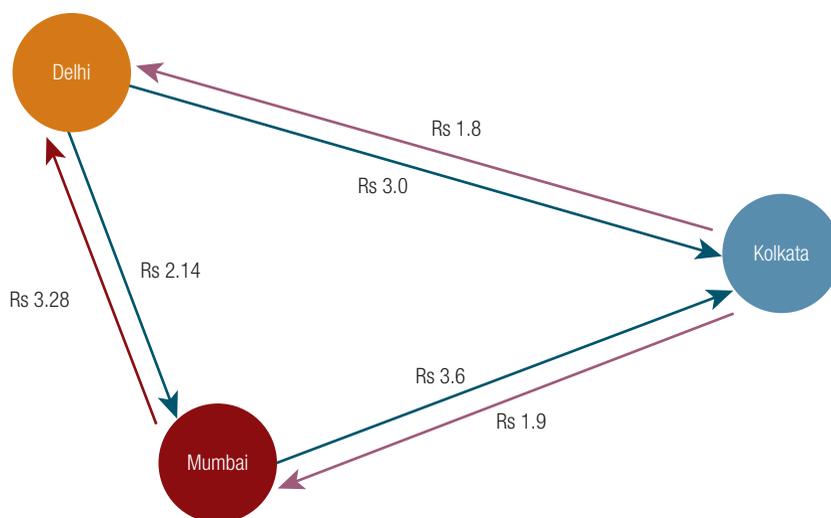
Source: Lall, Sinha Roy, and Shilpi 2021, for this volume.
Note: Estimates are for India. Rs = rupees.

　　　　　　　　　　　　　　　　　　　　　Place, Productivity, and Prosperity

to reload. This phenomenon is pervasive in most, if not all, modes of transportation: trucks, trains, container, air, and ocean shipping all exhibit similar price asymmetries that correlate with trade.

Stylized Fact 3. Improvements in Infrastructure "Hardware" May Be Necessary, but Are Not Sufficient to Reduce Domestic Trade Costs for Distant Regions

There is considerable evidence that declining transport costs enhance specialization. Using data from 1983 to 2003, Duranton, Morrow, and Turner (2014) show that the United States interstate highway system, spanning a length of more than 75,000 kilometers, enabled cities to become more specialized in the production of heavier products to take advantage of lower transport costs. In Canada and Mexico, a reduction in transport costs led to greater industry-level specialization from 1992 to 2008 (Behrens, Brown, and Bougna 2018; Blankespoor et al. 2017). In China, declines in trade costs are linked to regional specialization in export-oriented industries close to ports (Coşar and Fajgelbaum 2016). The advent of high-speed railway connections has increased employment, especially in industries with a higher reliance on non-routine cognitive skills (Lin 2017). In Argentina, the construction of the railroad network over the period 1869–1914 had a positive effect on productivity in a sector with comparative advantage (agriculture) and was strongly related to specialization in the new export crops (Fajgelbaum and Redding 2018).

In developing countries with high trade costs, economic activity, on average, tends to increase as transport costs decrease. Evidence on roads upgraded between 1960 and 2010 in 39 Sub-Saharan African countries suggests that a 10 percent increase in market access induces a 0.6 percent to 1.8 percent increase in city population (Jedwab and Storeygard 2019). This elasticity estimate is smaller than the 0.25–0.3 percent range observed in US counties during the 1870–90 period (Donaldson and Hornbeck 2016), perhaps because returns to infrastructure investments in the period after the 1960s were lower in Africa due to lack of complementary conditions (Jedwab and Moradi 2016). For example, the costs of trade and migration in Africa remained high (Atkin and Donaldson 2015). High oil prices and unpaved roads depress urban economic activity in Sub-Saharan Africa by making access to critical primate cities more expensive (Storeygard 2016). Nevertheless, the impact of roads on output in Africa is sizable and comparable to that of India's GQ highways (Alder 2015), and significantly higher than that found in postconflict Mozambique (Chiovelli, Michalopoulos, and Papaioannou 2018).[5] Compared with the United States, railroads in Africa created a change in the level of economic activity rather than a reorganization of it (Jedwab and Moradi 2016).[6]

Lowering transport costs may improve average firm productivity, although these effects are modest, at best. In China, average firm total factor productivity increased with improved market access, mainly due to the entry of new and productive firms

and the exit of inefficient firms (Yang 2018). In another study on China (Baum-Snow et al. 2017), the effects of a large-scale highway expansion on wages and GDP per capita were found to be generally less striking than usually envisaged. More generally, these effects vary even within the places that get connected. For instance, proximity to GQ highways in India disproportionately helped the young cohort of plants scale up, while the older cohort of plants experienced a decline in economic activity (figure 4.6, panel a). Comparing the life-cycle dynamics across time suggests that the

FIGURE 4.6 **Upgrades of the Golden Quadrilateral Highway Improved Plant Dynamics, but Only for Young and Productive Plants in India**

a. Dynamics of average plant size along the GQ network, by age cohorts

b. Dynamics of average labor productivity along the GQ network, by age cohorts

c. Initial productivtity: Young versus old cohorts

d. Productivity of old cohort, 2009 versus 2000
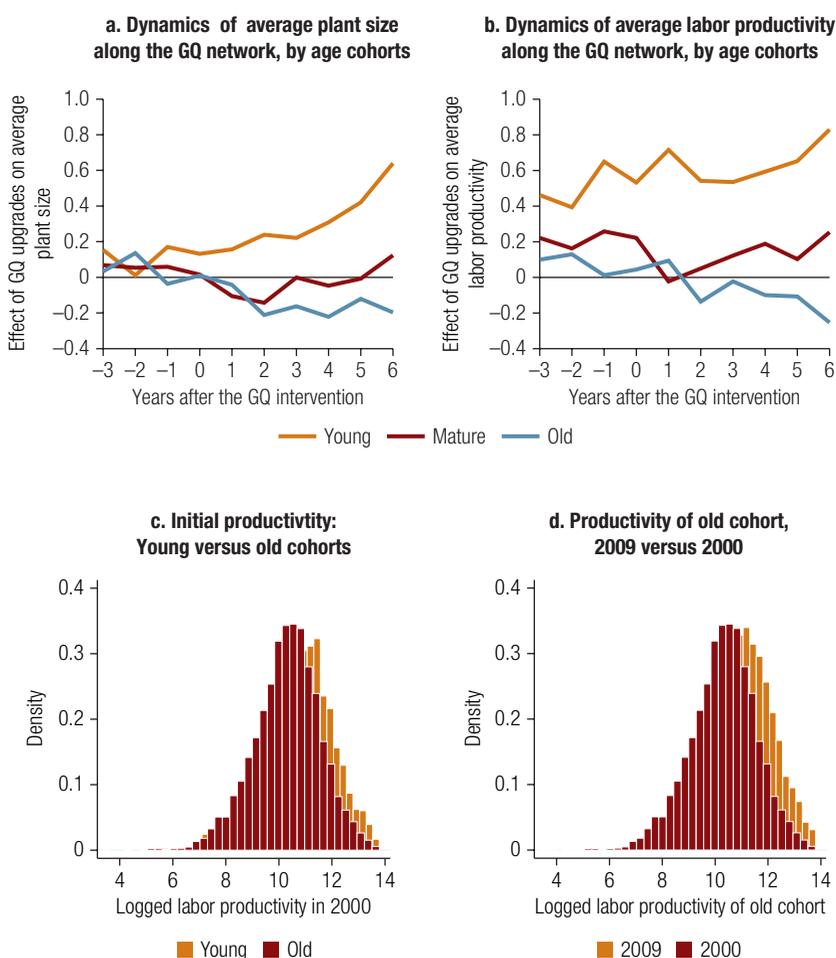
Source: Grover, Maloney, and O'Connell 2021, for this volume.

Note: Panels a and b plot the evolution in average plant size and labor productivity over the treatment period of Golden Quadrilateral (GQ) highways for the three cohorts of plants. In panel a, average plant size is measured in terms of employment. Panel c plots the productivity distribution of young and old cohorts of plants in 2000 (pre-GQ period). Panel d compares the productivity distribution of the old cohort in the initial and end periods of the GQ intervention.

highway program improved resource allocation by allowing the more productive younger plants to grow, while inducing the less productive old cohort of plants to exit or upgrade (Grover, Maloney, and O'Connell 2021). The GQ network that connects the four major cities of India (Delhi, Mumbai, Chennai, and Kolkata) constitutes the fifth-longest highway in the world. The upgrades and new highways enabled higher employment, output, and plant entry in districts along the GQ network that in turn improved the allocative efficiency of manufacturing production (Ghani, Grover, and Kerr 2016).

However, a meta-analysis of the impact of transport infrastructure based on 776 elasticity estimates originating from 78 studies, including some from developing countries, finds that the expected effect (elasticity of production) of investing in infrastructure is quite small, varying from −0.06 to 0.52. Nearly half of the estimates are between 0.0013 and 0.031, suggesting that a doubling of transport infrastructure is associated with an increase in production of merely 0.31 percent to 3.1 percent.[7] Nearly one-quarter of the elasticity estimates are negative (Holmgren and Merkel 2017).[8] The median elasticity is 0.03. The estimates exhibiting the highest precision are very close to zero. In another meta-analysis relying on 97 studies with 337 estimates covering a range of developing countries, Roberts et al. (2020) report that fewer estimates consider trade and productivity outcomes. Although 48 of these estimates show positive impact of transport infrastructure, several of these studies do not consider the variations in impact based on the remoteness of the location.

A further cautionary note is warranted: "hard" infrastructure investment is not always justified by demand. The African experience indicates that roads are often built in places for political rather than economic reasons.[9] Less intuitively, investing in roads is also sometimes the necessary but insufficient intervention, especially when regions lack agglomeration economies and complementary inputs such as human capital. For instance, India's Pradhan Mantri Gram Sadak Yojana funded the construction of all-weather roads to nearly 200,000 villages at a cost of almost $US40 billion (Asher and Novosad 2020). However, these investments do not appear to have transformed village economies. Farmers do not own more agricultural equipment and have not shifted from subsistence crops to cash crops and have not increased agricultural production (Asher and Novosad 2020). Nevertheless, the rural development scheme has led to a reallocation of workers out of agriculture into wage employment due to greater access to jobs outside the village.

Stylized Fact 4. Complementary Investments in "Software" Are Needed So That a Decline in Trade Costs Does Not Widen Spatial Inequality

It is not obvious that investments that reduce trade and transport costs are likely to help in spreading economic activity. And even if a decline in transport costs is successful in dispersing activity from regions with weaker agglomeration forces, the

reallocation will likely be toward coastal cities that can offer opportunities for international trade (Henderson et al. 2018). The final outcome may be similar to what is observed in China: that is, increased spatial inequality (Baum-Snow et al. 2017).

Accordingly, economic concentration per se should not be of concern to policy makers if changes in the internal geographies of countries do not generate any spatial inequalities that reduce welfare. But in reality, the spatial concentration of economic activity can lead to rising spatial inequalities in welfare, given that workers are not fully mobile or are slow to adjust to opportunities that emerge in urban hubs. Such immobility or slow adjustment is likely to enhance spatial inequalities in real incomes and is worrisome to national policy makers who have issues of spatial equity first and foremost on their minds—not least because of the associated political costs.

Reduction in transport costs may create spatial winners and losers. Evidence from the Belt and Road Initiative (BRI) investments suggests that the welfare gains vary across countries: welfare is expected to increase by 1.8 percent in Kazakhstan, 8.7 percent in the Kyrgyz Republic, 1.3 percent in Uzbekistan, and 0.4 percent in China (Lall and Lebrand 2020). Including the estimated costs of the BRI, however, means that the Kyrgyz Republic may experience a net negative welfare effect. Furthermore, BRI investments are likely to favor development in urban centers with better amenities.

BRI investments could also be complemented with investments in trade facilitation (that is, reforms that reduce border delays) to improve the procedures and controls governing the movement of goods across national borders. Undertaking trade facilitation would increase the gains for all countries and compensate for the high infrastructure costs. The welfare gains from additional trade facilitation programs also vary across countries: welfare is expected to increase by 3.8 percent in Kazakhstan, 13.2 percent in the Kyrgyz Republic, and 10 percent in Uzbekistan.

Lowering mobility costs for workers can also increase the economic gains from BRI investments and reduce wage inequality. Welfare is projected to increase by 14 percent in Kazakhstan, 17 percent in the Kyrgyz Republic, and 13 percent in Uzbekistan from removing internal mobility costs. Domestic policies and investments that support spatial mobility of labor and internal connectivity could mediate potential trade-offs between spatial efficiency and equity within countries.

Reducing economic distance in the hinterland may possibly also lead to a decline in local activity, as New Economic Geography models suggest (see Krugman 1991). For remote locations, linkages offer better access to markets, but also remove protection from outside competition for local producers. Analysis of the BRI suggests that remote regions may lose out. Urban hubs near border crossings will likely disproportionately gain, while farther-away regions with little comparative advantage will be relative losers. Real wages are predicted to grow five times more in the locations around Kazakhstan's largest city, Almaty, than in the northern locations at the border with the

Russian Federation (Lall and Lebrand 2020). Improvements in transport connectivity are often not enough to support economic development in less attractive locations. The quality of local amenities and the strength of comparative advantage in the export sector are strong predictors of gains across districts.

Domestic policies and investments that support spatial mobility of labor and internal connectivity can mediate potential trade-offs between spatial efficiency and equity within countries. Analysis of the BRI shows that by supporting measures that enhance domestic labor mobility, policy makers in Central Asia can leverage these large-scale infrastructure investments to reshape their economic geographies. These policies will allow for faster development and avoid the risks associated with balancing efficiency with equity concerns (Lall and Lebrand 2020). Many Central Asian countries retain remnants of the Soviet-era *propiska* systems, which are internal passport requirements, and limit mobility and access to services. Similar systems are in place in China (*hukou*) and are prevalent in Vietnam (*ho khau*) and other countries (see chapter 3). Policy makers may thus want to focus on relaxing domestic policies that restrict spatial mobility.

Complementary investments in trade facilitation can accentuate economic gains around hubs, while investments in domestic transport networks help spread the benefits spatially. As the returns to infrastructure taper off, such as in China, places will need to combine complementary factors to infuse economic activity. Analysis of the BRI suggests that investing only in transport infrastructure creates a large number of absolute losers, while investment in both transport and trade facilitation benefits almost all locations. Simulations show that in Central Asia, districts with high employment in nontraded sectors and districts that experience low reductions in transport costs would experience negative welfare gains. However, when these costs are complemented with reductions in border costs and increased amenities, almost all districts would benefit from lower transport costs and experience positive welfare gains (figure 4.7) (Lall and Lebrand 2020).

The Role of Digital Connectivity in Narrowing Disparities between Regions

Digital technologies can also play a key role in reducing trade costs; however, the extent to which they are successful is contingent on complementary factors. Technological innovations such as the telegraph cables of 1860s, the mobile phone revolution in developing countries during the 1990s, and the advent of Amazon and e-commerce in the 2000s have lowered trade costs tremendously. Information technology has dual effects: it permits dispersion of certain routine activities, while encouraging agglomeration of complex productive activities. It improves connectivity and matches between producers and consumers, but in most cases it complements rather than substitutes for physical connectivity. Studies show that digital technology improves welfare by

FIGURE 4.7 Reductions in Transport Costs When Combined with Complementary Conditions Improve Welfare in Central Asia
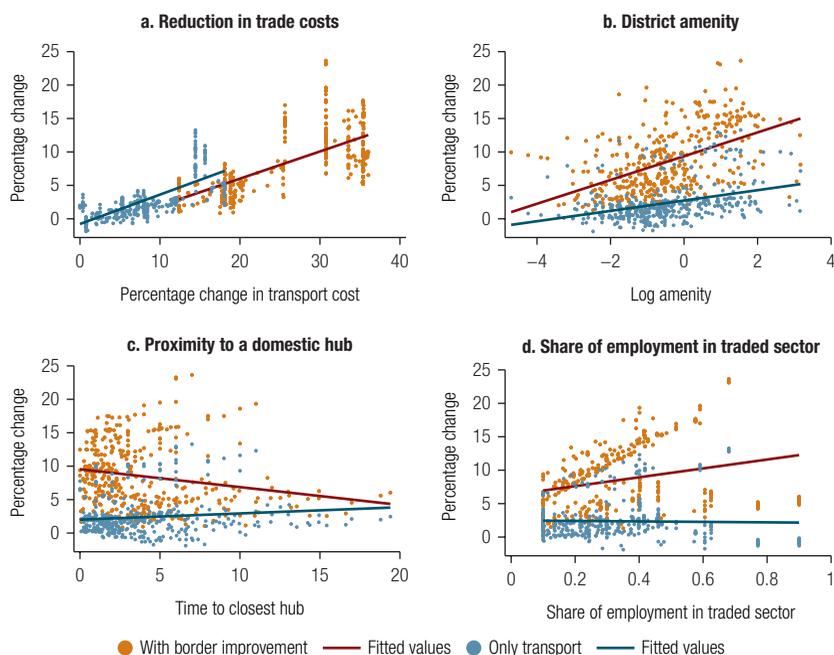
Source: Lall and Lebrand 2020.

Note: The panels show the percentage change in real wages for all locations in Kazakhstan, the Kyrgyz Republic, and Uzbekistan for two scenarios: with and without the additional reduction in border delays. The blue dots represent the scenario only with transport infrastructure investments. The orange dots represent the scenario with the additional reduction due to border reforms.

reducing search costs and average price inflation (Goolsbee and Klenow 2018) and generates spatial convergence in prices (Brown and Goolsbee 2002; Jensen 2007; Steinwender 2018; Jo, Matsumura, and Weinstein 2019).

These effects, however, are not uniform across space. In the case of Japan, for instance, Jo, Matsumura, and Weinstein (2019) find that the regional variation in e-commerce sales intensity is entirely driven by the share of college-educated people, with no role for urban-rural or young-old divides, once the analysis controls for education (figure 4.8). Lack of complementary interventions, such as business training or access to credit, can also explain the lack of production-side effects on local economies. This was the conclusion of a study of rural Chinese counties ("Taobao villages") that sell clothing and other consumer items, mostly obtained from small local factories, on Alibaba platforms (Couture et al. 2021). Box 4.1 provides evidence of the importance of complementary conditions, such as education and access to reliable ICT services, in allowing people and regions to take advantage of digital connectivity during the COVID-19 pandemic.

FIGURE 4.8   The Use of E-commerce Is Positively Associated with Higher Skills and Education in Japan
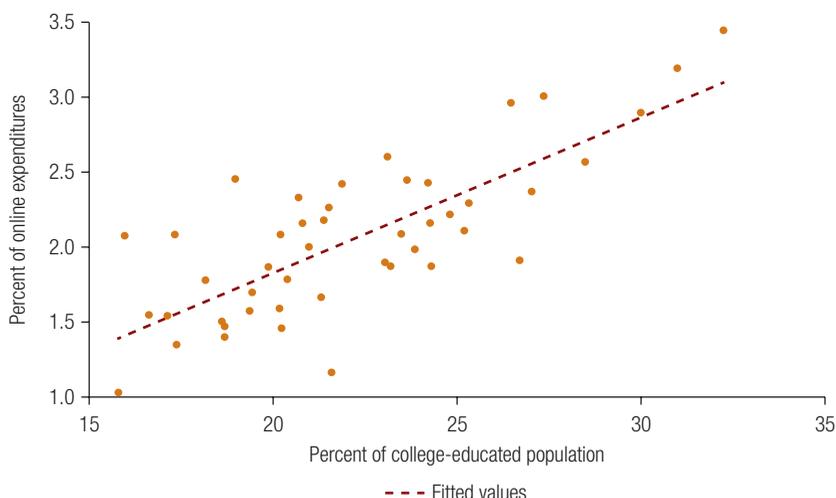
Source: Jo, Matsumura, and Weinstein 2019.

Note: Data are at the level of a prefecture, Japan's first level of jurisdiction and administrative division. The figure shows the share of online sales versus the share of college education in Japanese prefectures. Specifically, it uses data from a representative survey of Japanese households that reports the purchase channels of products to regress the share of a prefecture's expenditures online on the share of a prefecture's college-educated population over the age of 15.

BOX 4.1

The Role of Complementary Conditions in Connecting People and Regions Digitally during the COVID-19 Pandemic

Lockdown and physical distancing measures instituted to tackle the spread of COVID-19 (coronavirus) resulted in a decline of workplace mobility by 55 percent relative to January–February 2020 for a sample of 72 countries around the world and an increase in mobility around residential areas (OECD 2020a). This has resulted in job losses for many, and especially for those in occupations that require greater face-to-face interactions. The ability to work remotely depends on the extent to which job functions can be performed from home—an issue that is likely to be specific to particular tasks or sectors of activity (Dingel and Neiman 2020). However, and quite importantly, it also depends on the capacity to leverage digital technologies, the degree of adoption, and the stock of skills (OECD 2019, 2020b). In addition, it requires access to reliable information and communication technology (ICT) services (telecom and computer and related services) and goods (network equipment such as cables, wires, and hardware), as well as reliable digital networks.

Member countries of the Organisation for Economic Cooperation and Development (OECD) have, to some extent, been able to adapt to new circumstances. They have the highest share of jobs that can be performed remotely (figure B4.1.1, panel a) (OECD 2020a). By comparison, in non-OECD countries, containment measures do not bear any relationship to reductions in workplace mobility (panel b). In developing countries, not only are jobs less amenable to home-based work,

(Box continues on the following page.)

The Role of Complementary Conditions in Connecting People and Regions Digitally during the COVID-19 Pandemic *(continued)*

FIGURE B4.1.1   Fewer Jobs in Developing Countries Can Be Performed Remotely
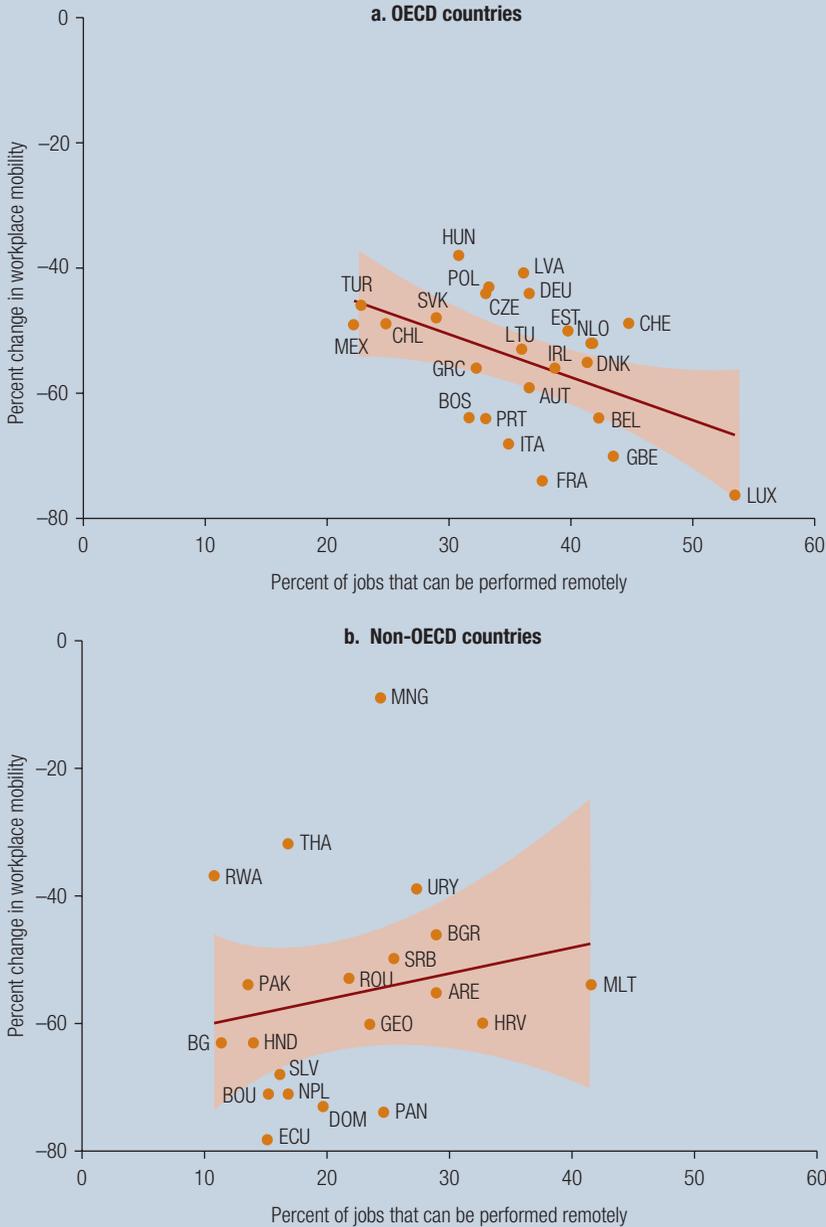
Sources: OECD 2020a; Dingel and Nieman 2020.

Note: A drop in workplace mobility was recorded two weeks after the imposition of confinement measures. Data labels use International Organization for Standardization country codes.

(Box continues on the following page.)

The Role of Complementary Conditions in Connecting People and Regions Digitally during the COVID-19 Pandemic *(continued)*

but there are other serious challenges as well. The ability to telework and shop online during confinement depends on access to affordable and reliable digital networks. Complementary trade policy can play a key role in enabling access to ICT services and goods, which are subject to high tariff rates in developing countries (figure B4.1.2).

FIGURE B4.1.2 **Network Equipment in Developing Countries Is Subject to Higher Tariffs**
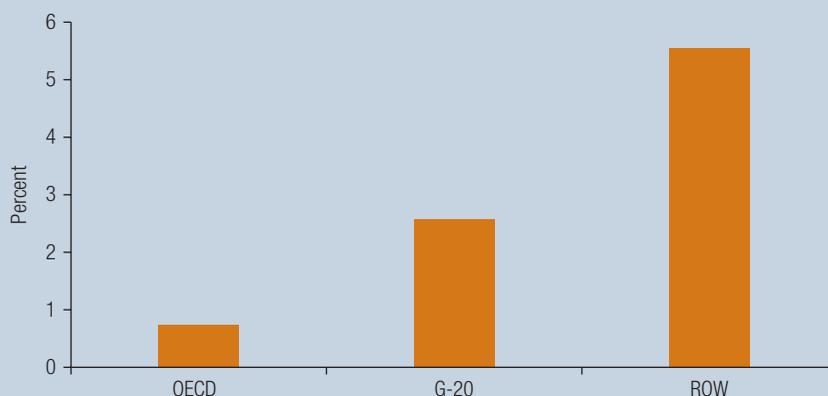
Source: OECD 2020a.

Note: Simple average applied tariffs for 2017–18 for 133 countries. The G-20 grouping includes OECD countries. G20 = Group of Twenty; OECD = Organisation for Economic Co-operation and Development; ROW = rest of the world.

The increasing digitization of goods and services lowers the frictions associated with moving information (Goldfarb and Tucker 2019), increasing tradability of services (Gervais and Jensen 2019), and lowering barriers to trading with distant customers with similar tastes (see, for example, Blum and Goldfarb 2006; Sinai and Waldfogel 2004). It also enables new strategies for omnichannel (integrated and seamless customer experience) retailing (see, for example, Brynjolfsson, Hu, and Rahman 2009), and fosters the translation of relationships embedded in social trust into online relationships (see, for example, Forman, Ghose, and Wiesenfeld 2008). Modern digital technologies have redistributive economic benefits within countries and, in particular, between cities and rural areas (World Bank 2016).

Digital communication could be a substitute for or a complement to urban hubs (Gaspar and Glaeser 1998). So far, the biggest beneficiaries of digital technologies and data have been in large urban areas (see, for example, Eichengreen, Lafarguette, and Mehl 2016; Forman, Goldfarb, and Greenstein 2012). Cities benefit through agglomeration effects, particularly with respect to skilled workers in local labor markets. Overall, two forces are at play. Agglomeration effects mean that cities disproportionately benefit.

Low-cost communication, however, can benefit the geographically isolated. In any particular context, the overall result depends on the balance between these forces. Generally, the more difficult the technology is to use, the more likely it is that agglomeration effects will dominate (see box 4.2).[10]

BOX 4.2

Digital Technologies May Exacerbate the Differences across Regions as They Cope with the COVID-19 Pandemic

Evidence from the World Bank's Business Pulse Surveys reveals that while the COVID-19 (coronavirus) pandemic is depressing sales of firms by comparable amounts across regions, within countries, those in the capital (or major business) city are more likely to adjust by adopting digital means and cope better with the crisis. This suggests that over time firms in the capital city are likely to be relatively resilient, remain operational, and recover sooner, compared with other locations. Figure B4.2.1 provides some illustrative evidence from Malawi and Tanzania.

FIGURE B4.2.1 **Firms in Capital or Business Cities Are More Likely to Digitalize during the COVID-19 Crisis**

a. Impact on sales (predicted percentage change)

b. Adjustment through digitalization (predicted average probability of adoption)
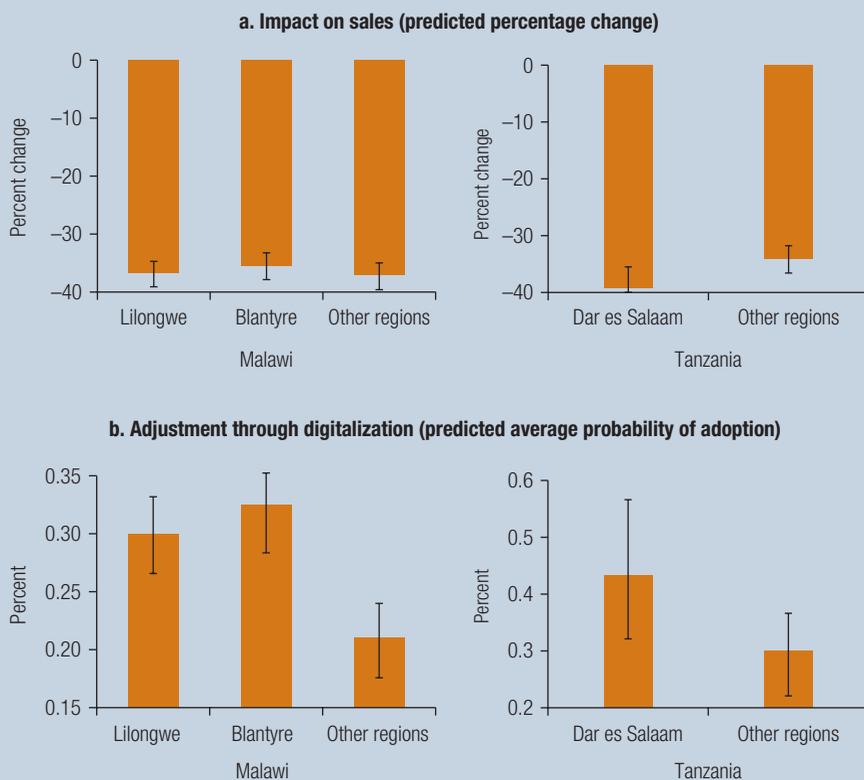
Source: Elaborations based on the World Bank's Business Pulse Survey data. Regressions control for size, sector, age and exporting status of firms.

Digital development spreads primarily in urban locations with adequate demand. Consider data centers that are core services for any firm with a digital presence. They are highly land-intensive and expensive operations that require little labor. Communication via the internet makes it feasible for data centers to locate virtually anywhere, yet they are still found in dense locations that are the most expensive. Almost all data centers in the United States are located in large urban and suburban areas with medium to large populations—that is, counties in Metropolitan Statistical Areas—Greenstein and Fang (2020) find, using information on 1,433 active data centers as of February 2019. Why is this the case? Buyers for data center services exhibit a strong distaste for distance and prefer services from nearby suppliers.[11] The number and the capacity of the data centers in a county have a strong and positive association with county population size (figure 4.9) and density. This pattern is consistent with the hypothesis that entry and firm size grow with larger local demand. Having a population density one standard deviation above the mean level is associated with a 13.3 percent increase in the likelihood of entry of a data center into a county. A 1 percent increase in population density is associated with a 1.059 percent increase in urban capacity, and a 1.416 percent increase in suburban capacity.[12]

Digitalization is encouraged by the presence of information-intensive industries, which goes hand in hand with the presence of localized demand as well as complementary skills to supply these services. A one standard deviation increase in the presence of information workers is associated with a 2.7 percent increase in the likelihood of data center entry into a county, while it increases by 4.2 percent with a similar increase in workers in the knowledge-intensive FIRE services (Finance, Insurance, and Real Estate) (Greenstein and Fang 2020).

Overall, the evidence suggests that digitalization as measured by data centers and cloud services has an urban bias, favoring bigger and denser cities. There is scant evidence that data centers will spread to nonurban locations, except for a select few footloose potential data center locations with low electricity prices. Even as demand spreads to the cloud, it is more likely that the infrastructure to support it will locate in suburban areas with low costs, and that are sufficiently close to potential customers to relieve concerns about network congestion.

Conclusion

This chapter examines how and why the impacts of globalization vary among regions within countries. It also examines various factors, including trade costs, infrastructure conditions, and supporting institutions within countries, that limit the extent to which gains from trade reach distant places. Finally, the chapter considers the role of digital connectivity in mitigating spatial disparities. While globalization is appealing for

FIGURE 4.9   Local Demand (Population) Critically Determines the Location and Size of a Data Center

a. County population and entry of data centers

b. County population and size of the largest entrant data center

○ Footloose   + Private   × Suburban   △ Urban   ● None
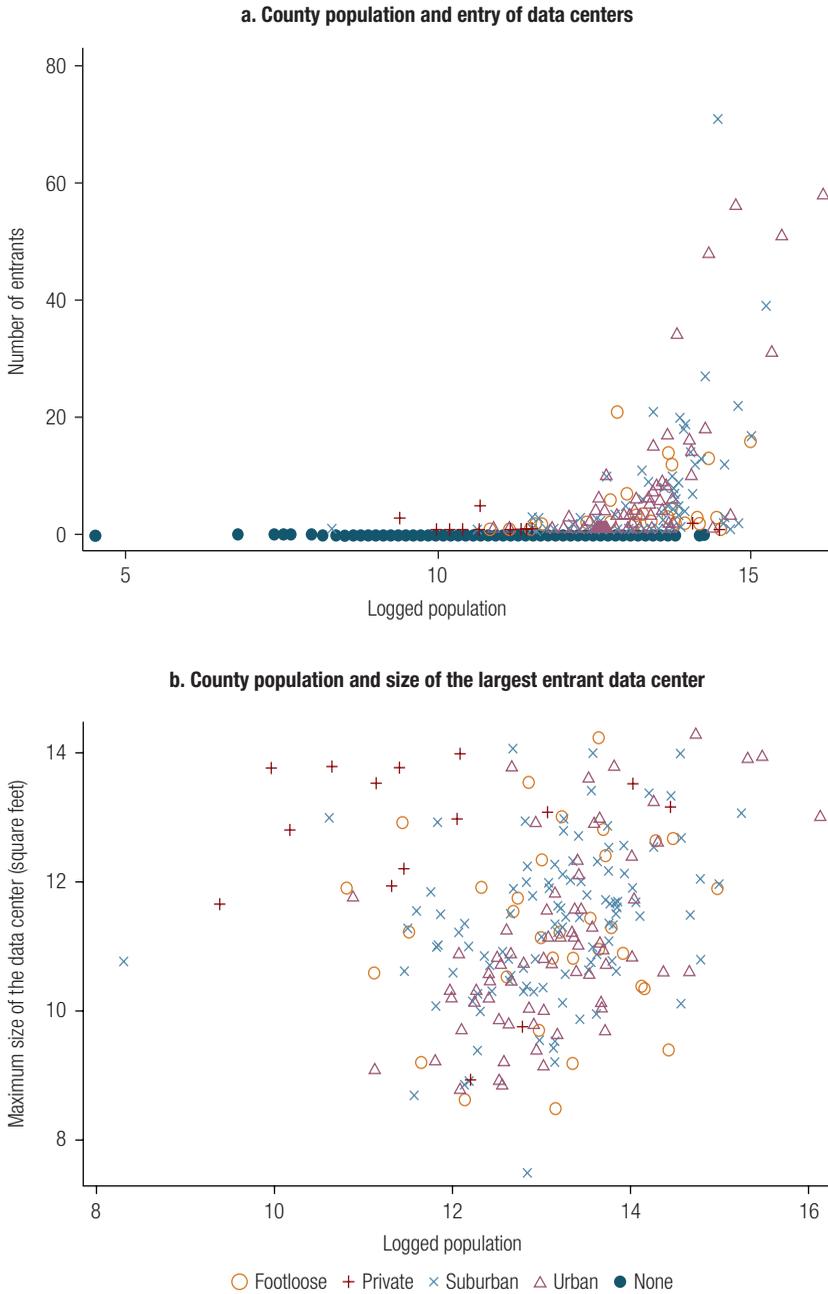
Source: Greenstein and Fang 2020.

Note: An urban data center is located within 5 kilometers of the downtown hub of a Metropolitan Statistical Area, while a suburban data center is located between 5 kilometers and 30 kilometers from the downtown hub, and a footloose data center is located more than 30 kilometers away. A private data center is owned and used exclusively by a single organization. Panel a measures the relationship of population density with the number of data centers, while panel b does the same with respect to the maximum size of the data center, in terms of square feet of land devoted.

expanding external market opportunities, economic activity in open economic systems tend to concentrate near international gateways and large urban agglomerations.

Further, internal trade costs limit the extent to which economically and physically distant regions can be integrated into trade and production networks. The interaction of scale economies in production and in transport make it harder—not easier—for economically distant places to enter production chains and develop local scale economies; trade tends to be vigorous between regions that are nearby. Further, while a major focus of efforts to reduce trade costs is on transportation "hardware," these need to be complemented by "software" interventions around market structure of the transport industry and trade facilitation efforts. Further, policies that enable labor mobility can help amplify the benefits of trade and transport cost reductions.

Finally, new digital technologies could potentially connect distant places; however, their adoption and use depend on the availability of complementary human capital, which is usually scarce in distant areas.

The challenges in spreading growth across many regions in a country often provide the motivation for place-based policies that employ targeted interventions to create jobs and induce firms to produce in lagging regions. The chapters that follow discuss the limitations faced by lagging regions, as well as provide a heuristic framework to assess the viability of such place-based policies.

Notes

1. The OECD defines re-imported DVA as the content from any industry in the county that has been exported for the production of intermediate goods or services abroad and subsequently embodied in imports used in the production of exports by the country.
2. These results are not driven by concerns relating to reverse causality.
3. Most of the heterogeneity is driven by port versus non-port states, where internal barriers make up 17 percent and 51 percent of the total trade barrier, respectively. On average, the total trade cost is more than three times as high for non-port states as for port states.
4. Logistics costs can include barriers to market entry such as access restrictions, technical regulations, customs regulations, and cartels (Teravaninthorn and Raballand 2009).
5. The impact is also higher for domestic than for foreign cities in Africa, and weaker in politically favored and more agriculturally suitable areas.
6. Railroads induced reorganization of agricultural activities, trade integration, and structural change in nineteenth-century America (Atack and Margo 2011; Atack et al. 2010; Fajgelbaum and Redding 2018).
7. This could also be due to an overrepresentation of large positive estimates in the literature to date.
8. There are no studies reporting a single negative (or only negative) result, whereas several studies report single positive ones.
9. There is evidence that such investment decisions may be based on the possibility of winning elections, rather than on their economic contributions (Eliasson and Lundberg 2012; Odeck 1996, 2010).

10. Broadband and basic internet technology may benefit low-density areas (see Kolko 2012; Forman, Goldfarb, and Greenstein 2005).

11. Preference for proximity arises when consumers move "big data"; small differences in response time can be important for users. Preference for nearby suppliers is also motivated by "server hugging" among client firms that wish to monitor shared facilities to ensure that promised efficiencies are delivered.

12. Industry convention has designated a data center's size by its use of electricity, while the capacity measure is flexible enough to handle different uses for the servers, such as storage, computation, and so on.

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5. Lagging Places: Missed Opportunities, Left-Behind People

Introduction

Chapters 2 to 4 lay out recent advances in understanding the building blocks of spatial economics and their links to productivity: the power and persistence of agglomeration, the promise of mobility, and the tyranny of distance. This chapter illustrates how they also guide our thinking about approaching lagging places and the people who populate them.

That economic activity and employment are distributed highly unevenly across space moves spatial policy to center stage. If distortions and inefficiencies were redressed, what might be the growth potential of lagging regions such as Brazil's Nordeste, China's Xinjian region, or India's state of Bihar? Or if we do not deal with sustained territorial inequalities, will they lead to social discontent and even armed revolts, for instance, in Colombia, Indonesia, Nigeria, Peru, and Thailand.[1] What should be done to support the populations left behind where foreign competition or new technologies have undermined the previous basis for prosperity, contributing to, for instance, the populist backlashes in the United States and the United Kingdom?

Policy responses to redress such spatial disparities often proceed by analogy to development policy for nations as a whole. However, as discussed in chapter 3, where migration is reasonably fluid within the country, then the wage gaps that have proven so attractive for firms to relocate abroad—for instance, from the advanced economies to China, Ethiopia, or Vietnam—will be vastly reduced. Hence, certain regions may possibly have "no comparative advantage." They may be fundamentally "unviable" as locuses of growth and be left behind. On the other hand, it is this very internal mobility that offers one solution to lagging places: moving individuals from lagging areas to leading ones. Box 5.1 discusses the case of Kolmanskop, Namibia, which once produced 12 percent of the world's diamonds and was one of the richest towns on the planet—its hospital had the first X-ray machine in the Southern Hemisphere. Yet now it is an abandoned desertic site on the excellent B4 road between the port of Luderitz (population 12,000) and Aus (population 1,200). Conceptually, there is no market failure at work here and national welfare is maximized: factors are optimally reallocated in response to diverse shocks.

Insights on Migration and Nonviable Regions from a Mining Boom Town: The Case of Kolmanskop, Namibia

One evening in 1908, Zacherias Lewala, a Namibian railway worker, spotted some stones shining in the low light of dusk while shoveling railroad tracks clear of sand dunes. His German employer identified them as diamonds. While Lewala was not rewarded for this find, hordes of prospectors descended on the area. By 1912, a town had sprung up producing one million carats a year—12 percent of the world's total diamond production. Kolmanskop's economy started booming. A butcher, a baker, a post office, an ice factory, pipelines and connections for fresh water; rail services; and a tram soon appeared. A school was built for the children of the families who flocked to the town. A hospital reputedly had the first X-ray machine in the Southern Hemisphere.

Yet now, the town is abandoned. An inventory of the hundreds of nineteenth century US mining cities would likewise yield a list of ghost towns. These experiences highlight a critical feature about within-country spatial dispersion dynamics: the ability of labor and other factors to move between regions. In international trade, countries have a comparative advantage based on their endowments, which are largely immobile. A textile worker will receive a lower wage in Vietnam than a comparable worker in the United States and hence Vietnam can build an industry on this comparative advantage. However, with mobility possible within countries, the wages of an engineer or X-ray technician (as in Kolmanskop) are set substantially in whatever other industry center they can migrate to. Hence, after diamonds played out, Kolmanskop had no comparative advantage in engineers or much of anything else. Modern-day examples of this dynamic can be found where trade competition or technological progress eliminate the comparative advantage that a region may have once enjoyed (Autor, Dorn, and Hanson 2016).

However, worker mobility within countries can be limited by various barriers. The growing demand for specialized skills creates a mismatch whereby workers in declining industries may not have the skills profile to be absorbed in dynamic urban economies where cognitive and social skills command a premium (Lall, Henderson, and Venables 2017). Land and housing market rigidities also limit worker mobility (Hsieh and Moretti 2019).

Source: World Bank staff elaboration.

Two Tales of Cities: Not Every Place Has Potential for Growth

Figure 5.1 presents two tales of cities that reiterate the point that the coming together of people and economic activity in the form of agglomerations may have very different potential for long-term growth. Cities with two types of natural advantages (first nature factors) are represented: those established along water fall lines, and those established for mining, as discussed in chapter 2 and Bleakley and Lin (2012). The horizontal axis of the figure shows the population of these US towns at the time of the peak of their original reason for existence: portaging around waterfalls, and mining (Bleakley and Lin 2012). The present-day population outcomes, along the vertical axis, are vastly different, even though in both cases their original reason for

FIGURE 5.1   Towns along Fall Lines Evolved Very Differently than Mining Towns
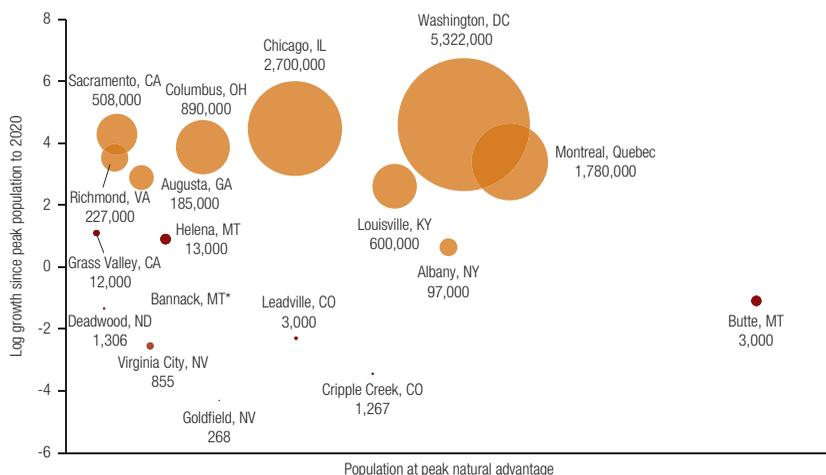
Source: World Bank elaboration. Fall line data based on Bleakley and Lin 2012.

Note: The figure plots city population at the peak of the original reason for being, either as a portage site (orange) or mining town (red), against subsequent population growth to 2000. Bubbles capture current population size. The asterisk (*) next to Bannack refers to it having no permanent population, which means it is not correctly scaled in the figure.

being disappeared: Most of the fall line towns have grown substantially in size, while most of the mining towns have emptied out. This is partly because while the fall line towns started as trading sites and deepened this vocation over time, mining towns had little in the way of agglomeration economies or fungible physical plant that would possibly attract new firms. Geographical isolation also played an important part. The ghost town of Bannack, once the capital of Montana territory, was connected only by the winding Montana Trail, which was enough for the engineers to traverse, but far from adequate to provide sufficient connectivity even to the nearest metropolis, Salt Lake City (1880 population: 32,000). Like its counterpart in Namibia, Kolmanskop, it was no longer "viable."

In fact, what this volume calls "viability" might be better thought of as a continuum of endowments of natural and historical factors—such as distance or established trading networks—where the needed policy interventions to make them prosperous had a rate of return comparable to that of other policy priorities. For instance, the former mining town of Grass Valley, California, is close to a rich agricultural area and not too far from Sacramento, the capital city and a major transport hub and major urban center. Helena, Montana, got a new lease on life by becoming the state capital. But most of the cities featured in figure 5.1 do not have these endowments and are scraping by on ghost town or recreational tourism.

This discussion also points to a fundamental and inescapable fact—*vast areas of countries may have a limited economic future.* Economic geography is lumpy, persistent,

and efficiently so: not every poor place has the potential to be rich, and their populations will eventually need to move to more prosperous areas. Further, while the choice of location for needed trading centers along portage sites is, in historical hindsight, arbitrary and multiple possible spatial equilibria were possible, the successful agglomerations that materialized are likely to prevail and remain dominant. Chicago and Montreal will have no regional competitors.

Why Is a Region Not Thriving Already?

Policy makers are thus not painting on a blank canvas and are more constrained than often acknowledged in how much they can alter economic geography. The question "Why is a region not growing already" helps answer whether place-based policies are appropriate, and, if so, which policies might work best. There may be three broad reasons why an area has stagnated:

1. *The place is viable but held back by market distortions or failures.* Many regions of developing countries can be viewed as areas where "development hasn't arrived yet": the accumulation of human, physical, and knowledge capital has not materialized. This raises the question posed by Robert Lucas Jr. (2002) in his inquiry into growth economics of what distortions or market failures are preventing the rapid flow of capital and knowledge capital and what are the key market failures or frictions that need to be resolved (see Kline and Moretti 2014; Bartik 1990).

   ▪ *Absent public goods.* Productivity-enhancing public goods and public amenities are definitionally underprovided by the private sector. As discussed in chapter 2, the Kenyan highlands had latent comparative advantage in exporting tea, but needed transport in the form of the rail link between Mombasa, on the coast, to Lake Victoria, in the west, before it could access markets and attract human capital in the form of experienced farmers (see box 2.1 in chapter 2). Public eradication of hookworm in the American South led to a rise in education, returns to education, and incomes (Bleakley 2007). As discussed later in this chapter, providing electricity to the Tennessee Valley raised incomes and stimulated industry. In all successful regions, public education plays a central role. The processes of innovation and technology transfer are replete with market failures that need to be addressed (Cirera and Maloney 2017).

   ▪ *First-mover coordination problems.* Even though congestion costs may be high in current cities, firms may be willing to seed a new agglomeration only with the assurance that others would join them. This "first-mover" problem is fundamentally a coordination failure that can cement existing congested agglomerations. Governments can resolve this by building infrastructure, branding new city plans, attracting catalytic large private investors around which other firms may coordinate, and so on. Smaller shifts in agglomerations are easier to support than large ones.

   ▪ *Distortions and missing markets.* Many government interventions—whether place-based or not—create spatial inefficiencies. As a particularly dramatic

example, Buenos Aires was literally a backwater in the early colonial period. After the American Revolution in 1776, Spain sought to counterbalance emerging US power, and permitted trade through the port of Buenos Aires, allowing it to realize its potential as one of the great ports and cities of the world. Today, business ecosystems, in addition to government-imposed distortions, may lack financial markets or other support services that would attract firms. In new research for this volume, Grover, Maloney, and O'Connell (2021) find that areas along the Golden Quadrilateral highway system in India with better financial access have benefited the most from increased connectivity. Duranton et al. (2016) find that spatial differences in urban land market policies (such as land ceilings and sales taxes) have critical implications for misallocation of factors within and across districts in India. Labor market frictions may lead to high unemployment rates. Some seemingly spatially blind policies addressing other social ends, such as income taxation, minimum wages, or carbon taxes, can generate spatially biased distortions.

There are unquestionably places with untapped potential to be realized by reforms and interventions in these areas. Lifting Spanish trade restrictions on the natural port of Buenos Aires in 1775 transformed it from a from a backwater to one of the world's richest cities, with arguably the premier opera house on the planet. The construction of the Uganda Railway through the Kenyan highlands, and the subsequent immigration of skilled farmers, led to the development of a dynamic tea industry and the emergence of Nairobi from swamp to great capital city. In China, the establishment of the Special Economic Zone and associated policy "rules of the game" in 1979 allowed Shenzhen to take advantage of its labor force and position across the straights from Hong Kong SAR, China, to attract foreign direct investment and transform from a fishing village to China's Silicon Valley. In each case, policy altered the spatial distribution of national activity, but could do so only because there was a fundamental latent source of economic advantage that could be released by eliminating distortions, providing necessary complementary factors, or resolving market failures.

2. *The place is viable but transitioning from negative shocks.* Extreme trade and technology shocks have hit cities and regions around the world, but the installed man-made infrastructure, housing stock, and institutions offer the foundations for new, as yet unidentified industries to emerge. In the classic adjustment mechanism, as agglomeration forces weaken with the retreat of lost tradable sectors, the productivity of a city declines and housing prices drop to some degree, compensating for lower wages and dampening incentives to migrate, while possibly attracting new low-skilled residents (Rosen 1979; Glaeser, Kahn, and Rappaport 2000; Glaeser and Gyorko 2005). For decades, the burned-out, rat-infested ruin of Detroit's Michigan Central Station was a must-see symbol of a dying city where automotive jobs had moved abroad and the wealthy population had fled to the suburbs. About 80 percent of owner-occupied single-family

housing was valued at least 30 percent below construction costs. After decades of decline, the city is seeing a renaissance as a nascent tech hub. The combination of real estate bargains, several nearby world-class universities, installed research and development capacity in automotive automation, established venture capital industries, and a welcoming investment environment have made it an attractive option compared with the stratospherically costly Silicon Valley, Boston, or New York. But then Boston, too, has reinvented itself. Glaeser (2005) notes that "in 1980, Boston was a declining city in a middle-income metropolitan area in a cold state." What enabled it to successfully transition from a decaying manufacturing base was the high human capital, distinguished universities, and established infrastructure that made possible a transition to high tech, finance, and education and that attracted cognitive and non-routine task workers.

For both types of lagging regions, there is a clear role for public policy, by providing public goods or redressing market failures. The question is how governments can intervene to kick-start a region or accelerate its transition to a new economic base. Chapters 7 and 8 discuss broadly two types of policies and the lessons learned to date. The first is called "hard infrastructure," which consists primarily of physical transport–based construction including roads and digital connectivity, but also the transport corridors and export processing zones constructed around them. The second, called "soft infrastructure," relates to educational, entrepreneurial, legal, and other investments and reforms. A central message of this volume is that these types of soft infrastructure are often essential complements to hard infrastructure if its potential is to be realized.

3. *The place is nonviable.* There are places like Kolmanskop so far below a threshold of remoteness (distance) and a critical mass of economic activity that there is no package of hard and soft policies that would work. In economic terms, it may not be reasonable to expect a positive discounted net present value of the investment.[2] The good news is that most people around the world live in places that are not very remote. Map 5.1 and the accompanying analysis done for this volume show that 85 percent of the world's population lives within an hour's drive of a city of 50,000 people. That share increases to 95 percent for driving times within three hours. For example, Canada is a country as large as a continent, but most of its population lives within a thin band bordering the United States.

There are exceptions. Hill and Gaddy (2003) show that the Russian Federation's vast geography has become a source of long-lasting drag on growth and pain because for 70 years, Soviet planners moved tens of millions of people and thousands of large-scale industrial enterprises to Siberia, making them languish in cold and distant places with limited economic prospects. The move was an attempt to equilibrate migration and effectively reverse the productivity-augmenting agglomeration dynamic.

Small island economies face the challenge of having small populations with little potential for agglomeration economies that are also very distant from major centers of economic activity. Figure 5.2 locates several island groups along these two dimensions. The most populous countries, China and India, have average distance to markets, but clearly massive possibilities for agglomeration. New Zealand and Australia are more

MAP 5.1   Ninety-Five Percent of the World's Population Lives within a Three-Hour Drive of a City of 50,000 People

Travel time to cities
Less than 1 hour
Less than 3 hours
Less than 5 hours
Less than 12 hours
Less than 1 day
More than 1 day
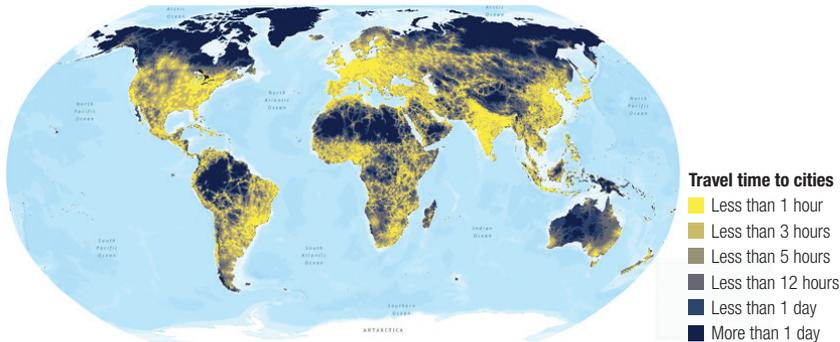
Source: World Bank staff elaboration based on travel time grid layer from Weiss et al. 2018 and gridded population layer from WorldPop from 2015.

FIGURE 5.2   Some Small Island Countries Are Very Far Away from Markets
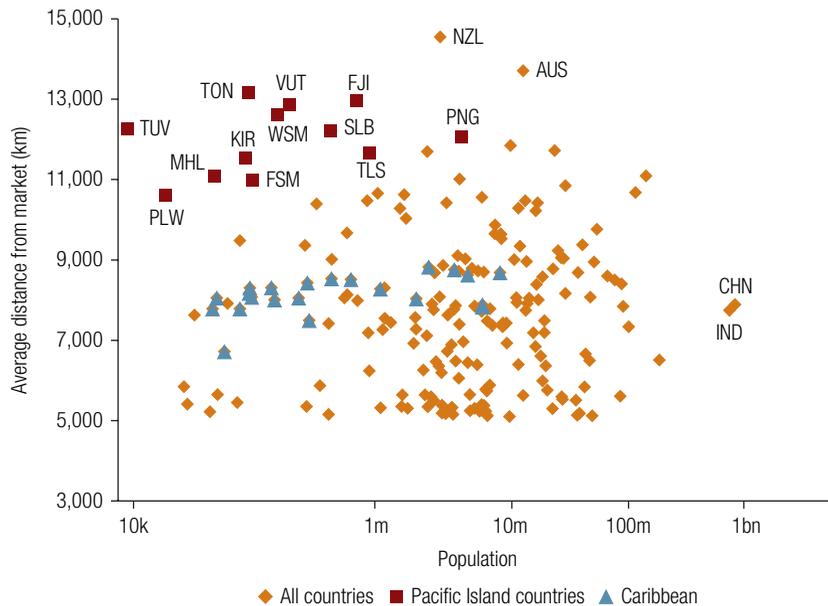
Source: Utz 2021.

Note: The figure uses International Organization for Standardization country codes. AUS = Australia; CHN = China; IND = India; NZL = New Zealand.

distant from markets, but their success testifies to the fact that a population of 5 million to 25 million can offer sufficient agglomerations to be viable in itself.

But other cases are less clear. Nauru and Tuvalu are the smallest members of the World Bank in terms of population. Each has roughly 11,000 individuals, slightly more than the mining town of Bannack, Montana, in its heyday. In the Marshall Islands, only 2 of 24 islands have populations over 10,000, with the rest substantially under 2,000. Often such islands are dependent on tourist revenue but cannot diversify much beyond this. It is highly unlikely that multinational corporations would move there because of the high costs of both bringing in inputs and transporting out products, but also because the available labor force is simply too small and undiversified. Nor can the economy offer a range of career opportunities for a population with increasingly specialized skills as they develop.

Where distances are not too great, agglomeration can be effective by reducing costs through investment in infrastructure, as Denmark has done. But as distances rise, viability falls and over the long term, different kinds of migration arrangements are probably necessary to provide opportunities. New Zealand's seasonal workers program is an example. Launched in 2007, it lets workers from Pacific Islands work for a maximum of seven months per eleven-month period in horticulture and viticulture. An evaluation shows improvements in per capita income, subjective well-being, housing quality, and savings in Tonga and Vanuatu that have dwarfed the impact of other development programs on those islands (Gibson and McKenzie 2014). Eventually, as education levels rise, the local economy will be too small to provide good matches for an increasingly specialized and diverse workforce. Over the longer term, some modality of migration to larger agglomerations in other countries is likely to be the only way to provide these workforces with opportunities.

In a sense, the distant US mining towns and far-flung Russian outposts can be thought of as "island economies" where, in the former case, the migration option was exercised. This experience remains salient today. As the World Bank report, *Managing Coal Mine Closure: Achieving a Just Transition for All* (Stanley et al. 2018) notes, over the past 50 years 4 million coal jobs have disappeared in the United States, the United Kingdom, and Eastern Europe, with big losses expected in China, India, Indonesia, and Africa. Attempts to breathe new life into distant coal towns with very narrow economic bases in the United Kingdom have been expensive and generally disappointing. The report concludes that an orderly, fair, and humane process that seeks to manage the transition to other regions is likely to be a better alternative (see box 5.2). That said, some former coal areas have found some new sources of vitality. Carbon County, Wyoming, after decades of closures and population loss, has grudgingly admitted wind farms, which have injected income into the region. They provide many fewer jobs than coal, the aesthetic impact on the Wyoming countryside is controversial, and there is a reluctance to embrace a change in the way of life, but Carbon County is on its way to hosting the largest windfarm in the United States.[3]

Managing the Closure of Coal Mines: Achieving a Just Transition for All

The coal industry is contracting, causing permanent job loss across the world. The pace is likely to pick up as efforts intensify to reduce carbon dioxide (CO_2) emissions. In a recent report, the World Bank studied the experiences of Poland, Romania, the Russian Federation, and Ukraine, complemented by data on impacts of coal industry adjustment in the Netherlands, the United Kingdom, and the United States, to provide lessons on a humane and just transition for the towns that grew up around mines that are now closing (Stanley et al. 2018).

These communities face severe challenges to reinventing themselves. The potential to create jobs is small, given the narrow economic base. The geographic isolation of most mines reduces local reemployment potential. The disparities of wages between coal mining and alternative professions—as well as the reluctance to shed a deep-seated vocational identity centered on strength, determination, hard work, and risk—are stumbling blocks for reemploying coal miners. The extreme dependence of other local industries on the multiplier effect from coal further complicates finding new jobs locally. The report concludes that

> There are few if any instances of fully satisfactory economic rejuvenation outcomes in mono-industry coal mining towns … even if good intentions and sufficient funds are deployed. For instance, the United Kingdom long targeted various forms of regional aid with the intention to foster job creation at several of its main mining areas, including through a program of coalfield site reclamation and redevelopment that disbursed more than British pound sterling (GBP) 600 million between 1996 and 2007. In addition, British coal mining regions have been supported by the European Union, both through disbursement of its "standard" structural funds and specific programs like the RECHAR program [for coalfield regeneration] that deployed more than GBP 250 million over 10 years. Still, decades after the major waves of mine closures in the United Kingdom, labor market impacts can still be felt—especially where difficulties are entrenched, such as South Wales. Therefore, mobility support for workers to relocate out of mono-industry coal mining towns may sometimes represent the better option (Stanley et al. 2018, 17).

Saying that migration may be the better option does not imply callousness to the potential disruption to families and communities. The report offers suggestions on how to achieve these transitions in an orderly way and cushion the blow, including income support instruments and labor market programs to address the needs of redundant workers and community support initiatives and new job creation programs (reflecting different levels of resilience to downsizing the sector), as well as policies to restore the environment.

Source: Stanley et al. 2018.

Climate change may make cities less viable as rising sea levels and increasingly frequent storm surges pose insurmountable flooding, or desertification makes rainfed agriculture unfeasible. Guangzhou, on the Pearl River, and New Orleans, at the mouth of the Mississippi River, are likely to face annual losses of more than US$500 million from flood exposure due to climate change and subsidence (Hallegatte et al. 2013). Average global

flood losses in 2050 are projected to be approximately US$52 billion. Investment can forestall nonviability, but as with any investment, the cost of building prophylactic measures such as seawalls needs to be weighed against long-term economic potential, fiscal capacity, and governance capabilities. Not all regions will pass the test.

Over the short to medium term, fiscal transfers and service provision will contribute to reducing the welfare gap between leading and lagging regions. Over the longer term, moving people out of unviable regions—investing in people instead of places, as suggested by the 2009 *World Development Report* (World Bank 2009)—may be the best course. Place-based policies in certain lagging areas are inevitably used to serve a fundamentally person-based motive: supporting poor households. Addressing this goal would be more efficiently achieved by making the tax system more progressive (as in France) or strengthening means-tested transfer programs (Kline and Moretti 2014).[4] *Equity per se is not a sufficient motivation for spatial policies*, as Bartik (2020) and Neumark and Simpson (2015) note.

Three Arguments Often Used to Support Place-Based Policies for Nonviable Regions

The political unpalatability of the conclusion that some regions are not viable is often enough to goad governments to embrace place-based development projects, despite frequent arguments about the superiority of other policy packages. Three countervailing arguments are often employed. Their validity depends heavily on context.

Argument 1. Excessive Expansion of the Leading Areas Increases Congestion Costs and Puts Excessive Pressure on Real Estate Prices

Mass movements to cities can create a host of other problems. As Paul Krugman (1999) noted, "I am quite sure in my gut, and even more so in my lungs, that Mexico City is too big."[5] The same could be said of Mumbai or Jakarta or Los Angeles or any number of other cities. Political access, poor services in the rural areas, or the concentration of certain natural endowments may lead to overly large cities that are less productive than crowded, as chapter 2 discusses.

However, problems in the major agglomerations are not somehow an argument for decentralizing to distant lagging areas. As Duranton and Venables (2018, 2020) note, the better policy response to this is likely to be policy *within* the booming region, as discussed in chapter 7 on cities and zones. In the case of China, for instance, Desmet and Rossi-Hansberg (2013) argue that reallocation of population to other cities could lead to large increases in national welfare. If all cities had the same level of efficiency, welfare would increase by 47 percent. If all cities had the same level of amenities, welfare would increase by 13 percent. However, the exercise is entirely about reallocation *among cities*, not to lagging regions. Further, they argue that improving the overall low

levels of amenities in the large cities would lead to even larger cities. Some countries, such as the Republic of Korea, have tried to resolve the coordination failures of breaking up mega-cities by establishing secondary cities and then seeding them with government ministries as a form of coordination. The wisdom of this course in the end depends on the relative productivities and amenities of the secondary versus primary cities.

Argument 2. Mobility Is Imperfect

As chapter 3 discusses, migration may not offer pathways out of poverty in lagging regions of low-income countries. The evidence suggests that migration increases with economic development; yet the lack of structural transformation in many developing countries impedes productive reallocation to urban areas from lagging regions. Mobility is also hindered by workers' age, lack information on destinations, access to finance, skills, or the fear of discrimination in potential destinations. It may also be explained by preferences to stay in vastly depreciated real estate, or simply an attachment to a place. Hence, sizable residual populations may be anchored in lagging regions or in areas experiencing adverse shocks. In the United States, even long-standing job loss has generated only limited out-migration. For instance, shocks to local manufacturing induced by trade with China have not led to substantial changes in population, Autor, Dorn, and Hanson (2013) find. Chapter 3 suggests the same is true in Brazil, with substantial welfare losses.

As always, ideally, the policy response is best directed at the distortion. If mobility is limited by information or lack of credit to move, or skills mismatches that can be remedied, then policy needs to be directed there to facilitate migration or provide appropriate training. If the issue is, however, one of infirmity or cultural frictions (see box 5.3), then the options are less clear—but do not necessarily dictate place-based policies. As the 2009 *World Development Report* (World Bank 2009) and others have argued, income transfer policies are likely to be more efficient ways to support individuals than complex and expensive spatial development plans.

Argument 3. Employment Rates Differ

In the presence of differential shocks and weak mobility, the resulting differential employment rates may reflect different social values of the additional job created, Bartik (2020) and Austin, Glaeser and Summers (2018) argue. Joblessness is compounded by associated problems (negative social externalities) such as regional crime and mental illness, as well as increases in alcohol and drug use and opioid deaths (Autor, Dorn, and Hanson 2016).

These problems provide a rationale for what Bartik (2020) calls "place-based jobs policies." Because only the private sector can create sustainable jobs, this necessarily implies policies that seek to expand firms or relocate them to areas with a lower supply

Limited Policy Options for Lagging Regions When Migration Is Challenging: The Case of Colombia

Colombia's territorial inequality is roughly twice as high as other Organisation for Economic Co-operation and Development (OECD) countries, and remedying the very persistent regional disparities has long flummoxed analysts. Incomes are high in the capital region, Cundinamarca, Antioquia—one of the three Latin American poles of industrialization identified by Hirschman (1958)—and Valle de Cauca (centered on the salsa capital, Cali). But monetary poverty is 3.7 times higher in the department of Choco on the Pacific coast than in Cundinamarca, while illiteracy is 5 times higher in the department of La Guajira.

Population groups in both lagging regions face cultural and educational challenges to migrating to more prosperous regions. Choco, famous as the home of the hip hop group ChocQuibTown, is largely Afro-Colombian, and the Wayuu of La Guajira are a weakly assimilated indigenous people.

On the other hand, both regions face challenges to local development. La Guajira, for example, is distant and largely desertic. Its indigenous inhabitants survive by herding goats, with some nascent tourism from its salt flats, flamingos, and coast. However, it is showing new potential with a plan to make the Latin desert bloom and develop. The Israeli government recently signed an accord with the government of Colombia to develop a "Guajira Verde" (Green Guajira) that would bring Israeli technology and know-how to both digging wells and introducing new crops, among them the date palm. In principle, the similarity of the region to the Negev desert offers La Guajira a road map and some notion of the cost-benefit analysis of the package of necessary complementarities, as well as the expertise to execute.

Choco enjoys a spectacularly rugged coastline, *lindos cielos*, with vast potential for tourism and an ample work force. However, it has limited infrastructure, low human capital, and weak governance capabilities. Hence, policy faces a difficult trade-off. A big push on several fronts may be poorly implemented and wind up an expensive failure, yet migration of a large share of the population also seems unlikely, while ongoing fiscal transfers would not be transitional, but an ongoing burden.

Source: https://caracol.com.co/programa/2019/10/12/al_campo/1570835764_116140.html.

of jobs through employment subsidies or incentives to relocate plants. Hence, an emerging literature formalized by Moretti (2010) and advanced by Bartik and Sotherland (2019) focuses on the potential of stimulating industries that export to other regions or abroad to create local jobs. As Bartik (2020) notes, subsidizing a new Burger King in a local area is likely to have a pure displacement effect since local demand cannot suddenly expand: it would only imply fewer burger jobs in the nearby McDonalds. Hence, the focus has been on generating jobs from tradables (products for which producers and consumers do not have to be in physical proximity to enable exchange), particularly exporting firms for which demand is, in theory, unlimited from the perspective of a typical open economy.

Estimates suggest that a 1 percent increase in jobs in tradable sectors created in the United States would generate a 1.5 percent to 2.5 percent increase in jobs in nontradable

sectors (Moretti 2010; Bartik and Sotherland 2019). The highest elasticities arise from high-tech firms. This effect occurs in part because those sectors demand higher education for their workers and pay them better. Thus, high-tech jobs generate a larger demand-pull effect.

Figure 5.3 presents estimates generated for this volume that show that such elasticities appear to increase the less well developed the country—to the point where they exceed 5 in Costa Rica, the Dominican Republic, and Mexico (Maloney, Posadas, and Taskin 2021). This result appears to be due in part to a flatter labor supply curve (large agriculture labor reserve) on the one hand, and on the other, to the fact that the relative productivity, wages, and skill-intensity are higher in the tradable sector than that in the nontradable sector, which operates mainly with lower, local minimum (reservation) wages. In any case, the results would seem to strengthen the case for such jobs policies in the developing world.

FIGURE 5.3 The Payoff (Multiplier) for Creating Jobs in the Tradable Sector is Higher for Developing Countries
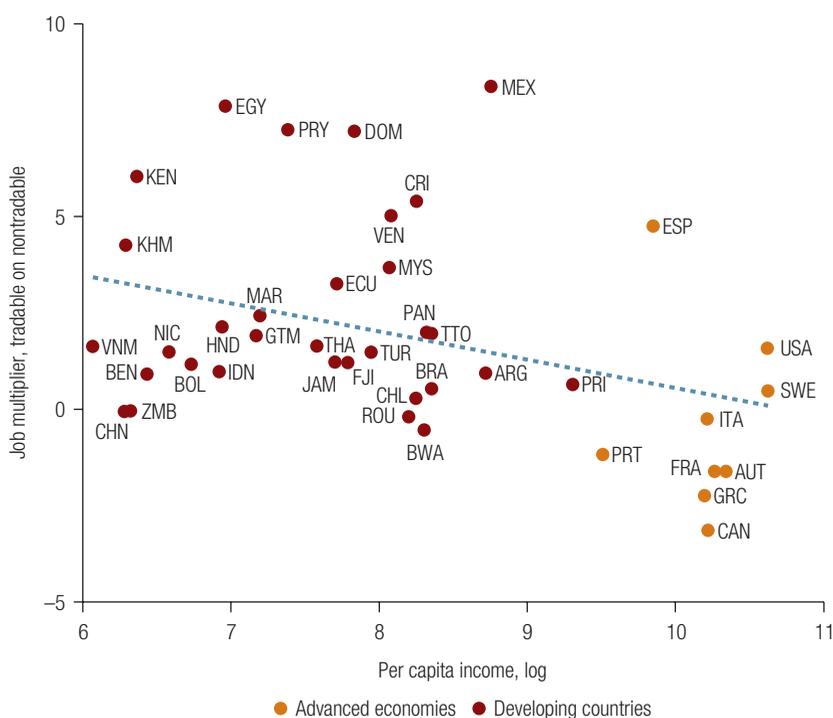
Source: Maloney, Posadas, and Taskin 2021, for this volume.

Note: The figure plots how much employment in the local nontradable sector is generated by a 1 percent increase in employment in the tradable sector. Estimates for the United States are from Moretti (2010). GDP per capita data are from the 2018 World Bank World Development Indicators (accessed in 2021). Estimates use the Integrated Public Use Microdata Series census data. Data labels use International Organization for Standardization country codes. CRI = Costa Rica; DOM = Dominican Republic; MEX = Mexico.

However, these elasticities are country averages and as such obscure the fact that—as per the framework of this volume—whatever policy lever is thought to attract private sector investments, the desired indirect effect depends on a host of fundamental and complementary factors in a particular region, including those intrinsic to its viability. The marginal social utility of a job created in a locale may be high, but the marginal cost of creating that job is possibly higher still. Both need to be weighed in prioritizing projects.

In the end, the decision to engage in place-based policies directed at any of these types of regions will involve a host of economic and political factors. The point stressed here is that place-based policies in areas that are not clearly merely in need of resolving select market failures may imply trade-offs with aggregate efficiency and growth. Attempting to keep coal mining areas afloat even as they may follow Bannack and Kolmanskop into history will mean that resources are not devoted to more dynamic areas and—as the United Kingdom experienced—may not work.

Given other considerations, this choice may be socially optimal, even if it does not maximize overall growth. But to make such a choice, what is needed is a disciplined expectation of what is reasonable from a region, a clear-eyed view of the capabilities of government to design and execute, and a fair weighing of other options of migration encouragement, training programs, and income transfer safety nets.

Though this volume does not venture into the design of migration support or income transfer policies, the next chapter offers a framework for assessing the likely returns on the place-based policies that are often the first arrows drawn from the policy quiver.

Complementarities, Silver Bullets, and Big Pushes

A central theme of the framework is that policy assessment must take into account all the complementary factors required to achieve the hoped-for rate of return. There are some cases—such as releasing export restrictions on Bueno Aires harbor—where reforming a single regulation or investing in one piece of infrastructure may have been sufficient to turn around fortunes. However, a persistent theme of this volume is that this is not usually the case. Market failures, missing complementary factors, and distortions are often found in company. Hence there are few silver bullets that can be fired with success in the absence of other complementary initiatives: Nairobi needed the railroad, but it also needed the influx of skilled famers. If digital connectivity can lift the fortunes of places, a knowledge base and complementary investments will be crucial for its uptake. For example, in Japan, analysis of household data on online sales of products suggests that regional variation in e-commerce sales intensity is almost entirely driven by the share of college-educated people (Jo, Matsumura, and Weinstein 2019) (see figure 4.8), while lack of interventions in business training or access to credit explain the minimal effects of e-commerce on local rural economies in China (Couture et al. 2018). In India, more new businesses have been started along the Golden Quadrilateral—the major highway system connecting the four

major cities to the north, south, east, and west (Delhi, Kolkata, Mumbai, and Chennai)—along corridors where financial and land markets function well (Grover, Maloney, and O'Connell 2021).

Hence, policies to kick-start a lagging region frequently will require multiple subprograms. In some cases, the complementarities seem obvious and the design straightforward. For instance, both electricity and market access are arguably necessary for an export processing zone to be successful. Other interactions are much less well understood, including those that take place between hard infrastructure such as transport corridors or export processing zones discussed in chapter 7, and softer interventions such as training, entrepreneurial capabilities, business climate, and fiscal incentives discussed in chapter 8.

The most ambitious multidimensional programs are those motivated by the idea that complementing multiple policies at a large enough scale in a "big push" can propel a lagging region to ride scale economies and other spillovers to a higher equilibrium level of income. Such policies place the issues of complementarities at center stage and therefore require an extremely detailed understanding of what the underlying frictions and market failures are and how they interact, even as discontinuous effects are expected.

The iconic example of a big push, the Tennessee Valley Authority in Appalachia (see Kline and Moretti 2014), had several components: mainly energy generation (through the construction of numerous dams), transport (through the development of roads and canals), and education (through the construction of new schools). While small relative to the scale of the US economy, the transfers were substantial for the treated counties, amounting to up to 10 percent of local incomes at the beginning of the 1950s. Given that scale is key, it is important to note that many big push programs, such as Argentina's Plan Belgrano and some European initiatives, commit far smaller levels of investment and may not reach the thresholds envisaged. Further, even if it were theoretically possible to push a region to a better equilibrium, this does not necessarily imply that in practice achieving this is feasible, or that "displacement effects" would not leave national welfare unchanged: Both New Jersey and Silicon Valley had potential to host a high-tech cluster, but once California had "moved first" and generated associated agglomeration and clustering externalities, shifting activity to the East Coast would be prohibitively costly. And even if New Jersey were to succeed in displacing Silicon Valley, it is not clear that the country would be better off for it (box 5.4).

Given the scale of resources required, and the complexity of assessing big push projects, either by decision or de facto, policy makers often recur to more modest approaches to incrementally removing barriers to growth in an already viable but lagging or recovering region. This may involve hard infrastructure projects, building the capabilities of entrepreneurs and workers while improving elements of the business climate. An example is the World Bank Upper Egypt Local

BOX 5.4

Not All Places Are Equal: The Coexistence of a Low and a High Equilibrium in the Context of Regional Development

Being able to move from a low equilibrium to a high one through place-based policies sounds attractive because a temporary intervention may be able to bring about a permanent change for the better. To this end, policy makers combine some place-based interventions with efforts to develop individuals' and firms' capabilities, such as support for higher education, and incentives to technology firms to relocate in hopes of creating a "transformative" high-tech cluster. Yet such interventions can also produce multiple equilibria—that is, the coexistence of a low and a high equilibrium—with some places benefiting, and others not so much, or at all. Moreover, the knowledge needed to design effective interventions far exceeds what is currently known. Extant research still struggles to offer solid conclusions regarding the existence of multiple equilibria in regional development and the ability to move from one equilibrium to another.

Multiple equilibria involve some form of increasing returns. It is useful to distinguish between three forms of multiple equilibria.

1. Although leading and lagging regions coexist, which region will lead is not a foregone conclusion. While Silicon Valley emerged around Palo Alto and Stanford University in California, New Jersey—with its high concentration of human capital—was also a strong candidate. Naturally, the lagging region wants to change the equilibrium it faces to become the new winning region. However, any policy to redirect development is of no overall net social value unless the concentration of economic activity initially occurred in the "wrong" region: one that was not predisposed to a higher equilibrium because of the first, second, or third nature factors discussed in chapter 2 of this volume.

2. Multiple equilibria are possible with numerous configurations. There is no general result about which configuration is more desirable. Multiplicity arises when both concentration of economic activity in one region and an even distribution of economic activity across both regions can be in equilibrium (Krugman 1991b). Concentration of economic activity may be in equilibrium if no firm wants to leave the leading region, where it benefits from agglomeration effects, and serving the leading region from the peripheral region would be too costly. An even distribution of economic activity may also be in equilibrium because the benefits for firms of increased concentration in one region would not compensate for the higher cost of serving the equally large market in the other region. The efficiency of a given configuration depends on the fine details of the exact model at hand and the situation on the ground (Baldwin et al. 2005).

3. Policy interventions are justified in a situation of multiple equilibria in the absence of factor mobility and reallocations across regions. These situations are often referred to as poverty traps. While there are many ways to justify the existence of poverty traps, a first classic motivation is the existence of an equilibrium characterized by low human capital and low productivity, which can persist when a region cannot finance its initial growth in human capital (Azariadis and Drazen 1990). Another classic example involves the existence of a persistent agrarian equilibrium: in a predominantly agrarian economy, the viability and expansion of the industrial sector is limited by the local demand (Murphy, Shleifer, and Vishny 1989).

(Box continues on the following page.)

Development Program. Having provided infrastructure, social services, and job creation projects in the past, it piloted a new integrated approach to provide two sets of missing complements. First, it supports firms by improving their business environment. Key components include improving the efficiency of government-to-business services, technological support to upgrade clusters, access to serviced land, and investment services through better industrial zone management and infrastructure. Second, it supports local governorates in planning and implementing policies and expenditures that improve access to infrastructure and services. Key components include better capital investment planning, improved service delivery, and better financial management. The operation is still being implemented, but early results are promising. Since implementation, the occupancy rate in the industrial zone has increased from 13 percent to 34 percent in the Qena Governorate, and more than 5 million people and 3,000 local firms have benefited from improved access to infrastructure and services. Evaluation of combinations of such policies is still challenging, but an accurate valuation of the expected gains from the (indirect) scale effects of a big push approach is not necessary either.

With any multidimensional program, when government capabilities are limited it may not be possible to diagnose and implement the full range of necessary complementary policies, including coordinating them across ministries and levels of government. This necessarily reduces the expected return to investments in a region and can relegate it to de facto nonviability. The case of Integrated Rural Development programs of the 1970s and 1980s in Colombia offers an illustrative example. These programs sought to bring together agricultural credit, technical assistance, supply of inputs, and marketing integration assistance in a coordinated fashion, precisely to resolve multiple market failures at once while creating a modern farmer. In an early pilot in the municipality of Cáqueza, the technology assistance and input components substantially increased yields, but the market integration component, in particular roads was neglected, leading to a dramatic fall in local prices that offset the productivity gains. Hence, the lesson was

learned about the need to have all components functioning (Zandstra et al. 1979). However, in the first phase of the Rural Development Investment Program, governments in some departments found it more politically compelling to give the separate components to distinct villages, thereby invalidating the initial concept, and high-level bureaucratic competition led to fragmentation in practice. The second phase relocated the program to areas with better infrastructure and higher levels of human capital, thereby de facto lowering the dimensionality of the program (Maloney 1983; Lacroix 1985). However, this tactical retreat also implied leaving areas that required more than the manageable number of programs.

Conclusion

That growth is uneven across space raises concerns for lagging places and those populations left behind, either by development or by the loss of a previous anchor industry. The three elements of spatial dynamics discussed in the preceding chapters lay out how many places, even if supported by policies, may not have a comparative advantage, and may not be viable. In practice, existing natural and human-built endowments can be considered complements to policy packages. Such endowments lie along a continuum and determine the rate of return and viability of those policy packages. When approaching a lagging place, the first question that needs to be asked is "Why are capital and technology not flowing there already?" The answer may be, as in Kolmanskop or US ghost mining towns, that their distance and lack of a source of comparative advantage simply makes them nonviable.

In these cases, programs leading to an orderly and humane process of encouraging migration are likely to be the better option, along with income support across the transition, as a recent World Bank study (Stanley et al. 2018) concluded for contracting mining towns around the world. As *World Development Report 2009: Reshaping Economic Geography* (World Bank 2009) argues, it is better to invest in people, not places. However, the earlier discussion shows that such decisions are not so clear cut. First, many developing country cities do not appear to show the gains in productivity expected from increased density: they are simply crowded. More people migrating to cities to take advantage of better service provision, for example, just moves a problem of human need from one place to another. For migration to reach its potential as an antipoverty tool, the process of structural transformation and growth must be advancing robustly.

Second, people move less than expected for a variety of reasons. Some of these have to do with lack of information or the wrong skills, and these can be addressed. Others relating to attachment to place, nonportable assets like real estate, or age are less easily remedied. Whatever the case, the political pressures to do something for a lagging or shocked region can be intense. What this chapter has sought to emphasize is that there are trade-offs. Investing in regions that are low along the viability continuum, or

connecting them with thriving places, is likely to preclude more productive investments of capital, and hence lead to slower aggregate growth.

There are places that have been hit by adverse trade or technology shocks but have the potential to rebound, and there are those with the potential to grow and generate jobs with the resolution of some group of market failures. These are often approached with multidimensional programs that include elements such as investments in transport, capacity upgrading, and fiscal incentives. Sometimes they ambitiously aspire for a big push to a vastly higher equilibrium, but often more prosaically they seek simply to raise the region's rate of accumulation of human, physical, and knowledge capital. Before making these huge investments, it is crucial to identify the market failures, appraise the design of the appropriate constellation of policies, and then execute in a coherent way. This can be difficult in countries with limited government capabilities or resistant entrenched interests, and the track record of such interventions is mixed. Here again, however, the key underlying message of this chapter—that not all places are created equal—cannot be ignored. In the examples reviewed, the failures exceed the successes. The next group of chapters seeks to inform first, the decision on whether to engage in place-based policies, and then second, how best to appraise and design them.

Notes

1. See Rodriguez-Pose (2018); Mudde and Kaltwasser (2012); Greven (2016); and Hewison (2014).
2. That is, increasing returns and clustering for some subset of economic activities are not viable possibilities.
3. *The Daily.* https://www.nytimes.com/2021/03/16/podcasts/the-daily/wind-power-wyoming -climate-change.html.
4. In France, spatially blind policies of progressive income taxation, social security, and unemployment benefits have kept spatial income disparities in check. Through a "scissors effect" that emerged in the last two decades of the twentieth century, these policies enabled reductions in spatial differences in disposable incomes across secondary regions with 800,000 to 3 million people (NUTS 2 regions), alongside increasing concentration of production (Martin 2005).
5. Paul Krugman added that he was uncertain about what the optimal population should be.

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6. A Framework for Appraising Place-Based Policies

Introduction

So far, this volume has discussed the roles of agglomeration, distance, and migration (in chapters 2, 3, and 4) in determining the distribution of economic activity and income across space and focused on places and people left behind in that process (chapter 5). The concern with the economic potential forgone and the uneven distribution of welfare has given rise to a variety of place-based interventions, which are discussed in the next two chapters. Given the competing claims for assistance and resources that many governments face; the large, upfront costs of many public investments; and the often long-lasting nature of the assets, it is critical that the choices of places getting the intervention and the type of intervention(s) chosen are informed with a realistic, objective, and systematic ex ante appraisal of projected policies. This chapter summarizes the framework prepared for this volume by Duranton and Venables (2018) to appraise the impact of place-based interventions in a systematic and rigorous manner. The framework is broad enough to be relevant and adaptable to a variety of circumstances, yet rigorous enough to provide a comprehensive measure of the value of a project taking into account the presence of the necessary quantification of effects. Even where quantification is difficult, the framework provides a disciplining exercise to help policy makers ask the right questions about likely impact and insulate policy decisions from pure political calculus.

Principles for Appraising Place-Based Policies

An economic appraisal of a proposed place-based policy should rest on seven principles.

Principle 1. Provide a Clear Narrative

It is critical to have a clear narrative regarding the main problem and the market failure(s) that motivate the place-based policy. Frequently, the primary motive for place-based policies is the creation of new jobs in the targeted place expected to result from increased investment and economic activity. However, as the previous chapters stress, policy is constrained by lumpiness and persistence of geography and hence places vary in their suitability for growth and, indeed, fundamental viability. It is thus critical to have a well-argued narrative that is specific and transparent about the

barriers to growth a region faces and what the policy is supposed to achieve. The causal mechanism to substantiate why the proposed measures are the best way to address the desired outcomes and point to uncertainties in achieving these outcomes should be described in detail. This narrative is intended to address the key market failure(s) that motivate the policy. These could include the following:

- *Public goods*. The private sector is likely to underprovide public goods. For example, before the Uganda Railway was established, the Kenyan highlands had a latent comparative advantage in exporting tea but needed transport before the area could attract human capital in the form of experienced farmers.
- *Externalities: Clustering and congestion*. Externalities are created by the location—and concentration—of economic activity. Some of these are positive (cluster and agglomeration effects), while others are negative (urban crowding, congestion, and pollution).
- *Path dependence.* Location choices of firms or households are typically major decisions that entail large sunk costs—and, if structures are being built, that create long-lived assets. Expectations of future returns are therefore critical. Agglomeration economies mean that the returns to investing in a place depend on who else is (or is expected to be) there. This in turn creates a coordination problem: no one wants to move to a new place while uncertain about its future development.
- *Imperfect labor mobility.* As chapter 3 explains, though large movements in people often occur across space, many barriers can impede mobility —especially in the short term—including absence of information, lack of resources to move, mismatch in skills, and social attachment to place.

Principle 2. Fully Describe Direct and Indirect Quantity Changes

The impact of a place-based policy is often intended to be wide ranging, affecting many aspects of the economy. The overall effect of a policy can be broken down into direct and indirect *quantity* changes. These direct and indirect quantity effects have a net social value—which in turn arises from the net interaction of quantity changes with market failures and inefficient resource allocation or from equity concerns.

The expected quantity changes arising from the project include the changes to real economic activity induced by the policy compared with conditions without the policy: that is, "business as usual." In turn, quantity changes can be broken down into direct effects and indirect effects. *Direct effects* are the immediate impacts on users of the project. They include the change in economic activity, assuming that other factors of production and the technology remain the same even after the intervention. In a typical road infrastructure project, for example, direct effects would include how a road benefits users by saving time and lowering vehicle operating costs. For a project to build or expand an airport, direct effects would include how the airport could facilitate a

larger number of flights, benefiting passengers and those shipping cargo that would otherwise have had to be shipped more slowly, less directly, and at greater expense.

Place-based policies also often anticipate *indirect effects* such as job creation and higher wages: that is, induced changes in the location and levels of activity, alongside changes in inputs and the efficiency of combining those inputs. These effects may arise if the policy changes private sector behavior (such as firms deciding to relocate, or workers switching from agrarian to industrial jobs) or triggers a private sector investment response. It is often claimed (or hoped) that place-based policies will trigger regeneration of a district, or growth in a lagging region.

Given these indirect effects, analyses may understate the expected benefits. However, conversely, the justification for policies often hangs on overly optimistic promises of indirect effects, which seldom receive the analytical rigor needed to discipline the analysis. Parsing these effects clarifies the mechanisms through which a particular policy is thought to work.

Figure 6.1 depicts the challenges of measuring quantity effects—direct and indirect—as well as placing a *social valuation* on these changes. Direct effects are relatively simple to measure, at least in principle. Examples include the number of extra people receiving health care or the number of minutes by which travel time has been reduced. It is much harder to identify and assign value to indirect effects because they are contingent on a set of underlying assumptions about how economic linkages work in a given context.

To capture the form and size of indirect quantity effects on induced private investment requires an understanding of two factors. The first is the presence of *complementary conditions* (such as the business environment) that drives private sector location and investment decisions, mainly those of firms but also those of workers.

FIGURE 6.1   A Framework for Appraising Place-Based Policies
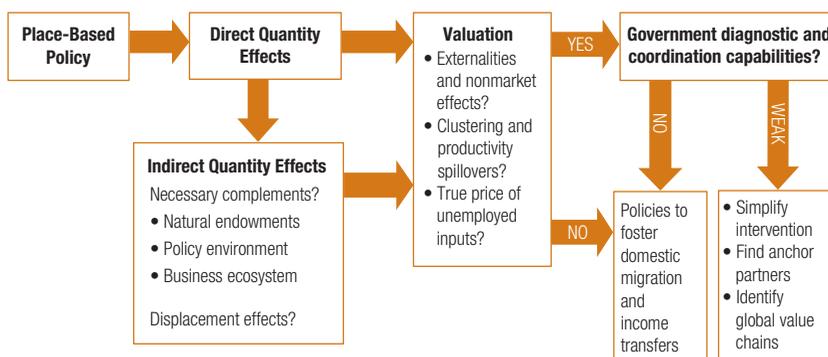
Source: Elaboration based on Duranton and Venables 2018, for this volume.

The second is *displacement*: that is, other sectors or areas might contract in response to broader general equilibrium effects of place-based policy interventions. Although both complementary conditions and displacement are context-specific, a number of general points apply, leading to the next two principles.

Principle 3. Consider Complementary Conditions and Policies

Location and investment decisions inherently are not choices made at the margin: they are either/or choices rather than fractional adjustments. They are costly, typically incurring sunk costs and long-lasting assets, and are shaped by expectations. The private sector will decide to invest in a place, for instance, only if multiple conditions are met. These conditions include the natural characteristics of a place, the policy environment, and the business ecosystem. As discussed in chapter 5, weaknesses in any or some of these necessary complements may stymie private sector investment and lead to no or few indirect effects. Again, the basic geographical endowments and distance from markets may imply that a region is nonviable and that place-based policies are a non-starter: there is no road or big push effort that is going to breathe life into areas like Kolmanskop. In a less extreme case, good roads for exports will not be enough if a place lacks reliable electricity or necessary human capital.

Nevertheless, it is difficult to assess multidimensional projects or big push initiatives. The temptation to assess individual elements separately contradicts the notion that there are strong complementarities among them. Quantifying spillovers and scale effects is also difficult. Relying on the aggregate outcomes—such as overall employment or GDP per capita in the treated regions relative to the untreated—is often difficult to disentangle from other aggregate changes in the economy unrelated to the policies at hand. New synthetic control methods (see Abadie 2021) that construct a control region against which progress can be measured offer a reasonable option, but only after the investment or decision has been made. Finally, the initiative may have displaced labor or industry from "untreated" regions, thus overstating the nationwide social benefit. All this occurs against a backdrop in which investments are often dispersed across wide geographical areas, the amounts invested are modest, and many of the policies are ongoing, thereby making it difficult to conduct a rigorous impact evaluation. These challenges have inhibited robust research and evidence on interventions with multiple components (Neumark and Simpson 2015).

In addition to natural endowments, complementarities include the policy environment and the business ecosystem. The *policy environment* covers national variables and those that are specific to a place:

- Infrastructure, including utilities and transport
- Place-specific taxes and regulation, as in a special economic zone

- Policy as it affects labor supply, covering such factors as public services, commuting, and housing
- Institutions, including the clarity and enforcement of property rights and contracts.

The items included in the policy environment cover different areas of government; hence, the effectiveness of the policy environment is contingent on coordination across space, function, and time. For example, in order to grow a city, coordination is needed both within the city and in surrounding areas. Policies need to be integrated functionally: that is, they must cover planning, land, and building regulations; infrastructure; and the provision of utilities and public services. Policies also need to take a long view, meaning that policy makers must be able to make credible commitments to future city development. This would require some coordination and consistency between the different levels of government at the local, regional, and national levels. Having the competence, financial resources, and credibility to meet these challenges requires an authorizing environment better integrated between different parts of government than is typically found, especially in developing countries (World Bank 2017).

Business ecosystem refers to the network of organizations—including suppliers, distributors, competitors, customers, and workers—that contribute to the performance of firms and the value of investment decisions that they undertake in a particular place. This includes the following:

- Related firms: The stock of firms and other productive activities, in particular its suppliers and customers
- Workers: The supply of workers with appropriate skills at competitive wages, or the potential to attract migrants to the area
- The availability of other complementary factors, land, and capital
- Market size: The size of markets to which the place is well connected.

The items in the business ecosystem largely mirror those concerning agglomeration and clustering. Conditions that determine one investor's decision depend not only on the business climate, but also on decisions that have been—or will be—taken by other private sector agents. This extends across a wide range of agents and depends on expectations. Thus, the location decisions of firms depend on those of workers and other firms; the location decisions of workers depend on firms and on house builders; house builders are themselves taking a long view about employment and population in the place; and so on.

All these points indicate different ways in which policy can shape private investment and location decisions. Some are dealt with in the policy environment, but others (which this volume calls *soft complements*) involve shaping expectations about the business ecosystem, including credible signals about the government's commitment to a place, effective investment agencies, and a responsive government that will credibly

remove future blockages and obstacles. Evaluating the direct effects individually of packages of complementary policies is misleading because, by design, these packages of policies expect there to be important interactive effects among them.

Principle 4. Consider General Equilibrium Effects and Displacement Effects

General equilibrium effects are the quantity changes that occur—possibly in quite different places—in response to changes brought about by the policy. While total factor productivity may change, changes in those factors—notably labor and capital—may merely be shuffled from one location to another. As a result, the investment induced by a place-based intervention may occur in one place at the expense of another; that is, investment may merely be displaced.

Displacement effects can occur through several distinct routes. The first is competition for a particular project, such as a single factory that will operate in only one of multiple possible places. Second, displacement can occur through a product market in which, if demand is inelastic, an increase in supply in one place will be met by a reduction in supply elsewhere. This effect is most pronounced for nontradable goods, where demand comes only from a local or national market. Third, displacement can be channeled through factor markets. If the supply of capital is fixed or labor is fully employed, then expansion of one activity is bound to be accommodated by contraction of another.

It is not always either necessary or possible to identify general equilibrium effects with precision. However, if capital and labor are simply being reshuffled between uses, then both sides of these quantity changes must be taken into account. The principle of market valuation discussed next requires establishing both *the value of a factor in its new use* and the *opportunity cost* of this employment.

Principle 5. Conduct a Valuation of Quantity Changes

After the direct and indirect quantity effects have been identified and assessed, the second stage in policy appraisal is to place a value on quantity changes (social valuation). Valuing the direct effects (the effect of a change in policy, holding other factors constant) is usually straightforward and such valuations are generally the main focus of appraisals. Indirect effects are less straightforward to measure because they have net value only if policy works to correct inefficiencies: that is, if it draws resources from a lower-value use to a higher-value use. Otherwise, the policy will simply be drawing resources from one place to another: it will have no social value. So what matters is the incremental change, captured through the notion of marginal value—the change in the value of labor, capital, or other resources when switched from one activity to another.

In the face of market distortions, the private marginal cost on which firms base their decisions is not the same as the social cost. For example, if labor is being drawn from

an underemployed stock of labor with a low opportunity cost, then the social cost of moving labor is lower, creating a further channel of benefit. A way to capture value changes is to appraise labor at a "shadow price": that is, capture indirect effects by using the social opportunity cost of labor instead of using the market wage in cost calculations.

By comparison, in the benchmark case with no distortions or market failures, capital and labor are fully employed, and their marginal products (the change in output attributed to a change in input) are equated across all industries and regions of the economy. Hence, a project that increases employment in a region will merely be displacing labor from elsewhere.

Evaluating the indirect benefits thus requires identifying existing distortions or market failures that policy will effectively be mitigating. In fact, there are many market failures. The task of the appraisal is to identify the most relevant ones and place a value on redressing them. Some examples follow.

Labor market inefficiencies across space. Most often, the hoped-for indirect impact of a place-based policy is the creation of jobs. As chapter 3 shows, migration is not so fluid as to eliminate differences in unemployment rates or wage gaps among regions; hence, creating new jobs in a depressed region has social value. Reallocating labor can lead to a net social benefit if there is some market failure or barrier that prohibits equalization of marginal productivity in two sectors. For example, the shift from less productive agricultural jobs to more productive industrial jobs can be efficient because the productivity of labor in nonagriculture is multiple times higher than that in agriculture (Gollin, Lagakos, and Waugh 2014; World Bank productivity series, *Harvesting Prosperity*, Fuglie et al. 2019).

Comparing the social value of new jobs that can potentially be created by place-based policies depends on capturing the inefficiency of local labor markets. Figure 3.5 in chapter 3 illustrates the simple analytics in the case of barriers to migration from less productive agricultural jobs to more productive industrial jobs.

Distortions in capital and land markets. In urban areas, land is the ultimate scarce factor, so there is a high return to using it efficiently. However, unclear property rights and obstacles to trading land can prevent it from being allocated to the most productive use. Building is impeded by failures in capital markets (particularly for residential mortgages) and in some cases inappropriate building and land use regulation. Place-based policies that aim to address these imperfections yield direct benefits if they enable land to switch from a low-value to a higher-value use. Multiple effects are likely. For example, a regulatory change that enables efficient use of a piece of urban land might yield social benefits by raising land values not only directly, but also indirectly by creating better jobs, and encouraging positive economies in the urban cluster.[1]

Nonmarket effects (externalities). Many place-based policies seek to remedy outcomes arising precisely because allocation occurs outside or external to markets. For example, a subway project may seek to diminish congestion or pollution—disamenities not internalized by individual actors through the market and hence overproduced. Similarly, the knowledge spillovers discussed in chapter 2 are not intermediated through the market and thus are undersupplied.

Coordination failures. The balance between agglomeration benefits and costs discussed in chapter 1 can lead to clusters or cities that are too big because externalities are not appropriately internalized by firms. But an individual firm will not leave to start a new agglomeration unless others accompany it lest it lose the benefits of being around other firms. Place-based policies whose indirect effect is to resolve this coordination failure thus add value by reducing the social losses arising from congestion or giving life to a new region. As an example, Washington, DC, built a fixed track trolley line in the depressed Northeast quadrant as a signal of government commitment to renovation and a coordinating device to firms and restaurants to move around the new corridor. These coordination considerations are more salient in developing countries. As discussed in chapter 4, transport costs in developing countries are still four to five times higher than in advanced economies, which makes the need for coordination greater—and makes the cost of coordination failure greater.

Principle 6. Assess Whether Better Policies Exist

In general, the fundamental determinants of market failure should be diagnosed first and foremost and then addressed by targeted policy. For instance, if unclear land rights hamper investment in infrastructure and housing, then the first-best policy is to clarify these rights. Place-based policies may not be the first-best policy. Policy makers should treat them as only one arrow in their quiver. Instead of pursuing interventions to influence the exact location of economic activities (place-based interventions), governments can influence access to opportunities for people (people-based interventions), or they can reduce distortions that constrain markets through broad-based national interventions (institutional interventions).

Principle 7. Be Brutally Honest about Government Capabilities to Diagnose, Appraise, and Implement the Place-Based Policy

Governments have finite capabilities to appraise and execute policies. This reality must be integrated into laying the best of plans. The *developing country policy dilemma* introduced in the first volume of this productivity series (Cirera and Maloney 2017) has a spatial analogue:[2] the number of market failures that a potentially viable region suffers from, and hence the multiplicity of necessary policy interventions, increases with distance from the frontier, while policy capability to evaluate and implement decreases.[3] Hence, not only are governments facing a spatial landscape with vast inertia,

with regions that are simply not viable, but their tools to sort out what is feasible and then implement policy are bounded. Identifying "doable" combinations of policies becomes as important as designing policies that, if perfectly implemented, would yield the highest returns.

Dealing with Challenges in Fully Appraising Policies: Using the Framework as a Heuristic Tool

Ideally, even the simplest road project would have a full appraisal that would allow a solid ranking of projects by their social value added. This would offer some disciplining of the often-formidable pressures to "do something" to either reverse the declining fortunes of an area or kick-start a long-standing laggard. However, while the direct effects can often be quantified, doing the same for the indirect effects is expensive, time consuming, and and it may be too complex a challenge even for the governments in advanced economies. Often simpler rules of thumb are employed, sometimes based more on the symptoms than a careful diagnosis of the underlying disease. For example, to be eligible for the local economic growth initiative in the United Kingdom, a local area had to rank fiftieth or worse against any of six indexes of multiple deprivation in 2000 or 2004. Likewise, the French urban enterprise zones program also selects lagging areas based on an "index" measuring socioeconomic conditions in the area (Mayer, Mayneris, and Py 2017). But none of these focus on viability per se or any attempt to quantify and value overall effects; by both measures, Kolmanskop might be a good target for revitalization efforts.

Given the challenges facing even well-established and competent bureaucracies such as those in the United Kingdom and France, it is probably better to view the above framework less as a mechanical valuation device and more as a heuristic tool that informs the dimensions that should be taken into account, that disciplines debate, and that surfaces some policy guidelines. In particular, the framework suggests eight guidelines for policy makers.

1. *Clearly identify the relevant market failures and distortions.* Even if the benefit of remedying market failures cannot be fully valued, identifying those failures is critical to designing an appropriate place-based policy. For instance, asking why capital and knowledge are not already flowing to a lagging region is a first step toward evaluating viability and likely returns to investment. If failures such as transport costs or policy distortions can be identified clearly, as in the cases of Kenya or Buenos Aires discussed in chapter 2, then the remedies may be straightforward. But if after objectively looking at the situation, the problems are more in the intrinsic viability of the region that could not be remedied through intervention, such as was the case in Bannack, Kolmanskop, and arguably many of today's coal regions, then that should be a cautionary sign that policy makers should be looking at alternatives to place-based policies.

Of course, knowledge of what policies have been generally successful in overcoming such failures is central to the appraisal process. Fortunately, an increasing bank of experience has been accumulating. An invaluable reference is an exhaustive review of ex post evidence, primarily from advanced economies, archived by the What Works Centre for Local Economic Growth, headed by Henry Overman.[4]

2. *Test the sensitivity of assumptions.* Given the difficulty of quantifying many elements feeding into the appraisal, testing the sensitivity of the cost-benefit analysis to assumptions and presenting alternative scenarios is useful for ranking projects. For instance, if a road project would be worthwhile only if very large clustering effects emerge among local industry as an indirect effect, it may be ranked lower than a project whose risks are smaller.

3. *Reduce dimensionality, tailoring the program to true shortfalls, and accept the possible.* The limitations in governance capabilities dictate a clear-eyed view of the limits to project complexity given diagnostic and implementation constraints. This puts a premium on minimizing the dimensionality of a project. Identifying "doable" combinations of policies should become a critical part of the appraisal process. An internal review of the World Bank Africa Region's Financial and Private Sector Development portfolio undertaken in 2012 (World Bank 2012) and a study by the Center for Global Development of 20 World Bank projects focused on agglomeration (Gelb et al. 2015) reveal that simpler projects performed better. A strong inverse correlation was found between the number of project components and achievement of the project's development objectives.

This exercise requires identifying what the most binding market failures and distortions are and which may be important in theory but less critical in practice. This task is made easier where some markets are functioning well, some infrastructure is already in place, and so on. Chapter 5 discusses how the Rural Development Investment Program in Colombia in its second phase shifted its focus to regions with more critical complements so it could reduce the number of coordinated interventions. Value chains, by virtue of linking more advanced firms, can fill in some missing markets or factors, such as entrepreneurial ability or financing. Thus, more focus can be placed, for instance, on building infrastructure, upgrading worker skills, and ensuring a better enabling environment for contracting and other critical activities. If a dispassionate appraisal of government capabilities, as shown in figure 6.1, suggests weaknesses, simplifying the program to something "suboptimal" but feasible makes sense. If such capabilities are extremely rudimentary, then the multidimensional investment package necessary to advance a region may not be possible and a region that in theory is viable becomes nonviable in practice.

4. *Build on existing dynamic areas.* Linking lagging areas to existing dynamic areas, which have already resolved some of the market failures or distortions, rather than attempting to kick-start lagging regions from zero improves the chance of avoiding investments in nonviable areas.

5. *Partner with agents that can supply information, help resolve market failures, and provide credibility.* Identifying and bringing in an anchor industry can improve understanding of what the binding constraints on local growth truly are, supply necessary technical knowledge and entrepreneurial expertise, and provide a fixed point around which agents can coordinate. Attracting a piece of a local or global value chain also provides evidence of the viability of a region, and will surface missing complements, such as worker training programs.[5] On the other hand, if there is no private sector interest in a region, it probably suggests that the place is not viable.

6. *Ensure explicit coordination among critical actors.* Regional policies inevitably involve actors at various levels, including the national level. Vertical failure to synchronize among tiers of government can result in an oversupply or undersupply of public goods and services. Horizontal failures to join forces with the federal government may end up in beggar-thy-neighbor policies that pit one place against another (Bartik 2016); similarly, failing to attain buy-in from all the relevant ministries may start bidding wars (Rodríguez-Pose and Arbix 2001). For instance, the local government in Indonesia was often not in sync with the center when implementing the Integrated Economic Development Zones program (lack of vertical coordination) and did not have the capacity to undertake and manage many of the responsibilities (lack of horizontal coordination) (Hofman and Kaiser 2004). This experience illustrates the importance of developing credible mechanisms for both vertical and horizontal coordination.

International experience provides examples of different approaches to improving coordination. First, coordination mechanisms should suit their function.

- *Broad-based functions.* Instruments may be required for the broad-based planning and management of a territory. For instance, regions, counties, and metropolitan authorities often coordinate a broad range of functions, due to the overlapping geographies and high complementarity of these functions. A metropolitan region may oversee transit, land use planning, local tax administration, environmental protection, and economic planning because high complementarity between these functions requires them to be planned together.
- *Narrow functions.* Other coordination instruments serve much narrower functions. When the geography of functions differs substantially across areas, local authorities may form separate clusters for these functions. For example, the same

metropolitan region may need to cooperate with one cluster of local authorities along a river or coastline to manage pollution, and with another cluster to manage an economic corridor, or to synchronize regional water or health services. Where the geographies of different functions vary substantially, local authorities require instruments for flexible collaboration suited to specific functions.

Second, territorial systems can benefit from both bottom-up and top-down cooperation instruments, though the risks of each need to be managed.

- *Bottom-up approach.* Partnerships formed on the basis of local authorities' own demand may better reflect local needs and enjoy stronger local ownership compared with collaborations devised and imposed by a more distant central authority. Manizales Mas, for instance, was an initiative designed to rekindle industry in an entrepreneurial city in Colombia by upgrading its entrepreneurs, educational institutions, export facilitation, and other elements of the business climate in a multisectoral push. The initiative was bottom up in a relatively small city. However, this approach brings attendant risks. The multiplication of bottom-up agreements can create a complex national system, and partnerships may reflect the self-interest of the local authorities partnering at the cost of the national or wider regional interest (such as when certain localities are excluded based on political differences or lower economic development). Therefore, complementary procedures may be needed to ensure that the process is inclusive and that the national system is adequately streamlined.
- *Top-down approach.* Some circumstances may demand imposed (top-down) coordination (such as by the central government) to ensure that less-advantaged localities are included in associations, territorial coverage is comprehensive, or the overall territorial structure is coherent and simple. Top-down partnerships, however, may require complementary procedures to increase ownership and cooperation of members (such as elections and devolution of powers), and mechanisms to strengthen responsiveness to local needs (such as the responsive adjustment of boundaries and powers).

Third, because functions span various geographic areas and coordinating bodies, it is beneficial to provide instruments that allow flexibility, according to the needs, including unforeseen ones. Without this, new instruments may need to be developed for new collaborative functions, leading to either reduced collaboration or a confusing multiplication of tools. Table 6.1 presents a typology to categorize some international instruments by narrow versus broad function and bottom-up versus top-down approaches.

Coordination failures can lead to waste and lost momentum. Box 6.1 provides a breakdown of the components of place-based expenditures in various nations in the Middle East and North Africa and compares them to selected other countries.

Establishing explicit protocols can help avoid coordination failures. Public expenditures reviews have been used in the fiscal and innovation context to track the flow of funds from different agencies by all instruments to all recipients. Public expenditure

TABLE 6.1 Categorization of International Instruments to Coordinate Place-Based Policies

	Narrow function	**Broad function**
Bottom-up approach	■ France: EPCI with no tax powers ■ Colombia: Some development agreements	■ England: Combined authorities ■ France: Some EPCIs with taxation powers ■ Colombia: Some development agreements ■ North America: Service delivery regions
Top-down approach	■ France: National park contracts and interregional contracts for river basins or mountains	■ Denmark: Post-2007 regions ■ France: Regions; some EPCIs with tax powers (such as Marseille Metropolis) ■ Colombia: Departments and departmental development agreements

Source: World Bank.

Note: According to the Code général des collectivités territoriales (general law over regional administrative structures), a communauté de communes is a public establishment of intercommunal cooperation (EPCI), formed by several French municipalities, which covers a connected territory and forms a framework within which local tasks are carried out together.

BOX 6.1

Lessons from an Analysis of Spatial Public Expenditures in the Middle East and North Africa

Governments have a spectrum of spatial intervention options that may introduce distortions in attempts to resolve one market failure (see Lall 2009). From the most to the least potentially spatially distortive, these options range from place-based interventions to people-based interventions to broad-based national interventions (institutional interventions). For instance, if the true failure is a lack of intrinsic viability, then a big push initiative will divert resources from more promising areas whereas investing in people or institutional reform increases options. An analysis of spatially distortive interventions in Middle Eastern and North African countries relative to comparator countries (World Bank 2020a) makes the following observations (see also figure B6.1.1):

- Spatially targeted expenditures are high. In 2017, they represented about 77 percent of government expenditures in Morocco, and about 50 percent in Tunisia, compared with a level consistently below 20 percent in advanced economies.
- Expenditures on institutions are quite low. They represent less than 1 percent of public expenditures in Morocco and only 12 percent in Tunisia, while ranging among comparator countries from 15 percent (in Poland) to 52 percent (in South Africa).
- Expenditures on people-based policies are also low. They represent 22 percent of public expenditure allocation in Morocco and 38 percent in Tunisia, compared with around 74 percent in Austria and Poland and 75 percent in Spain. While Tunisia seems to allocate more resources toward skill development, basic public services, and basic health and education, this allocation reflects a sharp difference from benchmark countries.
- Within allocations of people-focused expenditures, the gap is greatest in basic health and education. Morocco allocates 3 percent and Tunisia 19 percent. By contrast, the lowest percentage allocation in benchmark countries is 30 percent in South Africa, while the highest is 64 percent in Austria.

(Box continues on the following page.)

BOX 6.1

Lessons from an Analysis of Spatial Public Expenditures in the Middle East and North Africa *(continued)*

FIGURE B6.1.1 **Expenditures on Spatially Distortive Policies in the Middle East and North Africa Vary Greatly from Those of Benchmark Countries**
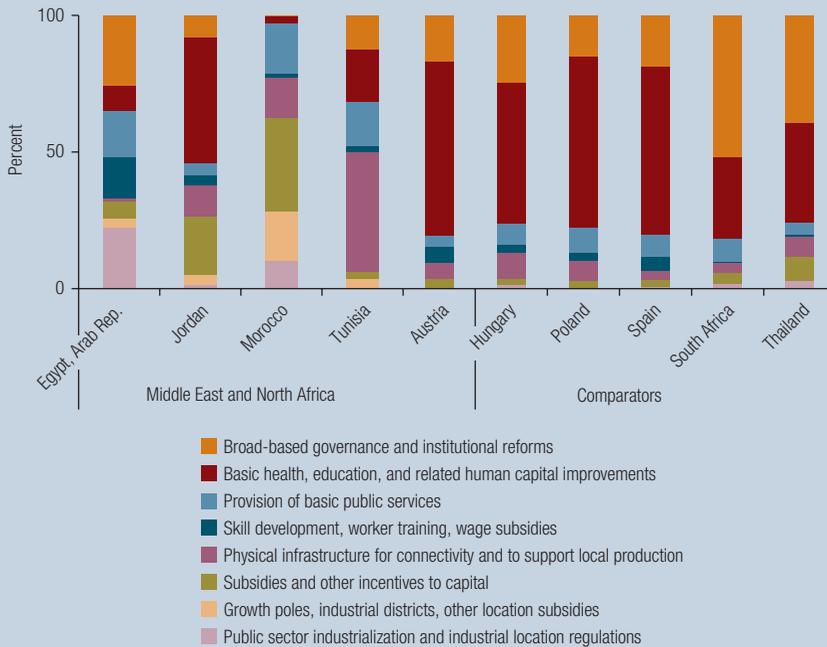
Source: World Bank 2020a.

reviews have proven to be effective ways of opening and grounding national dialogue across ministries and levels of government. This volume proposes a spatial version that would analogously map resource flows, at the instrument level, to lagging regions and thereby provide a concrete outline of national policy (see box 6.2). Once the overall organogram of policies is laid out clearly, it can provide a framework on which to hang deeper analysis of the effectiveness of spatial policies.

7. *Prioritize projects based on feasibility and fund them accordingly.* However daunting it is to determine ex ante whether policies targeting lagging regions will succeed, deficient funding will guarantee failure. The expectation of important scale effects and externalities in big push initiatives requires a high level of government resources, particularly in light of the high degree of persistence documented in chapter 1.

A Proposal for Spatial Public Expenditure Reviews

Spatial public expenditure reviews (PERs) could help countries enhance the quality of their place-based policy making, improve resource allocation across different programs and instruments, and achieve budget savings. Spatial PERs could be modeled analogously to the World Bank's public expenditure reviews for innovation and small and medium enterprises. In a spatial context, this would include the following four stages:

1. General assessment of the quality and coherence of the place-based policies based on the conditions of the country and its ambitions of territorial development, including the portfolio mapping of all place-based policies. Such a mapping of the full range of place-based policies can capture total spending, confirm alignment of expenditure with national and regional development priorities, and identify potential overlaps.

2. Assessment of the quality of design, implementation, and governance (functional analysis) of existing place-based instruments based on international good practices. This stage will help understand the functioning of place-based policies by evaluating their origins, as well as the extent to which they are addressing clearly identified market failures, are adequately targeted, and are deploying the most appropriate policy instruments.

3. Appraisal of the efficiency of existing instruments: that is, the ability of a place-based policy to produce the expected outputs with reasonable levels of resources. This would include the direct and indirect effects envisaged in the Duranton and Venables (2018, 2020) framework, but also the breakdown of administrative versus program expenditures.

4. Evaluation of the effectiveness of existing instruments and the system by analyzing their ability to generate the desired impact. This comprises an impact evaluation that would allow the returns on investment of place-based policies to be calculated to decide whether to expand, restructure, or eliminate such policies. In some cases, it could be based on randomization, while in others it could deploy spatial general equilibrium models, and in others, it could use ex post evaluations.

In a much narrower context, the subnational public expenditure reviews on innovation policy instruments conducted in Poland suggest that national operational programs differ significantly from regional ones (World Bank 2019). The value of regional programs is small relative to national ones. They cater to a diversified set of thematic objectives. The smaller scale of operations in regions limits specialization of implementing agencies compared with national programs. A functional analysis of national versus regional innovation programs in Poland suggests that the latter can be improved across several of the 31 dimensions of instrument design, implementation, and governance (figure B6.2.1).

(Box continues on the following page.)

BOX 6.2

A Proposal for Spatial Public Expenditure Reviews *(continued)*

FIGURE B6.2.1 **Functional Analysis of National versus Regional Innovation Programs in Poland**

a. National programs only

b. Regional programs only

Design ■ Implementation ■ Governance
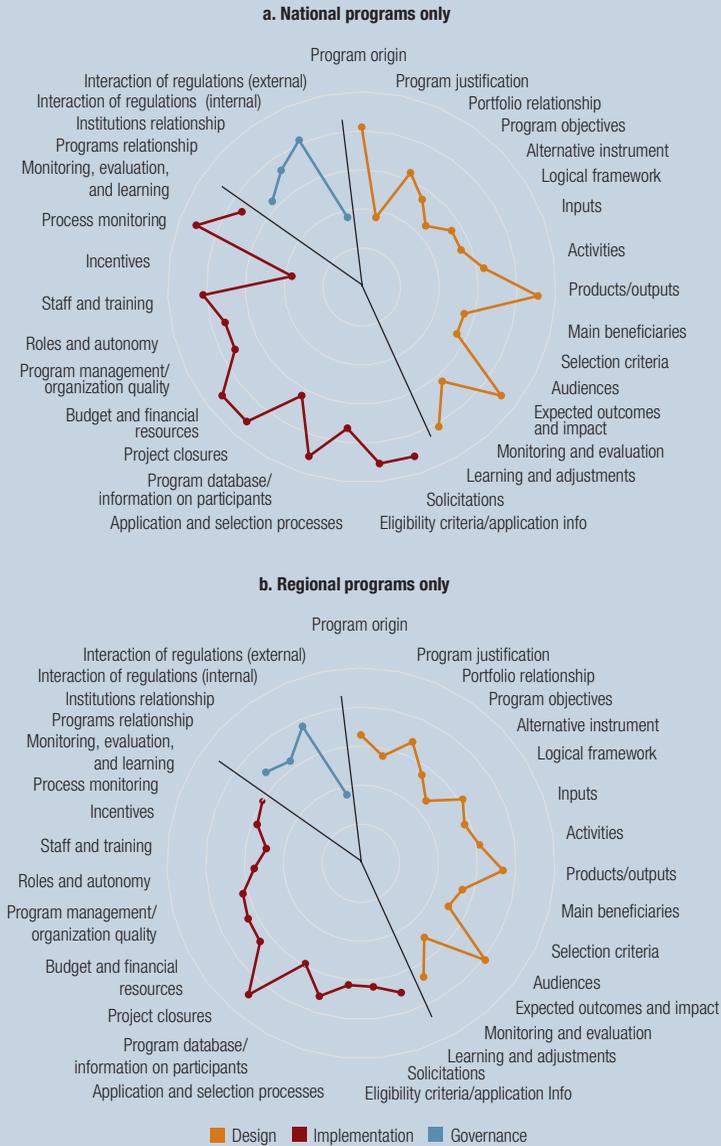
Source: World Bank 2019.

Note: Numbers in parentheses refer to the score for the respective parameters assessing functional capabilities. The score ranges from 1 to 5, with 5 representing best practice.

(Box continues on the following page.)

A Proposal for Spatial Public Expenditure Reviews *(continued)*

Spatial PERs would focus on the individual place-based policy instrument as the unit of analysis, which would allow the evaluators to identify what is spent with which objectives, and therefore assess efficiency and effectiveness at a more detailed level. Spatial PERs could help support the following objectives:

- Redesigning and shaping place-based policies by using data and information about existing instruments
- Improving the ability of governments to coordinate by evaluating the design and implementation process and assessing the quality of the monitoring and evaluation system
- Adopting good practices in design, implementation, and coordination of place-based instruments by benchmarking instruments across countries (where appropriate)
- Formulating policy recommendations to eliminate redundancies and leveraging complementarities across the portfolio of instruments.

8. *Weigh the costs and benefits of a place-based policy relative to migration or transfer-type policies.* Any project should make a strong case that it provides the most cost-effective way to solve the main problem described in the narrative. Diverting resources to a region with limited potential for growth from high-potential regions may address equity, but could reduce national growth and welfare over the longer term relative to, for example, providing incentives for people or firms to move or making targeted fiscal transfers.

Lessons from World Bank Evaluations of Projects to Enhance Agglomeration

A recent review of 20 World Bank projects focused on agglomeration such as special economic zones, growth poles, and industrial clusters over the period 1998–2014 (Gelb et al. 2015) underscores the relevance of many elements of the proposed framework and further illustrates the challenges of pulling these together for appraisal.

Most of these projects aim at increasing growth or economic activity, as well as promoting inclusive development focusing on rural areas or micro, small, and medium enterprises and increasing jobs, employment, or both. There are three types of projects:

- Twelve projects focus primarily on within-industry economies. They specifically identify particular industries within which they plan to intervene (such as Burkina Faso Bagre Growth Pole, Brazil Ceara Regional Economic Development, Cameroon Competitive Value Chains, and Ethiopia Sustainable Tourism Development).

- Five projects support the development and functioning of industrial zones (Afghanistan Private Sector Development Project, Bangladesh Private Sector Development Support Project, Togo PSD Support Project, Ethiopia Competitiveness and Job Creation Project, and Ghana Gateway Project). The primary objective is improving spatial economies. Within-industry economies are not identified.
- Three projects combine both within-industry and spatial economies (growth pole projects in the Democratic Republic of Congo, Madagascar, and Mozambique). The particular activities of the agglomeration-focused interventions vary according to the constraints seen as being "binding." These include efforts to improve infrastructure services, provide capacity building support to public sector agencies and firms, strengthen public-private coordination or consultation mechanisms, and provide financial support to "first movers."

There are several challenges in appraising or evaluating the ability of such projects to achieve the stated outcomes. Because the outcomes are not concrete achievements, such as miles of pavement laid, but depend on the response of private entities, it is challenging to confidently attribute the actual impact of the program. Further, interventions are often coordinated with large anchor investors, such as a resource company (Rio Tinto) in the case of the Madagascar Growth Poles Project. This anchor both intervenes and affects demand. Thus, disentangling the impact of the government policy is difficult. In addition, most of these projects have multiple interventions. The most complex project (in Madagascar) had five interventions. Thus, measuring the impact of any particular intervention is difficult. Finally, other donors sometimes provide complementary support to governments. For example, the Nigeria Growth and Employment project was complemented by substantial activity by the UK Department for International Development.

The review makes several suggestions based on the project documents that nest well within the framework offered by this volume.

1. *Understand investor behavior.* The projects pursued a linear approach from "input to output to outcome" that assumed that increased agglomerations would ease coordination failures in sectors and locations and thereby induce a critical mass of firms to enter. However, the projects did not consult sufficiently with the private sector in the planning stage to determine the potential "distance from the threshold" where costs and risks would justify such entry, as well as the uncertainty surrounding private sector responses and the likely discontinuous nature of payoffs around the threshold. In the framework offered by this volume, this can be seen as a combination of insufficient understanding of the market failures and distortions as well as the intrinsic viability of the chosen locales. For instance, the agglomeration-related component of projects in Ghana and Afghanistan included building industrial parks. In the former, restrictions on

access only to export-oriented firms led to deficient demand, which raises the question of what was necessary, in terms of complements or location, to attract them. In the Afghanistan project, insufficient attention was paid to ensuring power—generators were too costly and connection to the public grid was not implemented—which eventually hobbled the project relative to its initial design.

2. *Streamline projects.* Many projects involved multiple locales, interventions, and ministries—and many of these projects had unsatisfactory outcomes. No project seriously considered the need to manage complexity. As this volume's framework emphasizes, it is necessary to document the number of activities and institutions involved, as well as identify the need for institution-building and to embed flexibility into the project design. If the nature of the complementarities permits interventions to be sequenced, then the complexity of any one component can be diminished.

3. *Strengthen mechanisms to deal with complexity.* Especially in countries without a very strong central direction of economic and development policy, projects need to include mechanisms to ensure a common interest in the project and to sustain pressure to move forward through the inevitable snags in implementation that will accompany even well-conceived projects. Projects need to include mechanisms that ensure buy-in of key players from the start to ensure forward momentum, including understanding the incentives and constraints that they face. Further, ensuring local government capabilities is key: part of the challenge in adapting the industrial park design in the Ghana and Afghanistan projects arose from the limited expertise of the local implementing agency. The monitoring and evaluation framework for the project becomes particularly important, as it needs to provide accurate and timely reports that monitor progress and reasons for delays.

4. *Take important secondary effects into account.* In the terminology of this volume's framework, all important indirect effects should be accounted for: both quantity and valuation effects. For instance, projects will often have an impact on the value of land as well as on land tenure security. This can arise from large purchases of land for industrial parks (Ghana and Afghanistan), or large investments in irrigation (Burkina Faso), or infrastructure that facilitates tourism and other commercial activities (Madagascar). An understanding of who controls the land and how well the land market functions is as much an issue of political economy as technical design—and is just as important.

Subsequent chapters will apply the framework in more detail to particular projects. In this context, box 6.3 sets out some of the challenges the World Bank has faced in assessing the planned place-based interventions.

How Is the World Bank Group Assessing Place-Based Interventions?

A review for this volume of the economic analysis in many World Bank project appraisal documents (PADs) finds that the assessment generally provides a careful and rigorous cost-benefit analysis of *direct* effects, reporting a net present value and economic rate of return on the project. Treatment of *indirect* effects is highly variable and, in many cases, questionable.

Among transport projects reviewed, for example, some PADs make no attempt to assess indirect effects. One PAD is based on a full (if not fully described) computable equilibrium model deriving the impact of the policy on unemployment. Other PADs take the entire value of trade generated as a net benefit, offering no rationale for so doing. Some PADs appear to double count (adding in the appreciation of land values as well as direct benefits). Still others refer to impacts on agglomeration, access, and multiplier effects, possibly producing numbers yet without saying exactly how. The economic—or logical—basis for some of these approaches is not made clear, and in some cases seems incorrect.

In many cases it is nearly impossible for a reviewer to understand the basis of calculations that were undertaken. The cost-benefit analysis often sends the reader back to some external documents that cannot be easily accessed. There is no summary, back-of-the-envelope approximation of the bottom line that would allow the reader to assess where the important drivers in the cost-benefit analysis are coming from. Predicted economic rates of return often fall in some "happy region" of 13 percent to 14 percent—high enough to justify the investment but not so high as to raise skepticism.

The lack of a consistent framework for thinking about how to handle indirect effects is disturbing and stands in marked contrast to the generally systematic approach of the PAD as a whole and of the cost-benefit analysis of direct effects. This is needed to inform final decisions on whether to authorize particular projects and, perhaps more importantly, to shape World Bank Group thinking on place-based policies, to influence the set of projects taken forward to proposal stage, and to shape the detailed design of these projects.

Source: Duranton and Venables 2018, for this volume.

Conclusion

The next chapter discusses a range of place-based policies that are often employed to stimulate growth and reduce disparities. This chapter offers a framework and seven guiding principles with which to approach the appraisal of such projects, seeking to apply them on the ground. Though the framework requires gathering considerable information—much of it difficult to obtain—the very process of asking questions and attempting to gather information helps discipline thinking about how to evaluate a project. To highlight a few points:

- The appraisal should develop a narrative that clearly lays out the market failures or distortions that, if addressed, would lead to a region progressing, and that should drive the design of the intervention.

- These market failures often come in multiples, implying that cost-benefit analysis of any one intervention will be misleading because of the complementary effects of resolving several at once. Again, it is worth highlighting that barriers posed by natural geography or remoteness do not constitute a market failure, but rather a high underlying cost that may dictate that it is not worthwhile devoting resources to that region.

- Place-based policies need to be weighed against other policies, such as those facilitating migration or transitional fiscal transfers and service provision, which may provide better value.

- The general equilibrium effects, and in particular the displacement effects in factor and product markets, need to be taken into account to fairly identify the national benefit of a policy. Merely moving a plant or jobs from one place to another has no benefit.

- A complete appraisal must take a dispassionate look beyond the expected direct effects, which are easier to measure, to the indirect effects, as well.

- Such indirect effects are often invoked as the critical tipping consideration in defending a policy. However, they are usually not well documented, and the arguments are not supported with empirics.

- Governments need to be candid about their capabilities. Many place-based policies require interventions of multiple dimensions, large budgets over long periods of time, and well-developed government capabilities in diagnosis, design, and implementation. Limited capabilities may dictate that, even if a program is appraised well and appears to yield good benefits, in practice the returns may be low. Policy design should look for ways to limit the burden on government.

The outcomes of place-based policies are inherently uncertain, but choices must be made. This chapter seeks to inform these choices in two ways. First, it provides a framework in which policy makers can identify, organize, and assess the information needed to make choices. The approach is grounded in economic principles. It emphasizes the need to understand the direct and indirect effects of policy changes (quantity effects) and the importance of valuing changes accurately. The valuation needs to consider opportunity costs, the value of resources in alternative uses, and the market failures and inefficiencies that motivate the policy intervention.

Second, the chapter lays out some of the issues that are particular to the spatial dimension of place-based policies. This is a context in which there is no simple mapping from policy action to outcome. Increasing returns to scale, coordination failures, and the fact that multiple conditions must be satisfied for policy to be effective are all sources of difficulty. The next chapter illustrates some applications of this framework.

Notes

1. There is a tendency to use changes in land prices to value place-based policies. Changes in land prices will provide an unbiased measure of welfare changes locally only under restrictive conditions and will in general fail to do so when factors are imperfectly mobile, residents are heterogeneous, or lot size is endogenous to land prices (Kanemoto 1988).

2. This concept was originally termed the "innovation policy dilemma" in *The Innovation Paradox* (Cirera and Maloney 2017).

3. While capable government will certainly be an advantage, this is an exceptionally difficult area to appraise with precision.

4. See https://whatworksgrowth.org/. The center classifies interventions according to their people-based, business-based, and place-based focus. Among the place-based interventions, researchers at the center have considered more than 2,100 policy evaluations and evidence reviews of area-based initiatives meant to improve the economic outcome of a tightly defined geographical area. Likewise, the center reviewed 1,000 studies on broadband provision as a means of encouraging local economic growth. Using evidence from the United Kingdom and other Organisation for Economic Co-operation and Development (OECD) countries, the review found that only 58 studies on area-based initiatives and 16 on broadband provision met the center's minimum standards of robust evaluation. These reviews distill the overall impact of varying initiatives (such as EU structural funds, and US and French enterprise zones) and draw lessons for designing place-based programs. The center offers a set of design guides and toolkits to help make informed policy decisions. The center's expertise is helpful in steering policy in the right direction. The usability for the developing world may require (1) scaling up to include evidence from lower-income and middle-income countries, and (2) embedding rigorous impact evaluation in policy interventions to draw insights from ex post results.

5. See a previous volume in the productivity series, *Harvesting Prosperity* (Fuglie et al. 2019) and the 2020 *World Development Report* on value chains (World Bank 2020b).

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7. The Framework in Action: Appraising Transport Corridors, Economic Clusters, and Interventions to Manage Urban Congestion

Introduction

Chapter 6 provides the heuristic framework for assessing the likely impact of place-based policies and investments. This chapter illustrates the relevance and application of the framework to three sets of interventions: interregional transportation corridors; economic clusters and special economic zones; and interventions to manage urban congestion. These interventions are illustrations of prototype spatial policies operating at three different levels of geographical scale within countries.

At a regional level, investments in interregional transport corridors or infrastructure within countries have the dual objectives of reducing transport costs for users and stimulating economic activity along the network or in towns and cities at various points.[1] They are among the most visible investments for overcoming the tyranny of distance discussed in chapter 4 and improving connections between lagging and more prosperous places. They are also among the most expensive. The cost of building a new four-lane highway is $4 million to $6 million per mile in the United States and $2.2 million per kilometer (0.62 of a mile) in developing countries.[2]

Other spatial interventions operate at a lower scale, directly trying to attract investment and create jobs in specific places. Interventions include special economic zones (SEZs) such as industrial districts, free trade zones, export processing zones (EPZs), and special districts with favorable fiscal or institutional treatment. The economic case for pursuing SEZs is often based on potential economic efficiency gains from spatial concentration in the provision of infrastructure and development of clusters of businesses. Further, in resource-constrained developing countries, it would not be feasible to relax institutional and financial constraints across the economy. SEZs reduce the dimensionality of the reform problem.

The final type of intervention operates at the scale of a city. The success of cities in attracting investment and creating jobs—the hoped-for indirect effects of most policies—is closely tied to the way the city has been built: its infrastructure and connectivity, its housing stock, and its consequent amenity value to urban workers. However, as discussed in chapter 2, despite the rising concentration of workers and firms in developing country cities, the productivity-enhancing agglomeration economies experienced in the advanced economies appear to be largely absent. Meta-analysis by Grover, Lall, and Timmis (2021) and a careful estimation of agglomeration elasticity with respect to physical productivity by Grover and Maloney (2021) suggest that higher wages are reflecting higher prices and urban disamenities—not productivity. While this is partly due to a delinking of urbanization and structural transformation, thereby diminishing or eliminating the economic activity that might benefit from greater agglomeration, it is also due to high urban costs that arise from the way that poorly functioning cities limit scale and specialization, especially in internationally tradable manufacturing and services (Venables 2016). Congestion in land, housing, and transport exerts a serious drag on urban economies, raising the costs of doing business and limiting access to labor markets, while also curtailing the entry of new firms. Thus, this chapter investigates the interventions to lessen urban congestion.

Corridors and Long-Distance Transport Improvements

Cost-benefit analysis is widely used to evaluate policy interventions. Early cost-benefit analysis for appraising investments in the road infrastructure sector was developed for roads in more urbanized, high-traffic, high-density areas, drawing on methods from a developed country literature. Traditionally, road investments in projects financed by the World Bank were based on ad hoc analysis of direct benefits derived from consumer surplus calculations of road user savings, in terms of both costs and time. However, this approach tends to bias investments toward higher-income areas because the demand for vehicle traffic—and hence, willingness-to-pay measures—are higher for the relatively better off (Van de Walle 2000).

To correct for this bias, rural infrastructure projects were dealt with using "cost-effectiveness" analysis: certain projects were exempt from a conventional cost-benefit analysis. The success of these measures was based on socioeconomic indicators. An alternative cost-benefit analysis methodology was popularized by Shenngen Fan and colleagues (Fan, Zhang, and Zhang 2002; Fan and Chan-Kang 2005) to justify road investment in lagging regions. Fan's methodology attempts to capture both direct and indirect effects through the estimation of a set of equations with multiple variables (also known as simultaneous equations). The approach, however, does not account for the reverse causality of the public investment itself (that is, the growth potential of a region may have stimulated investment in the first place) and hence invariably and unknowingly overestimates the benefits of rural road projects.

Traditional cost-benefit analysis methods are narrow in their approach, focusing on user time and cost savings as well as changes in traffic flows and congestion. While the expectation is that investment in transport infrastructure will act as a catalyst for private sector investment, creating jobs, boosting economic activity, and growing (or rebalancing) the local (or national) economy, these wider benefits are typically not spelled out. This creates a disconnect between the strategic arguments put forward in support of a project and the associated cost-benefit analysis. Even if the value of wider economic benefits turns out to be small, appraisal would be well served to engage with the arguments proposed by project developers to ascertain the range of effects at work and how they net out.

Another drawback is that the analysis entails many subjective elements. For example, cost projections may be understated, while benefits and projections of future ridership may be overstated. Costs and benefits evolve as countries develop their stock of infrastructure. In advanced economies such as the United States, the relatively low returns to many projects partly reflect the advanced level of infrastructure in these countries.[3]

Incorporating wider economic impacts in cost-benefit analysis is challenging and has its own risks. For instance, to rationalize interventions, arguments can be biased or exaggerated by focusing on areas where a transport improvement expands economic activity and by ignoring displacement effects. Venables (2016) argues that although a full economic modelling exercise may be appropriate for some large projects, it cannot be a general solution because it would be expensive to use for most projects.[4] Because these models are typically expensive, one prototype tends to be mechanically applied to different situations. This defeats the purpose of contextualizing the analysis. More recently, the spatial general equilibrium models popularized by Redding and Rossi-Hansberg (2017) have been used to understand the wider economic benefits of transport corridors (see annex 7A for examples).[5] Spatial general equilibrium models embed three main building blocks—geography, economic activity, and workers—that are connected by goods prices, land rents, and wages that prevail in each location. A general equilibrium setting with multiple regions within countries allows the model to track down the indirect quantity effects of transport improvements.

Applying the Duranton-Venables Framework to Investments in Transport Infrastructure

The Duranton-Venables (2018) framework developed for this volume provides a heuristic to help policy makers and investors assess the direct and indirect effects from place-based policies, as well as place a value on associated quantity effects. The approach provides a structure with which to systematically document the channels through which wider benefits can take place. These channels are context specific, as informed by the strategic narrative that motivates the project. This section examines the task of identifying quantity changes and placing a valuation on them in the context of transport infrastructure.

The following issues are relevant to the application of the Duranton-Venables framework in assessing transport corridors.

- First, indirect effects are project specific, uncertain, and observable only ex post, but are likely to be useful for justifying the project and for shaping the development plans at the appraisal or planning stage.
- Second, indirect benefits generate an agglomeration effect. The entry of new firms generates a positive spillover because the entrant is unable to capture the entire benefit it creates.
- Third, evaluation of benefits ought to be placed in the context of product market displacement effects: that is, would the activity take place somewhere else if the transport improvement were not undertaken? If so, would this alternative activity be subject to the same market failures?
- Fourth, severe coordination failures limit the development of new clusters because it is not in the interest of any single investor to invest in the cluster, but each would invest if they knew that others would. Coordination failures lead to low-level traps and require some policy mechanism to coordinate individual actions and break out of the trap. Investment in transport corridors can be such a mechanism.
- Fifth, studies of the role of transport infrastructure in generating wider benefits suggest that it is an important part of a package of measures but is unlikely to be transformative by itself (see chapter 4 for detailed evidence). More generally, there is considerable interdependency between transport and other public projects and policies (such as land use policy). Transport appraisal needs to recognize potential synergies arising from interaction among complementary policies.

The direct and indirect effects of investments in transport are outlined in figure 7.1. While direct-user effects (left column) are traditionally the core of transport appraisal, they may be smaller than the indirect economic effects (right column) that arise because of the impact on economic geography. Better transport increases proximity, which enhances agglomeration forces, and hence can make places more productive. It may trigger relocation of economic activity as firms and households respond to new opportunities, which may induce complementary investments, such as the development of residential housing, office centers, or retail parks. Finally, it may improve the labor market by facilitating the participation of workers because of better connectivity and by creating new job opportunities resulting from agglomeration and relocation of activity.

Appraisals of place-based policies can be viewed as a two-step process. The appraiser must first assess whether it makes sense to include these impacts in a transport appraisal, and then outline the considerations for including them, if at all. Three questions must be addressed in the context of this appraisal.

First, is there a reason why indirect effects create social value, over and above user benefits? This essentially requires identifying the market failures. In the absence of such

FIGURE 7.1 **While the Direct Effects of Transport Investments Are Important, the Indirect Effects Are Likely to Matter More**
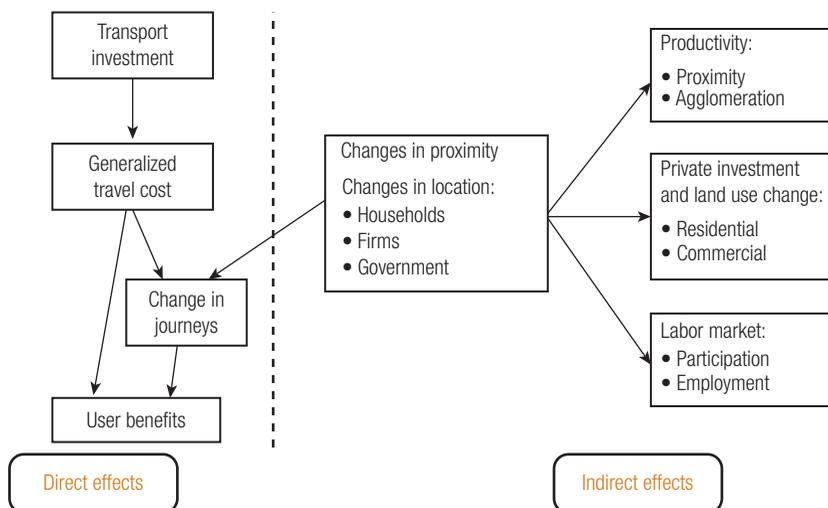
Source: Venables 2016.

failures, (small) quantity changes are of zero social value, given that the price system equates the marginal value of changing an activity to its marginal cost (see chapter 6). But if transport improvement induces a change that interacts in some way with a market failure, then it will create additional social welfare (or cost). To discern the indirect quantity effects of transport investments, it is critical to understand the underlying mechanisms that shape firms' location decisions: (1) *production costs;* (2) *market access;* (3) *product market competition;* and (4) the *business ecosystem.* A transport improvement is a double-edged sword that can make a place either more or less attractive for firms. Although better connectivity improves access to markets, it also opens the local market to competition.

Second, does the intervention displace existing activity? Local changes must be set in the context of the national aggregate. For example, job creation in one region may be at the expense of job losses in another. National appraisal must report aggregates and provide a complete view rather than neighborhood effects. Reducing transport costs from a high level to an intermediate level increases spatial inequality because of displacement effects, while reducing it further may lead to convergence (see Fujita, Krugman, and Mori 1999; Helpman 1999; Combes, Duranton, and Overman 2005). This ambiguity in predicting the impact arises because market access matters a lot when transport costs are very high, but production cost differences become all important once "globalization" has reduced transport costs to low levels.

Third, how can the indirect effects be quantified? Quantifying the "transformative" effects of transport corridors is difficult because of complementarities with other factors.

For instance, firms' location decisions also depend on the business ecosystem—their access to other firms that are a source of intermediate inputs and markets for their output. Corridors support clusters of activity, which means that there may be multiple equilibria. The actual location of a cluster may have been determined by historical circumstances and not by economic fundamentals, but once established it creates its own productivity advantage. This makes it even more difficult to isolate the effect of transport improvement on location.

Valuing Quantity Changes

Despite the central importance of investment in transport and much attention devoted to it in empirical work, knowledge is still scarce and of limited applicability to new projects. There are several reasons for this. First, empirical consensus on the economic impact of transport investment has not emerged because even in a simple model, effects are contingent on the context. Second, measuring changes in market access following a new transport infrastructure link is not easy. Simple measures—such as GDP or population in other regions, as discounted by some measure of distance or transport cost—are inappropriate.[6] Alternative and indirect measures of market access tend to be highly demanding in terms of data (Head and Mayer 2014). Third, most studies do not attempt to assess the full causal chain of transport investment going from an impact on trade costs, to market access, and then to final outcomes. Instead, they adopt a reduced-form approach and directly estimate the treatment effect of a new or improved corridor on final outcomes. This shortcut has the unfortunate drawback that most studies estimate average effects, and the heterogeneous spatial outcomes remain understudied.[7]

One obvious problem in understanding the impact of transport investment is establishing causality. Rational infrastructure planning requires placing infrastructure in areas where it has the greatest impact. This obviously leads to a spurious correlation between the outcome of interest and the placement of infrastructure. Alternatively, political realities increase the pressure to place public works in locations hit by negative shocks. To get around this problem, the literature has developed a number of empirical strategies that rely on examining the "in-between" locations along the network that were incidentally served, deviations from minimum cost predictions of connecting the nodes, and placebo treatment based on infrastructure plans developed under very different circumstances. These methodologies help generate some quasi-random variation for the location of corridors (for example, see Ghani, Grover, and Kerr 2016).[8]

Another fundamental problem is distinguishing between displacement and net growth. Said differently, if a treated place does better than an untreated one, that could be due to pure displacement, with no net benefit. To be able to distinguish displacement effects, three groups are needed: a treatment group receiving direct access to the infrastructure; an indirectly treated group that may have suffered (or gained) from displacement (or spillovers); and a control group of truly unaffected locations.

Notwithstanding these difficulties, there is now a large empirical literature on the impact of transport corridors (for a review, see Redding and Turner [2015] and Berg et al. [2017]). The literature points to four main findings so far. First, corridors tend to attract economic activity, and at least some of this is driven by displacement from locations farther away relative to the new infrastructure. Second, transport infrastructure also tends to promote the decentralization of economic activity within a corridor area away from the main centers. This dispersion of activity is nonetheless far from uniform along the transport network. Third, transport infrastructure appears to promote various efficiency gains through higher productivity and reductions in factor misallocation. Fourth, transport investments affect several margins, including the aggregate amount of economic activity in a location; its distribution across sectors, skills, and functions (such as production versus management); and participation in external markets. Given the methodological problems noted earlier, the findings on the impact of such interventions should be viewed as tentative. They also reflect broad trends in the data but should not be expected to hold every time, given the heterogeneity associated with relocations.

Valuing the Net Effects of Transport Improvements

Transport investment affects the location of economic activity. It attracts firms and economic activity into the surrounding vicinity, thereby increasing the local density and productivity of economic activity.

A critical element for appraisals of transport investments is the construction of the measure of access to markets that accounts for the distance of the region from all other locations, typically measured as a composite of travel costs. Transport investment can change access to economic mass by changing the levels of activity in each place ("dynamic clustering") and by improving the connectivity to other regions ("static clustering"). However, the benefits of connectivity are widely touted and frequently double counted. What are other benefits and costs that need to be netted out? There are three additional sets of considerations.

1. *Market failure and shadow pricing of inputs.* The first stems directly from the discussion of market distortions in chapter 5. These imply that the private marginal cost curve on which firms base decisions is not the same as the social marginal cost curve. For example, if labor is being drawn from underemployed workers with low opportunity cost, then the social marginal cost curve is lower, creating a further area of benefit. A way to capture this is to use a "shadow price" of labor: that is, instead of using the market wage in cost calculations, use the social opportunity cost of labor.

2. *Endogenous productivity and agglomeration.* A further source of benefits or costs arises if a transport improvement and consequent private investment create externalities. Some are negative (such as environmental damage); others are positive (less congestion); and many can be captured by shadow pricing (such as

attaching a carbon price). Chapter 4 presents evidence on the impact of transport improvement on productivity, growth, and spatial relocation of activity. There are two distinct mechanisms through which these impacts might occur. One is that, even given the location of economic activity, improved connectivity makes places "closer" together in economic terms and thereby increases the productivity benefits of proximity and agglomeration. The other is that the transport improvement may trigger investment (quantity changes) that takes the form of firms moving into a cluster of activity, further raising productivity. This induced change in activity, in both quantity and value terms, is difficult to measure. A transport improvement might well be associated with some clusters expanding and others contracting.[9]

3. *Large investments and endogenous price change.* Standard cost-benefit analysis is based on "small" private sector firms that take the prices at which they trade—for inputs and outputs—as given. In a developing country context, however, transport improvement might trigger private investment—a quantity response—that is large enough to raise input prices (wages, land rental). Because these benefits do not accrue to the investor, there will be a range of transport costs at which the investment will not be undertaken, even though it is socially efficient to invest. Lowering transport costs to the point at which the investment does occur then unlocks particularly large gains.

Illustrations of the Framework in Practice

Illustration 1. Quantifying and Valuing Direct Effects: The Southern Trans-Andean Railway in Argentina

The starting point of any appraisal should be a cost-benefit analysis of the direct effects. Duranton and Venables (2018, 2020) discuss the components of such a cost-benefit analysis for the direct effects in the context of the proposed project to build 276 kilometers of railway line connecting the Atlantic coast of Argentina at Bahia Blanca with the Pacific coast of Chile at La Araucania. The analysis is focused entirely on the effects of the completed project, and not on the construction phase of the project.

Determining Quantity Changes. The first element of a cost-benefit analysis on the effects of a transport improvement is a projection of freight and passenger flows, with and without the project. Important elements to consider include the following:

- Flows that will be diverted from other modes of transport (road, air) on the same route
- Flows that will be diverted from other routes
- Flows that would not have existed in the absence of the project
- Possible bottlenecks elsewhere in the system that may worsen because of the project or be alleviated thanks to the project.

If, for instance, the project will lead to rail freight flows of 300 and to passenger flows of 100—both from a zero baseline, then this rail freight will come partly from a diversion on the same route from road to rail, partly from a diversion from another rail route further to the north, and partly from the creation of new trips. To keep the analysis of the South Trans-Andean Railway in Argentina simple, the computations assume that rail passenger flows are all pure diversions from road transport and that the project will increase congestion around Neuquén. Table 7.1 provides quantity changes for these three alternative types of routes, based on these assumptions.

Valuing Quality Changes.   Valuation requires details on how the new service will create time savings and change other costs of travel. These changes will vary depending on the type of flow (diverted from another mode on the same route, from another route, and so on). These costs include the following:

- The value of time for passenger transport
- A generalized measure of freight transport costs, including driver salaries, the cost of trucks, and so on
- Potential improvements in reliability
- Accounting for other nonmarketed outputs such as changes in carbon dioxide (CO_2) emissions and in safety
- Possible changes in pricing power by the freight industry.

TABLE 7.1   Cost-Benefit Analysis of the Direct Effects of a Transport Investment

Quantity change	Value per unit	Total net benefit

Freight volume (number of units)
■ Diverted from road: 100
 	
■ Diverted from northern route: 100
■ Newly created: 100
	Net benefit per unit freight
	■ Diverted from road:
	  $125 – $75 = $50
	■ Diverted from northern route:
	  $100 – $85 = $15
	■ Newly created: [($125 +
	  $75)/2] – $75 = $25
		Total freight user benefit
		■ Diverted from road:
		  100 x $50 = $5,000
		■ Diverted from northern route:
		  100 x $15 = $1,500
		■ Newly created: 100 x $25 = $2,500
		Total freight user benefit: $9,000

Passengers (number) ■ Diverted from road: 100	Net benefit per passenger: $100 – $50 = $50	Total passenger user benefit: $100 x $50 = $5,000
Environmental benefit Freight: ■ Diverted from road: 100 ■ Diverted from northern route: 100 ■ Newly created: 100 Passengers: 100	$5 – $2 = $3 $2 – $2 = $0 $0 – $2 = –$2 $5 – $2 = $3	100 x $3 = $300 100 x $0 = $0 100 x (–$2) = –$200 100 x $3 = $300 Total benefit from reducing CO_2: $400
Other benefits: Safety impact ■ Expected lives saved: 1 Congestion effect ■ Time lost: –300	 Value per life: $500 Value per unit time: $ 1	 Safety value: $500 Congestion value: –$300
		Total net benefit per year $ 14,600

Source: Duranton and Venables 2018.

To avoid complications, it is assumed that road transport is competitive. The cost of rail per unit of freight is $75, compared to $125 for road transport. As reported in table 7.1, the social benefit for freight that is diverted from road transport on the same route is given by the transport saving per unit of $125 − $75 = $50. Multiplied by the number of units (100), this yields a benefit of $5,000. Note that this calculation is careful to consider only the additional effect of the new rail line.

For the freight that is diverted from another route, assume that the cost with the new route is $85. This is more than $75 because, for the sake of the example, it is assumed that this freight must eventually be carried to a destination further north. The cost of freight on its current route is $100. For this freight, the additional benefit from the new rail line is thus only $15 per unit ($100 − $85). The full calculation of the social benefit for this second source of quantity change is again reported in table 7.1. Note that the social gain per unit for this second source of freight traffic is much less than for the first one: $15 instead of $50. Therefore, it is important to distinguish between quantity changes along alternative routes.

Turning to the freight that did not exist previously, there was no demand at a cost of $125. At a cost of $75, the flow is 100. At one extreme, there is a local producer that was willing to send a unit of freight at a cost of $125. This producer now faces a cost of freight of $75 and makes a surplus of ($125 − $75) = $50 thanks to this new rail line. At the other extreme, there is a producer that would have never sent anything at a cost of $125 but is willing to send a shipment at a cost of $75. Even at this much lower cost, the benefit for this producer is minimal. If it is assumed that the distribution of gains from freight shipments are uniformly distributed, the benefit from this new line is [($125 + $75)/2] − $75 = $25 per unit, on average. Summing the user benefits for the three different sources of freight yields an aggregate user benefit of $9,000.

The fact that CO_2 emissions are less with rail than with road transport also needs to be taken into account. Assume, for instance, a cost of CO_2 of $5 per unit of freight with road and $2 with rail. This implies a CO_2 saving of ($5 − $2) = $3 per unit for freight that is diverted from the road. For the freight that is diverted from the northern rail route, the calculation reported in table 7.1 is different because it was already using a less carbon-intensive mode. The analysis assumes that there is no change in CO_2 emissions for this second source of freight. As for the newly created freight, it comes at a *cost* of $2 per unit because that output was not shipped before.

For passengers, if the cost of road travel was $100 and falls to $50 with the new railroad, the benefit is $5,000, to which can be added a benefit to society of $300 from reduced CO_2 emissions. If rail is also safer, and reduces the number of casualties by, say, 1, valued at $500, that yields another benefit of $500. Because the project would increase congestion in the city of Neuquén, the cost of this increased congestion—say, $300—would also need to be factored in. In all, users are gaining $9,000 for freight and

$5,000 for passengers, or $14,000 in total. Adding ($100 + $300) = $400 from the reduction in CO_2 emissions, $500 from the decline in accidents or casualties, and $300 from the decrease in congestion yields an aggregate benefit of $14,600 for the direct effects of the project.

While this example is hypothetical, it yields several lessons. First, systematic thinking is needed to ensure that all the key dimensions of the issue at hand are covered, even in a setting requiring estimation only of direct effects. Second, a lot of background work is needed to get the best possible predictions for the quantity changes. The numbers in table 7.1 are for the sake of illustration only. Real projections must be carefully and painstakingly constructed. In particular, displacements and rerouting must be considered, as they affect the valuation.[10] Third, the valuation exercise is more challenging because it requires obtaining some prices that are difficult to assess. It also requires some careful thinking to avoid double counting. Imperfect market competition in road transport could complicate these valuations even more. Some of the gains from rail freight would be completely offset because monopoly road transporters have such high profit margins.

While table 7.1 sketches what the direct effects of a project such as the South Trans-Andean Railroad may look like, it falls short of a full cost-benefit analysis. It not only leaves out the analysis of indirect effects, but it is static and considers only one time period. In practice, infrastructure projects are long lived, and annual calculations must be made for every year. This implies making forward projections over a long period of time. A residual value for the project also needs to be assigned for the years that extend beyond the time horizon over which projections can be made. Lastly, and fairly obviously, the cost of the project needs to be factored into any cost-benefit analysis. Construction costs and future benefits can then be compared by calculating present values; the key issue here is which discount factor to use.

Illustration 2. Valuing Indirect Effects: The Northwest Road Development Corridor in Argentina

The Northwest Road Development Corridor project, a $300 million loan by the World Bank to Argentina, seeks to make direct transport improvements and offer wider (that is, indirect) strategic benefits by promoting economic development in the Northwest of Argentina, thereby narrowing regional inequalities and delivering inclusive growth. The challenge for an appraisal of such a project is to provide estimates of what the project can be realistically expected to achieve (quantity effects), and the social value that it can create for the country (valuation). This example illustrates the issues surrounding appraisal of indirect effects.

Identifying Indirect Quantity Effects.   Place-based policies seeking to change the investment decisions of firms and households must consider the set of complementary

conditions described in chapter 6. These include the region's policy environment (such as infrastructure, tax, special zones, labor, housing, education), natural geography (such as climate, resource endowment, remoteness), and the business ecosystem (such as cluster of firms, skilled workers, market size). Each of these elements—policy, geography, and the business ecosystem—must reach sufficient standards if a region is to attract private investment. This creates a "weakest link" problem because failure in any one element can deter investment.

It follows that there are threshold effects and discontinuous responses of private investment to policy levers that make it inherently difficult to predict the effect of policy. For example, improving transport in a place may have no effect if other conditions are not present. Or, if other conditions are met, better transport may push the place across a threshold and trigger a large private investment response. These issues are particularly important in the context of lagging regions, which are not likely to have the dense network of related firms, skilled workers, access to capital, or large markets that make a place attractive for investors. This can create a "low-level equilibrium trap": A region finds it hard to attract investment because there is little investment there. This sort of *first-mover problem* or *coordination failure* cannot be solved by the market, which prompts policy makers to intervene. This situation is, however, challenging for policy because private investment decisions depend not only on policy, but to a large extent on other private sector investors. In this process, expectations are crucial. What matters is whether these conditions are expected to be in place over the duration of a long-lived investment.

A further point on the assessment of quantity changes concerns the issue of *displacement,* as discussed in Principle 4 in chapter 6. If policy succeeds in bringing an increase in activity in some place and some sector, is this simply displacing other activities?

Determining the Social Value of Indirect Quantity Effects. Start with the benchmark case in which markets are efficient such that the net value of indirect quantity effects is zero. The analysis can be illustrated by thinking of effects in the labor market. If the economy is efficient, then the value of labor is the same in all its uses. Creating new jobs simply moves (displaces) workers—and capital—between uses and is therefore of zero value; additional output in the new use is worth just the same as output lost in the alternative. Extending this reasoning to the context of a transport improvement, think of an improvement that induces private investors to bring a previously unutilized area of land into economic use. Does this yield additional value over and above that of the direct transport cost saving (on initial and generated trade)? If there are no market failures, then the answer is no, because the "benchmark" case applies (for details, see Duranton and Venables [2018, 2020]).

Indirect quantity effects generate value (over and above that of direct effects) when they offset or correct market failures. Such failures arise when some of the benefits (or costs) of an activity are not taken fully into account in private sector decision-making (such as productivity spillovers, environmental damage, or coordination failures). Market failures also arise if private sector decisions are based on market prices or wage rates that differ from social valuations—leading, for example, to unemployed labor.[11] In the presence of market failures, private sector decision-making will not lead to an efficient set of activity levels in the economy. Thus, there are potential gains from policy that can expand activity in the region—although this may be difficult to achieve in practice.

To reiterate the main points that can be drawn from this example: First, indirect effects are valued only in cases in which there is a real market failure. Remoteness is not a market failure, and it is not efficient to devote resources to attracting activity to a place that is intrinsically high cost. Second, market failures must be carefully diagnosed, and policy should be targeted at addressing these failures. A good test is, why should creating a job in a lagging region be more valuable than creating one in a booming region? Third, caution is required about the likelihood of success because multiple conditions must be met for policy to achieve a sustained improvement in the economic performance of a lagging region. Fourth, while this volume focuses on economic arguments, the wider social and political considerations are as important, if not more so. Deprivation in lagging regions is a reason for intervention, as is the need to mitigate political tensions that can arise. However, policy should rest on a careful diagnosis of the problem and assessment of the likelihood of achieving the stated objectives.

Illustration 3. Overall Project Evaluation: The WECARE (Western Economic Corridor and Regional Enhancement) Program in Bangladesh

The WECARE Program seeks to transform 260 kilometers of national highway from Bhomra in the southwestern corner of Bangladesh to Hatikumrul in central Bangladesh into an economic corridor. In doing so, it will turn an old two-lane single carriageway into a state-of-the-art and climate-resilient four-lane dual carriageway. Phase 1 of the program will also improve 600 kilometers of roads connecting rural villages, *upazilas* (subdistricts), unions (collections of wards or villages), and about 32 rural markets (referred to as growth centers) involving storage, grading, sorting, packaging, collecting, and selling facilities for selected agriculture value chains. Per the Duranton-Venables framework, the WECARE project in Bangladesh makes the case for policy intervention by identifying complementary conditions and market failures.

Complementary Conditions.   The program is critical for unlocking regional connectivity. The western region is serviced by the country's two largest overland trade gateways and the Mongla and Payra ports. The program follows a multiphase programmatic approach by building smart highways that install optical fiber cable and deploy fiber

optic internet, provide innovative solutions to reduce congestion, enhance road safety, and improve the overall operation of the network. Private financing in transport and logistics infrastructure and services will also be explored through the program in future phases, including the possible use of the World Bank's credit enhancement tools (guarantees) to enhance the capacity of the government to raise commercial financing for road sector development.

Market Failures.   Unique geographic conditions in the region—lack of transport connectivity and climate risks—present challenges in developing and maintaining the transport system such that private investment will not occur on its own. The intervention on the main corridor is thus based on true market failure. That is, high transport costs and road safety risk in an environment where roads are subject to high climate risks, rather than remoteness of the region, will inhibit the geographic potential for becoming a transit hub in South Asia.

In addition, the local (predominantly agrarian) communities are not able to fully benefit from enhanced connectivity because of poor access of farms to markets, and the lack of agrologistics facilities for processing produce (grading, sorting, packaging, and so on). To overcome these challenges, the project follows a "market-centric" approach to generate local impacts by first identifying high-priority rural markets (designated as growth centers) that need to be connected to the main corridor and then identifying key rural roads that connect these rural markets to the main road and farms to the selected rural markets. The interventions aimed at rural markets and road connectivity are also premised on an identified market failure: that is, high transport costs and missing logistics that cannot be fully internalized by users because of a collective action problem.

In general, to support any place-based policy intervention, one or both of the following statements should be false: (1) the project is of social value only if it is commercially viable (that is, profitable); and (2) if the project is profitable, then the private sector will undertake it, so there is no need for public support. Arguments that challenge the first statement essentially concern quantity changes, while those that challenge the second statement concern valuation. The western region is prone to disasters and vulnerable to climate change. More than 50 percent of the roads are exposed to varying levels of flooding and heavy rainfall. Although the WECARE intervention supports areas that have low economic potential, it carefully picks places with complementary conditions (such as more developed markets for investment) within these regions.

A background assessment yields three main findings related to the quantity and value changes attributed to this project. First, pervasive congestion substantially increases trucking costs. The project is likely to increase the transport mobility for passengers and freight by 11 percent and reduce logistics costs for key value chains by 5 percent. Second, higher congestion leads to road crashes that are about three times higher in this region than in the rest of South Asia and cost about 2 percent to 3 percent

of GDP. The project is expected to reduce road crash fatalities by 50 percent. Third, the corridor is expected to generate 7 million person-days of new employment and help the country recover from the COVID-19 (coronavirus) pandemic. Thus, the intervention is expected to have a modest indirect effect in the near future.

Illustration 4. The Critical Role of Complementary Policies: The Cautionary Tale of the Trans-Kgalagadi Road Project Connecting Botswana and Namibia

Botswana's Trans-Kgalagadi Road Project serves as something of a cautionary tale that underscores the importance of strategic planning, thorough diagnoses of local challenges and conditions, and the execution of complementary actions and investments.[12] The overarching aims of the Trans-Kgalagadi Road Project were to "reduce transport costs, enhance social and economic integration of South-Western Part of Botswana and facilitate economic integration with Namibia" (AfDB 2011, 7).

The project centered on the construction of 221 kilometers of bitumen highway to replace what was previously an unpaved stretch of road between Sekoma and the Namibia-Botswana border crossing at Mamuno. Construction of the highway was completed and the road opened in 1998. With time, however, it became clear that the road was underutilized and that traffic volumes were well below those envisioned in the early stages of the project. Concern that the highway "could potentially develop into a 'white elephant'" (AfDB 2011, 18) inspired authorities to undertake a comprehensive review of the project in hopes of developing some understanding of why the anticipated outcomes of the project had not yet materialized.

The review revealed that the underutilization was attributable, at least in part, to "non-physical barriers to the cross-border movement of people and goods" (AfDB 2011, 19), none of which were considered or factored into the planning process. That is, even though the road was designed as a facilitator of economic integration between Namibia and Botswana, authorities failed to recognize that the cross-border movement of people and goods was inhibited as much by institutional barriers—including customs and unnecessarily complex transit procedures—as it was by the previous lack of physical connectivity. As a result, the project did not include measures or initiatives to increase the ease with which goods and people could cross the border between Botswana and Namibia—a shortcoming that would prove particularly consequential for the economic impact of the highway.

It was only after a series of complementary investments were made and initiatives undertaken—including both physical measures such as the establishment of trade-facilitating "one-stop border posts" and less tangible ones, including institutional reforms and the establishment of bodies (the Trans-Kalahari Corridor Management Committee) to oversee and manage the corridor to transform the highway into a "transit corridor"—that the project began to impel and increase interregional cooperation and integration, promote trade, and yield broader development outcomes (AfDB 2011, 19–21).

Spatial Economic Clusters and Special Economic Zones

This section applies the Duranton-Venables framework to instruments that directly try to attract investment to and create jobs in specific places. The basic objective of these instruments is to develop spatially localized clusters of economic activity. Interventions include industrial districts, free trade zones, export processing zones (EPZs), or any special district with favorable fiscal or institutional treatment. Here, these interventions are grouped under the category of special economic zones (SEZs).

SEZs often employ a range of "hardware" and "software" policies in a well-defined geographical area or areas. Hardware policies include (1) liberal treatment of imports and exemptions from customs duties, particularly (but not only) in the export processing zones and free trade zones that were precursors to current SEZs; (2) tax incentives, particularly holidays from corporate income taxes; (3) provision of infrastructure, including electric power, transport, water, and sanitation; (4) distinct regulatory regimes, often involving laxer labor regulations, restrictions on union activity, and different land tenure systems; and (5) provision of large parcels of land, often with industrial sheds built in advance of occupation. Software policies include (1) management of SEZs that seeks out and works closely and effectively with private sector investors; (2) effective implementation and management; and (3) labor training.

The popularity of SEZs has increased dramatically over the past few decades. While there were 176 zones in 47 countries in 1986, the International Labor Office database registered 3,500 in 130 countries 20 years later (Boyenge 2007). In the mid-2000s, SEZs accounted for almost 20 percent of exports and employed more than 60 million people in developing countries, the Foreign Investment Advisory Service estimates (Frick, Rodríquez-Pose, and Wong 2019).

Applying the Assessment Principles to Special Economic Zones

Direct Quantity Effects: Attracting Investment
Many SEZs have been hobbled because key elements of the ecosystem are absent. First, SEZs need to be located in places consistent with their objectives and long-term economic viability. If they are export oriented (or import dependent), they need to have good access to port infrastructure. In countries where even well-located regions have difficulty attracting investment, SEZs in backward or remote regions are unlikely to succeed. Nigeria provides a case in point (World Bank 2017). A review of industrial clusters highlights that these interventions tend to counter rather than reinforce port access and agglomeration economies. Aside from zones in Lagos, as well as the special case of the Ogun Guangdong in Ogun state (one of eight free zones that China plans to form in partnership in Africa), other SEZs that are scattered throughout other Nigerian states are not operational because of lack of interest by investors. Because of the export-oriented nature of activities in the zones, the benefits from agglomeration economies

in and around Lagos are important factors in investors' decisions. Further, even with the tax-free incentives, poor levels of connective infrastructure significantly reduce the incentive to locate investment in zones in states farther away from Lagos.

The economic scale of the SEZ itself (to reap scale and agglomeration economies) and of the area where it is located (to provide a local labor market and depth of local firms) are also important. The importance of these factors is confirmed in Farole's (2011) study of African SEZs.

However, finding a "good location" is necessary but not sufficient for success. SEZs often offer firms generous tax incentives to locate in their jurisdictions. There is considerable evidence that tax incentives alone are insufficient for success. Assessing the marginal impact of one policy is difficult given the complementarities between it and the country context (policies in place outside the SEZ). Nevertheless, Farole (2011) looks at data across 77 countries and finds that infrastructure and trade facilitation have a significant positive impact, while tax and other financial incentives are much less important. In some situations, SEZs may be able to remedy one key bottleneck for development. For instance, the main advantage of SEZs in Bangladesh seems to be their ability to offer well-serviced land to manufacturing investors.[13] Effective implementation of policy also matters. This requires action that is coordinated across functions (tax, land, infrastructure)—and thus requires that the organization running the SEZ be empowered to deliver these functions. There must also be credible commitment to policy for many years ahead. Taken together, these considerations mean that commitment is needed from the highest level of government. At the same time, the SEZ authority needs to be responsive to the concerns of firms in the zone.

Indirect Quantity Effects: Linkages and Local Spillovers
Beyond direct effects of attracting investment and creating jobs, a successful SEZ will have an internal dynamic of spillovers between firms, agglomeration, and productivity growth. This will have a horizontal element, with a large number of firms in the same sector building up thick labor markets and other agglomeration economies. It will also have a vertical element, with co-location of input suppliers and the growth of forward and backward linkages. This process encounters the first-mover or "all-at-once" coordination problem—it is hard to start a cluster. Involvement of one or several large firms is one route to kick-start this process, as with the multinational electronics companies (including AMD, Fairchild Semiconductor, and Intel) initially attracted to the free economic zone in Penang, Malaysia. Attracting such companies requires governments to deliver intensive packages of soft policy, working closely with the companies and committing to meet international standards.

Links from the SEZ to the local economy include development of skills in the local labor market, expanding the technological capabilities of local firms, increasing use of local firms as suppliers and customers, and entrepreneurial spinoffs from firms

in the zone. In successful SEZs, the share of activity in the SEZ being undertaken by local firms increases—sometimes as part of a maturing and upgrading process. In Mauritius, the SEZ upgraded from low-value textiles to higher-value and more skill-intensive products (off-shoring low-value production to the SEZ in Madagascar). In Malaysia, the Penang SEZ focused from the start on electronics, but upgraded from basic assembly to more advanced and skill-intensive goods. Both these sectoral transitions were accompanied by a transition toward locally owned firms.

The role of government in this process is important and needs to be based on recognition that there are mutual benefits—for firms in the SEZ and for the local economy—from developing these spillovers. Thus, rigid domestic content requirements are likely to be viewed as a cost to firms in the SEZ and may transfer little learning to firms outside. But working to bring local firms up to the level where they are chosen suppliers is of mutual benefit. The knowledge transfer also benefits government itself because SEZs can provide a vehicle for learning about what makes an effective business environment. China explicitly used SEZs as vehicles for policy experimentation.

Wang (2013) examines whether SEZs have meaningful effects on the local economies in China using a novel data set of prefecture-level municipalities with information on municipal economies before, during, and after the expansion of SEZs. Wang finds that on average, the SEZ increases the level of per capita foreign direct investment by 21.7 percent and the growth rate of foreign direct investment by 6.9 percentage points. The average wage of workers in the treatment group increases by 8 percent more than in the control group, while the cost of living rises by 5 percent.

Valuating SEZs

The costs and the benefits of a SEZ depend on the quantity response elicited and on displacement—the extent to which investments and jobs created are additional to those that would have occurred without the policy. The value of jobs created depends on the state of the local labor market and the alternative sources of employment. Linkages to the local economy should be included to derive the net number of jobs in the economy relative to a situation without the SEZ policy.

Benefits accrue directly through (net) job creation in the SEZ and through potential impacts on the wider economy. One mechanism is sheer scale. In Bangladesh and Mauritius, the scale of job creation (in the SEZ, in suppliers, and via spending from wages) raised incomes not only of those employed in the SEZ, but by tightening the labor market throughout the country. Other mechanisms operate by raising skills and capabilities of workers and firms both inside and outside the zone, and through the consequent dynamics of productivity growth and increasing competitiveness in international markets. Substantial gains are possible, but as suggested, achieving them requires meeting all or nearly all of a large set of conditions.

Finally, the costs of the policy depend on the set of instruments being used. Tax breaks appear expensive but should be compared with revenue that would have been earned without the SEZ. Compared with this counterfactual, they are costly only if they divert taxpaying firms into the zone rather than creating new investment in the zone. Infrastructure investment is riskier because costs are incurred at early stages of development, while benefits depend on the success of the SEZ. Regulatory innovation and a focus on soft policies is a low-cost approach that can help the government learn, even in the event of failure.

These insights are based on economic intuition and evidence from assessments of specific cases. However, a major limitation in the understanding of the relative importance of specific factors in contributing to the success of SEZs is the lack of empirical analysis covering a large number of zones and systematically examining their performance over time. Frick, Rodríquez-Pose, and Wong (2019) provide the first such study covering 346 zones in 22 developing countries. They use changes in the radiance of nighttime light—also called luminosity—as a measure of economic activity in the zones. Through careful spatial data work, they match luminosity to the spatial extent of each zone. Their descriptive analyses point out that only half the zones grew by more than 5 percent between 2007 and 2012. During that period, 33 of the zones in the study shrank. Looking at the performance of zones relative to national growth paints an even less positive picture. Fewer than 20 percent of the zones grew faster than the national average, while most zones grew at the speed of the national economy.

The econometric analysis based on ordinary least squares estimations also does not find much conclusive evidence about the role of specific factors in explaining changes in night lights. These include incentive packages as well as ownership and management schemes designed to attract firms to the zone and facilitate their growth. The provision of corporate tax breaks has been of marginal importance, as have most nonfiscal benefits, such as the availability of national one-stop shops and the independence of zone regulators. Part of the reason for these inconclusive estimates may stem from unobserved decisions about program placement, which could be correlated with program variables and economic performance.

Among the characteristics driving the economic performance of specific SEZs, two factors stand out: zone size and technological components. Larger zones have performed better than smaller zones. Moreover, and contrary to the expectations of policy makers and zone designers, lower-tech, labor-intensive zones have been more economically dynamic than their more high-tech counterparts.

A Closer Look at Three Zones

The discussion that follows examines three zones more closely to better understand how applying the Duranton-Venables (2018) framework can better measure direct and

indirect effects. It draws on discussions with experts working on SEZs within the World Bank.

Illustration 1. The Coyol Free Zone, Costa Rica

The Coyol Free Zone (CFZ) in Alajuela, Costa Rica, has won numerous awards, including being named Best Free Trade Zone in Latin America by *The European* and a Top 10 Free Trade Zone by *fDi Magazine*. Established in 2007, the zone focuses on the life sciences cluster and includes such clients as Abbott, Cardinal Health, Medtronic, and Philips. In 2019, the zone exported nearly $2.1 billion in medical devices, amounting to 58 percent of manufacturing exports in Costa Rican free trade zones. It employs 16,000 people.

The CFZ is part of Costa Rica's Free Trade Regime, which provides incentives for international companies to locate in the country. In the CFZ, these incentives include permanent exemption from customs on imports and exports, tax on royalties and fees, sales tax on local products, and stamp duty. In addition, there is a ten-year exemption from taxes on property transfers. For service and manufacturing projects, there is a 100 percent exemption from income taxes for eight years, followed by a 50 percent exemption for four more years.

Several infrastructure advantages help make the CFZ successful. First, it is only five miles from Costa Rica's main airport, the Juan Santamaría International Airport. It has easy access to three highways, allowing for access to the coasts and shipment by sea.

Second, within the park, much of the essential infrastructure contains several backup systems. The electric grid has three backup substations in addition to the main station, and underground connections, which minimize the risk of weather damage. The water system is similarly redundant, with four wells devoted to the CFZ, and the water both inside and out of the CFZ is potable for those from developed countries.

Third, the fiber optic network is fully redundant and serviced by five different telecom providers. Together, these redundancies enable companies to feel secure that they will have continual access to power, water, and internet service if they choose to locate in the CFZ.

In addition to these redundancies, the CFZ also contains on-site sterilization companies. This represents a cost savings for medical device companies that choose to locate there. It is possible to produce a device in the CFZ, sterilize it, and ship it to its final destination rather than paying for an intermediate stop for sterilization.

The CFZ has partnered with the Costa Rica Investment Promotion Agency to create a database of people looking for jobs in the zone, making it easy for companies to find qualified workers.

Benefits: Direct and Indirect Quantity Effects.   Beyond the direct effects of providing the infrastructure that makes the zone attractive for companies to locate there and create jobs, the CFZ has potential positive spillovers to the local area. First, Procomer, the agency in Costa Rica responsible for promoting Costa Rica's free trade zones, believes that indirect employment generated by all the free trade zones in the country amounts to at least 50,000 workers, some of which is due to indirect employment around the CFZ. Indirect employment could stem from several sources, including utility companies that hire additional staff to deal with the increased demand from the zone and restaurants and shops that open to provide goods and services to the workers.

Partnerships between local universities and the CFZ also have human capital spillovers. The CFZ has agreements with multiple universities in the area, which offer training for bachelors and masters degrees as well as technical skills training on site at the CFZ. The University of Minnesota has collaborated with a local university, Technologico de Costa Rica, to offer a master's degree in engineering with a focus on medical devices. Programs such as these allow the CFZ to offer high-skilled jobs in areas where locals may not have degrees without these partnerships. Locals, even if they are not ultimately employed by companies in the CFZ, still have access to science, technology, engineering, and mathematics degrees, which will make them attractive to other companies as well. If these degrees would not exist in the absence of the CFZ, these human capital spillovers can be considered to be an indirect benefit of the CFZ. The companies in the CFZ also have partnerships with technical high schools to hire students as interns, which may lead to permanent employment.

Costs.   While the CFZ yields numerous benefits, it also has costs. First, the incentive programs limit potential government revenue from the program. Tax incentives for companies that locate in the CFZ is lost tax revenue, especially if the companies would have located in Costa Rica regardless of the incentives.

In addition to the lost revenue, another potential cost of the CFZ is increased traffic congestion as trucks transport exports from the CFZ to the airport, or as people commute to jobs in the CFZ. One study found that rush hour commutes in the Central Valley (the region in which the CFZ is located) have increased 40 percent since 2015. This increase is not necessarily all related to the CFZ, but the zone could be contributing to the severe traffic congestion in the area. Similarly, the jobs created by the CFZ would be attractive to residents of other parts of Costa Rica. If the CFZ induced migration either through direct jobs or the indirect jobs mentioned, this would put upward pressure on the cost of living in the region as people move in and demand housing.

The final potential cost is environmental. The manufacturing processes in the CFZ generate environmental pollutants, which are thus a consequence of the CFZ that

should be taken into account. It is worth noting, however, that the CFZ has committed some of its acreage to maintaining the ecosystem of the area, and that Costa Rica is generally committed to environmentalism, pledging to become one of the first carbon-neutral countries in the world by 2021.

Illustration 2. The Chittagong Export Processing Zone, Bangladesh

The Chittagong Export Processing Zone is one of the oldest free trade zones in the world; it was established in 1983 as the first EPZ in Bangladesh and became fully operational in 1984. Before 1992, the Bangladesh Export Processing Zones Authority had limited power, so government bureaucracy made it difficult to approve and launch projects. This inefficiency led 30 approved projects to ultimately decide not to invest in the zone. Revisions in 1992 gave the Export Processing Authority more powers, which is how the system remains. The Chittagong EPZ has a focus on garment manufacturing, followed by other types of manufacturing.

Projects in the EPZ may be either 100 percent foreign investment, a mix of foreign and local investment, or 100 percent local investment. Regardless of the type, products must be sold outside Bangladesh or become subject to customs and import fees. Investors in the EPZ are exempt from taxes for ten years, while foreign workers receive exemption from income taxes for three years. Imports and exports abroad are not subject to duty taxes, and foreign investment is protected by the Foreign Private Investment Act. Strikes and labor unions are forbidden.

In 2009, the EPZ occupied 183 hectares and included 140 active businesses. All the EPZs in Bangladesh accounted for 17 percent of exports, and 20 percent of garment exports. The Chittagong EPZ employed 136,000 people, the majority of whom are women, and virtually all are Bangladeshi.

The zone is popular with international companies because of the comparatively low wages in Bangladesh relative to the rest of the world. Moreover, the Chittagong EPZ is attractive relative to the rest of Bangladesh for several reasons. First, electricity is unreliable in much of Bangladesh, but the EPZ receives priority over other demand. In addition, some companies are contracted to produce power solely for the EPZ, removing further uncertainty about access to electricity. Second, security in the zone is stronger than in much of Bangladesh, decreasing the risk of labor unrest and crime, which is perceived to be more common outside of the EPZ. Finally, the EPZ has several complementary services located inside it, such as banks and emergency services.

Benefits. As mentioned, the EPZ directly employs a significant number of locals, who might not otherwise have jobs. However, the indirect job benefits appear to be limited. One channel through which indirect jobs could be created is if there are close linkages to businesses outside the EPZ, perhaps through a supply chain link. While there are some cases of local suppliers benefiting from the EPZ, and the process has

improved with time, benefits are not as large as may have been hoped. In the case of Chittagong, the EPZ does not appear to have significant benefits for the local economy. First, transportation between the EPZ and the area is restricted because of security concerns. Second, bureaucratic inefficiencies make it difficult for local businesses to reap the benefits of working with the EPZ.

In addition to creating a substantial number of jobs, both directly through manufacturing and through other jobs in the EPZ, the pay and working conditions for jobs within the EPZ are generally better than those outside the EPZ, although they have still been heavily criticized. Pay is typically 20 percent to 30 percent higher than outside the EPZ, includes benefits such as meals and transportation, and is paid on time.

The government charges a 10 percent surcharge on electricity within the EPZ, which is a major source of revenue. This money can then be used for other programs in Bangladesh.

Costs.   There are four main types of costs. First, there is the lost government revenue. If some or all the firms in the EPZ would have located in Bangladesh for the cheap labor without the EPZ, then the incentives represent lost government revenue.

A second cost comes in the form of competition for resources, especially electricity. As noted, the EPZ has priority for any electricity in the electric grid. This could prevent firms and individuals outside of the EPZ from having reliable access to electricity. Lack of reliable power could hinder economic activity for the affected businesses and individuals.

Third, labor relations are limited in the EPZ. Unions were prohibited until 2004, and even now their power is restricted. Moreover, the EPZ is exempt from many national labor regulations, and in fact the standards for the EPZ as of 2010 were lower than the national standards. This is an indirect cost to the workers, who may receive better treatment if allowed full union powers. If the working conditions in some factories are truly lower than in the rest of Bangladesh, this is a cost to the workers. In an effort to improve worker relations in the EPZ, the Bangladesh Export Processing Zones Authority established the Labor Counselor Program. Running this program is an indirect cost of the EPZ.

Finally, manufacturing will always have an environmental impact. Whether or not this impact is mitigated by environmental programs, both the cost of the pollution and any programs represent another cost.

Illustration 3. The Tangier Free Zone, Morocco

The Tangier Free Zone (TFZ) was the first free trade zone in Morocco, launched in 1999. The zone is located inside the city of Tangier, near the Battouta International Airport. The TFZ is operating as an EPZ focusing on agri-food, textiles, automotive, electronics, and high-technology products. Between 2005 and 2012, the TFZ helped the

city of Tangier create new jobs three times faster than the national average, while outpacing national GDP growth by about one-tenth.

A series of tax and subsidy incentives have been set up to attract private investors. All companies inside the zone are exempt from building and equipment taxes for the first fifteen years. There is no corporate tax for the first five years and then a reduced rate of 8.75 percent starting at the sixth year. The Moroccan government also provides direct subsidies to firms to acquire land.

The government also ensures that the administrative processes are streamlined and easy to navigate for all business investors. The TFZ functions as a one-stop shop, as all the administrative procedures are done on site. There is a clear guideline for how to submit applications for licenses to operate inside the zone. All the applications are submitted to a single authority, the Local Commission of Tangier Free Trade Zone, and are guaranteed a response within 30 days. In addition to incentives and streamlined administrative processes, the success of the zone also relies on its geographic and historical advantages.

The design of the zone exploits the strategic location of Tangier, a port city in northern Morocco located only 14 kilometers away from Europe. The zone is located inside the city with easy access to Battouta International Airport and Tangier Seaport and is directly linked to the national highways. The city of Tangier also has a long history of trade and cultural exchange with Europe. The city became a neutral demilitarized zone through a joint agreement among France, Spain, and the United Kingdom in 1923, long before Morocco's independence in 1956. The city later became a tourist hotspot for Western countries. The mixed cultures and ethnic diversity make the free trade zone a natural candidate for foreign direct investment when the right incentives are put in place.

In the early 2000s, the Moroccan government also started to invest heavily in infrastructure improvement for the city of Tangier, including the construction of the new Tangier-Med seaport, a modern railroad system, and upgraded airports. These simultaneous infrastructure investments, along with incentives provided inside the zone, ensure that the TFZ is well connected with both international and domestic markets.

Direct and Indirect Quantity Effects.　By 2010, the TFZ had hosted 475 businesses and directly created 48,000 jobs. The zone also benefits local businesses and leads to indirect job creation outside the zone. Before the zone was established, Tangier was already home to sizable local production in sectors such as machinery, metal works, and chemicals. As the TFZ began attracting international manufacturing firms, local firms have quickly adapted and have become an integrated part of the value chain in supporting production inside the zone.

The zone has attracted relatively high-skilled firms and workers to Tangier, which benefits the local retail and service sector and generates additional jobs. Together, these employment opportunities have additional social welfare impacts. They allow workers

to transition from informal to formal sector jobs, reducing the economic loss from informal activities such as smuggling and crime. The TFZ also leads to human capital spillovers. The National Agency for the Promotion of Employment and Skills of Morocco facilitates partnerships between employers inside the zone and local universities. Employers and local universities have set up training programs directly addressing the need for appropriate skill sets. These programs allow workers to become more skilled and accumulate human capital. Over the long term, they will also make Tangier more attractive to high-tech firms.

The most direct cost associated with the TFZ comes from the cost to public finance. The Moroccan government allows firms and workers inside the zone to enjoy various tax exemptions and provides direct subsidies to certain firms in the industry. These are direct revenue losses for the government and additional tax burdens for locals.

In addition, the government has concentrated a large amount of funding and investment on the TFZ to aid the success of the zone. This may have left many other regions (especially inland areas) in Morocco resource poor, causing long-term and persistent spatial inequality in the country. The Moroccan government subsidizes compensation for high-skilled workers inside the zone, which makes the city of Tangier attractive to high-income workers. The population growth and uneven wage growth for high-skilled workers make the city of Tangier expensive and prices out locals, exacerbating inequality within the city.

Comparing the Zones

This comparison of the three zones suggests that four factors are important in understanding differences in performance: geographic location, reliable infrastructure, connections with local universities, and high-skill exports.

Coyol and Tangier both benefit from their geographic locations. Coyol is close to the United States, which is Costa Rica's main trade partner. This makes it an attractive place for US companies because shipping costs will be lower relative to locations in Asia or South America. Coyol is also very close to the airport and major highways, and in the most populous part of Costa Rica. Similarly, Tangier is located very close to Europe, with good access to the airport and major roads. In comparison, Chittagong is isolated from the surrounding city due to security concerns, which limits transportation between the city and the zone. Geographic isolation from trade partners makes a zone less attractive because of shipping costs, and geographic isolation from the rest of the country limits the spillovers from the zone to the surrounding community.

Similarly, reliable infrastructure is important. In Tangier, the government has spent significant amounts to upgrade the port, roads, and airport. In Coyol, the entire electric grid and internet service are fully redundant, ensuring that companies are able to access digital communications. In Chittagong, the government has placed the needs of the

zone for electricity above those of the surrounding community and allowed additional generation in the zone to ensure that there is sufficient power for the firms inside. The Bangladeshi government has also secured banks and emergency services within the zone.

Third, the ability to partner with local universities helps maximize the human capital spillovers. Both Coyol and Tangier have linkages with local universities, offering training programs, degrees, and internships to locals. Chittagong has no such programs.

The advantages of human capital spillovers can only be achieved with high-skilled labor. Thus, focusing on high-skilled exports is another element contributing to the success of a SEZ. Coyol and Tangier both have specialties that require high-skilled labor. Coyol focuses on medical devices, while Tangier focuses on high-tech products, among other things. In comparison, Chittagong specializes in garment manufacturing. Low-skilled work provides jobs, but it does not create the opportunities for human capital accumulation through work or education, and the economic benefits are lower.

Interventions to Manage Urban Congestion

The discussion that follows focuses on place-based interventions to manage urban congestion. Improvements in transport, housing, and land expansion have the potential to lower urban costs and support the transmission of agglomeration externalities.

Urban Transport

Poor transport is a drag on the economic performance of a city, reducing the connectivity of firms to workers, of firms to other firms, and of firms to consumers—and with it both the livability and the productivity of the city. Reductions in transportation costs, such as those arising from road investments or improved public transit, can help increase connectivity between business and residential areas, improving mobility within the city and reducing commuting costs (see Fujita and Ogawa 1982; Lucas and Rossi-Hansberg 2002; Glaeser and Kohlhase 2004; Srinivasan and Bhat 2005; Liu 2005; Owen and Phillips 1987).

Quantity Changes: Lower Cost and Better Accessibility
Transport is not directly consumed, but rather facilitates activities such as working, shopping, or enjoying leisure whose benefits are hard to measure. Hence, the direct benefits are often seen as reductions in the total cost of reaching a destination, including both monetary costs (such as the gasoline consumed by the vehicle during a trip) and the cost of time. In turn, this cost of time will include various elements (such as the duration of trip, the discomfort of a particular mode of transportation, traffic conditions, not leaving at a preferred time, and reliability) (Small 2012). These costs, in turn,

are affected by the choice set of trips that people could take. People choose to take only a small number of trips from a much broader choice set. Thus, the entire choice set of trips should be considered in assessments (Duranton and Venables 2018, 2020).

The possible destinations and the total cost of reaching these destinations combine to determine "accessibility," a measure of the ability to go places. For instance, accessibility to jobs can be measured as the percentage of employment opportunities throughout the city accessible by the average individual within 60 minutes. Research supported by this project finds that average accessibility to jobs is extremely limited across Africa's cities (Peralta-Quiros, Kerzhner, and Avner 2019). Average accessibility is as low as 6.5 percent in Cape Town; about 30 percent in Nairobi, Conakry, Lusaka, and Kampala; and 47 percent in Dakar (figure 7.2). Low accessibility spatially segments a city's labor market and reduces the economic reach of the city. The value of a proposed route, therefore, is partly its contribution to the network of routes.

A further consideration is that transport costs are intimately linked to the price of real estate. Housing costs are higher in areas with better accessibility, and land prices are expected to capitalize improvements in accessibility, at least in part.[14] There are positive externalities associated with transport improvements that enhance accessibility.

Cities act as labor markets for their residents. There is a large literature showing that large labor markets are more productive than smaller ones (Bertaud 2018). A transport improvement in a city, such as the development of a bus rapid transit system, can change how residents can access jobs. In turn, this will likely change how employers and

FIGURE 7.2   **The Average Accessibility to Jobs Is Quite Low in Many African Cities**
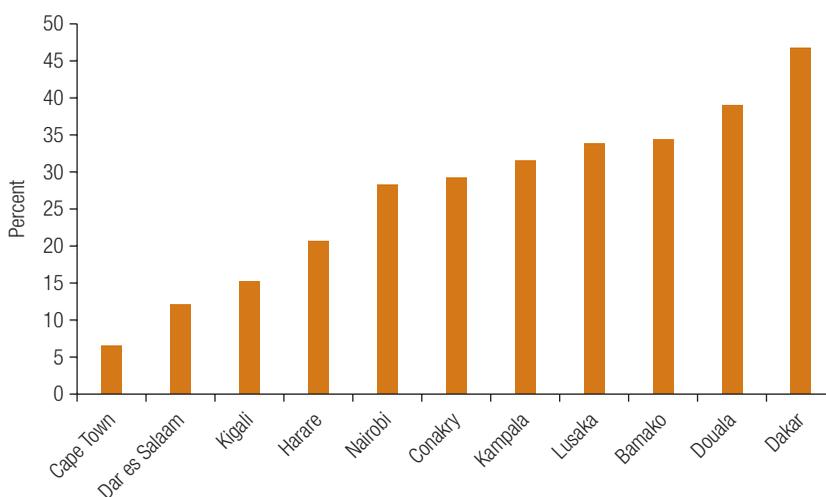
Source: Peralta-Quiros, Kerzhner, and Avner 2019.

Note: Accessibility is measured as the percentage of employment opportunities throughout the city accessible by the average individual within 60 minutes commute.

employees match. Employees may gain some bargaining power because of more job opportunities. Firms may be able to find better matches from a larger pool of workers. Transport improvements can also ease access to amenities such as shopping. In turn, more shopping options for shoppers may lead to greater price competition among retailers. Better shopping accessibility can also lead to a greater concentration of retail, a source of potential efficiency in an industry characterized by increasing returns. More generally, transport improvements can have wider economic benefits that take the form of agglomeration effects arising from better access. These positive externalities associated with transport improvements are likely to be more important in developing countries, where the inability to travel more than a couple of kilometers by foot is a limiting factor for a large share of urban residents.

Valuation of Quantity Changes: The Value of Transport Improvements as Reflected in Land and Property Prices

While the main short-term effect of transport improvements is on the travel behavior of residents, in the long term such improvements will also affect the location choices of residents and firms. These changes will affect how urban transport improvements should be valued. Because changes in location and travel behavior are hard to measure and value, a metric that would capture all these changes at once and would reflect welfare changes is alluring (Duranton and Venables 2018, 2020).

Changes in land and property prices are often considered to be a good proxy with which to evaluate urban transport improvements. Land prices can capitalize differences in accessibility across locations within a city. However, if markets work reasonably well, the prices of land and of built space will reflect time and cost savings. It would not make sense to double count benefits. However, if the project includes complementary policies to change land use along the project's area of influence, then higher density could reflect improved accessibility and mobility. The developing country context provides particular challenges in realizing and measuring land value appreciation because many developing countries lack various institutional prerequisites for land administration—including well-defined property rights, standardized and objective methods of land valuation, and transparent processes of land transactions (Lozano-Gracia et al. 2013).

Imperfect mobility introduces further assessment challenges. For instance, the social value of a transport improvement in an area may not be fully reflected in land values if potential newcomers face constraints to moving into the area. To take an extreme example, if a city is closed to new residents, a transport improvement will typically lead to lower land values as the accessibility premium from more central locations declines. Alternately, local residents in particular neighborhoods may restrict access to newcomers through restrictions on land use and new developments (Hsieh and Moretti 2019). Aggregate land value will reflect their "monopoly power." Because transport

improvements affect the behavior of incumbent residents and may lead them to impose more stringent restrictions, the change in land values will not in general reflect the social worth of the improvement. Two illustrations of the appraisal principles follow.

Illustration 1. Bus Rapid Transit Systems

Bus rapid transit (BRT) systems provide an attractive alternative to subways in rapidly growing developing country cities: they can deliver similar reductions in commuting times at a fraction of the cost and are much faster to build. In Guangzhou, China, the introduction of the BRT system in 2010 reduced travel times by 29 percent for bus riders and 20 percent for private car commuters. The change has been reported to yield total savings of 52 million hours a year, valued at ¥158 million ($23 million) (Suzuki, Cervero, and Iuchi 2013). In many cities, the direct quantity effects appear to be significant. In Bogotá, the first BRT line reduced travel time by 15 minutes per passenger day (Hidalgo and Yepes 2005); the second line reduced travel time by 12–14 minutes per passenger day (about 19 percent) (Perdomo, Castañeda, and Mendieta 2010). Passengers in Istanbul can save 28 days' worth of commuting a year by shifting to BRT (World Bank 2015). In Johannesburg, the BRT system reduces travel times by 13 minutes each way (Vaz and Venter 2012, cited by Carrigan et al. 2013). In Lagos, commuting time fell by an average of 25 minutes along a 22 kilometer corridor and wait time was reduced from 45 minutes to 10 (Peltier-Thiberge 2015).

A recent study (Tsivanidis 2019) carefully examines the direct and indirect impacts of Bogotá's TransMilenio Bus Rapid Transit System. Opened in 2000, TransMilenio is the world's most-used BRT system, with a daily volume of more than 2.2 million trips. The system operates more like a subway than the informal bus system that preceded it: buses run in dedicated lanes with express and local services, and passengers board buses at stations that they pay to enter using smart cards. Tsivanidis (2019) examines welfare impacts using a quantitative general equilibrium model. The study quantified the BRT system's impact on aggregate performance not only through reduced time losses from travel, but also through improved allocation between workers and places of employment and residence. After accounting for reallocation and general equilibrium effects, analysis by Tsivanidis (2019) suggests that welfare gains were 20 percent to 40 percent larger than direct effects.

1. *Complementary policies.* The assessment of the TransMilenio highlights the salience of complementary investments. A feeder bus system, which partly solves the last-mile problem of getting residents between poor, peripheral neighborhoods and BRT stations, improves welfare more than any single trunk line. Also, Tsivanidis (2019) ran a counterfactual exercise suggesting that if the government had adopted a scheme to capture increases in land value—increasing zoning densities near BRT stations, and auctioning building permits to developers—welfare gains could have been 18 percent higher. Government revenues would be able to cover between 8 percent and 40 percent of the systems' construction costs.

2. *Density thresholds.* While BRT systems have boomed since the early 2000s, especially in Latin America, they seem to be underperforming in Africa. Low and spatially fragmented urban densities limit the success of these investments (Lall, Henderson, and Venables 2017). While the average daily BRT passenger count in Latin American cities such as Bogotá is about 1.98 million, it is only 70,000 in Johannesburg (Carrigan et al. 2013). Mass transit needs high population densities, which make it more likely that the system will be used with sufficient frequency and that high capital investments can be justified. The appropriate transportation systems for a city vary with population and job densities throughout the city. Improving logistics and designing routes and bus stops might be enough to improve connectivity in places with low densities; higher density can require a BRT, a light-rail train, or a subway. A study of systems in the United States by Guerra and Cervero (2011) finds that to be in the top quartile of cost-effective investments, a BRT system with a cost of about $50 million per mile would need about 18 jobs and residents per acre within a half mile of the stations; a light-rail train would need 50 jobs and residents per acre; and a heavy-rail system would need about 60 per acre.

Illustration 2. Road Improvements

In addition to BRT investments, the framework provides an approach to think through the likely impacts of other transportation improvements, including roads and subways. Bernard, Bird, and Venables (2016) apply similar thinking to examine the direct and induced effects of transport improvement in Kampala, Uganda. Using a spatial computable general equilibrium model, the researchers develop a simulated version of a city in which firms and households choose their locations according to the cost of commuting and transporting goods across the urban area. The model captures the direct impacts of transport changes on commuting times, and the indirect impacts on the price of goods and services, rents, and wages. It also captures the important long-term impacts on land use within the city, as both firms and residents adjust their location choices in response to these price changes—leading to greater economic benefits of transport investments through economies of scale and agglomeration effects.

Bernard, Bird, and Venables (2016) examine the potential benefits of improving the northern bypass around Kampala, aimed at improving connectivity between the west and east of the city and upgrading the existing road network to facilitate movements within the city. The direct beneficiaries of these improvements are workers using motorized transport, whose transportation costs decrease. Other residents also benefit because lower transportation prices reduce the cost of living, at least in the short term. Over time, people relocate: The better-off locate farther from their jobs as commuting times decrease, reducing pressure on land close to the city center and allowing poorer people to settle close to their jobs. Low-skilled informal workers may benefit more than high-income workers, depending on the strength of agglomeration effects. If these effects are strong enough in the informal sector, as they were in Colombia (Duranton

2016), the relocation and increased clustering engendered by the transportation improvement will boost productivity in the nontradable sector (in which most low-skilled workers are employed). The resulting increase in wages in that sector might surpass the wage effect for high-skilled workers.

Bernard, Bird, and Venables (2016) estimate the long-term effect of the bypass on urban welfare to be eight times its short-term impact. The long-term effect of upgrading the road network is three times as great. Transportation investments not only decrease the aggregate commuting time of users of motorized and nonmotorized transport, but also make it easier for firms and households to relocate, and have agglomeration effects on the city. If households and firms can relocate, both projects lower the cost of living by 19 percent for high-income households and 6 percent for low-skilled workers. With stronger scale economies in the informal sector and increasing returns to scale, the difference between low-skilled and high-skilled workers decreases, with a reduction in the cost of living of 3 percent and 9 percent, respectively.

This research shows that the benefits of changes in the urban landscape, such as investment in transportation infrastructure, take time to emerge. Firms and households respond to these changes gradually. Policies should plan for the long term and support relocation in response to change of connectivity over years and even decades for the full benefits of investments to be realized.

Housing and Urban Infrastructure

A "house" is not only a dwelling. For purposes of policy and analysis, it should be considered a bundle of complementary services and utilities such as water, sewers, and power (Duranton and Venables 2020).

Shortages of affordable housing are a major concern in developing country cities. The demand for housing is high. At least 1 billion people live in slums. Most cannot afford better housing. Nearly three-quarters of people in low-income countries live on $2 per day. Circumstances are particularly dire in Africa, where spending on food accounts for 39 percent to 59 percent of monthly expenditures by urban households. The poorest households (those in the bottom expenditure quintile) spend an even larger share on food, ranging from 44 percent in Uganda to 68 percent in Zambia (Lall, Henderson, and Venables 2017).

Policy makers in developing countries are keenly concerned with expanding the supply of affordable housing. They often pursue goals similar to those in more developed economies: expanding access to housing, improving housing quality, increasing the ability of residents to consume housing, and facilitating housing transactions.

Expanding housing supply creates both direct and indirect jobs throughout the value chain from construction to maintenance of the house. It also leads to training and skills development for entry level and unskilled workers and represents dual use

opportunities for shelter and income generation. Housing plays a critical role in economic development because it is overwhelmingly a private, household investment that is the largest asset most households have. Thus, the aggregate process of national asset accumulation is fundamentally tied to investment in housing. For example, the UK economy has £7 trillion of tangible assets, of which £4 trillion are in housing (Collier and Venables 2012). In France, housing and land made up two-thirds of the national wealth of more than €8,200 billion at the end of 2003 (Collier and Venables 2018).

Quantity Effects: Fostering Supply and Demand versus Enabling Markets

Improving housing is a complicated task. Fundamental institutional policies are needed to enable the housing market to work, as are direct policies that either provide housing on the supply side or allow residents to consume more housing through subsidies on the demand side. Complementary interventions are also needed to raise the quality of the housing being supplied, by providing key infrastructure and utilities or appropriate urban planning. Developers are unlikely to start building a new residential complex if it cannot be serviced by utilities and accessed by transport.

As discussed throughout this volume, the assessment of place-based policies is challenging because the returns to one intervention depend on other enabling conditions. The timing of policies also matters, given the long-lived nature of housing assets. Investing in utilities too early could be wasteful and could lead to depreciation of infrastructure before it is fully used, whereas investing too late could require costly retrofitting.

Institutional reforms of land and housing markets are the bedrock of housing interventions but are hard to do. Several complementary factors need to be in place at the same time. These include well-defined property rights that allow for use and trade of land;[15] systems to delineate, register, and update land parcels through cadasters and land registry; and enforcement of land rights by a fair and timely judiciary system (Glaeser, Ponzetto, and Shleifer 2016). The not-so-good news is that well-functioning land and housing markets essentially require a high level of development, which is correlated with higher human capital and stronger government effectiveness (La Porta, Lopez-de-Silanes, and Shleifer 1999; Glaeser and Kohlhase 2004). Most emerging cities in low-income and lower-middle-income countries are not equipped with the tools for effective property rights and land administration.

The second key set of institutions needed for functional property and housing markets is a system of housing finance. In the absence of a dedicated system of housing finance, very few households can easily pay for an asset that is typically worth several times their annual income. Renting is the alternative tenure choice. It does not require households to make a large investment. At the same time, properties on the rental market still need to be financed by someone—and that "someone" is likely to need external finance.

Housing finance relies on several sets of conditions, with extremely limited substitutions between them. The first is a system of titles and a workable market for land and properties, as discussed.

The second is a set of laws and regulations for mortgages. These regulations must protect banks from fraudulent borrowers by allowing them to control titles. Regulations must also protect borrowers against potential abuse by lenders and make sure their titles are returned when the mortgage is paid. With a mortgage, both parties enter a long-term relationship that requires some guarantees and predictability.

The third set of conditions regards the creation of funding flows that allow lenders to lend to a large number of borrowers. In turn, this requires either large, well-funded retail banks; a system of specialized banks such as building societies associated with savings; or a large provident fund with an independent source of funds, such as a payroll tax.

While these more fundamental policies that allow property and housing markets to function and housing to be funded are eventually necessary at higher levels of development, they seem unlikely to fix housing consumption shortfalls in the short to medium term in developing countries. As a result, developing countries often turn to more direct interventions. Even with ill-functioning property markets, it is possible to develop a large quantity of new housing in a fairly short period, as demonstrated by mass housing programs in Brazil, Mexico, and South Africa (Buckley, Kallergis, and Wainer 2015). These programs seek to foster both supply and demand by mandating new large housing developments and by offering deep discounts for the newly constructed housing units (which are sometimes given for free).

For instance, Minha Casa, Minha Vida (MCMV), established in 2009 in Brazil, was able to develop more than 3.5 million new houses in about five years. A new phase of the program plans to build another 3 million houses. The program originated as part of the Brazilian government's public investment initiatives to support economic growth in the wake of the 2008 global financial crisis. The MCMV program provided incentives to facilitate the production and acquisition of new housing units (and the rehabilitation of existing ones) for families with incomes of up to 10 times the minimum wage. It was conceived as an effort to support the construction sector—a capital- and labor-intensive sector—while supporting the production of adequate housing options for low-income to middle-income households.

In South Africa, which is overcoming an era of apartheid that led to sprawling slums, housing policy is dominated by large subsidized greenfield developments but is unable to keep up with demand for homes. Delivery of subsidized accommodations has declined steadily and at times sharply over a decade—from a peak of 235,000 houses and serviced sites in 2006/07 to fewer than 175,000 houses, sites, and subsidized rentals in 2016/17 (South Africa, Integrated Urban Development Framework 2018). Figure 7.3 disaggregates subsidized housing and serviced site delivery totals as per the

FIGURE 7.3 Delivery of Subsidized Housing Has Been Declining in South Africa
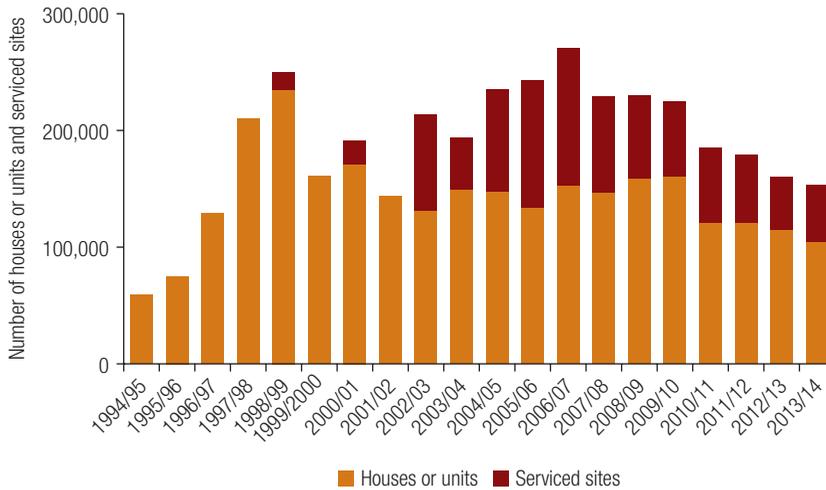
Sources: South Africa, Department of Human Settlements 2017; AfricaCheck 2015.

national statistics and illustrates the steep decline since 2006/07. A recent review suggests that it is unlikely to meet future demand because the needed expansion in fully subsidized housing would be fiscally unsustainable (Gardner 2018). Other countries such as Angola, Ethiopia, and Thailand have been far less successful at massive housing development. Their programs have often struggled to build more than tens of thousands of new housing units.

Other, less ambitious, policies may act only on the demand side by offering subsidies for house buyers or borrowers or only on the supply side by, for instance, building public housing directly or offering fiscal incentives for housing investments. An important question in the evaluation of new housing units is their location. At one extreme, some urban expansion is occurring through new housing built on greenfield suburban developments. At the other, urban expansion is happening by rebuilding or upgrading existing housing stock in already developed areas. Various forms of infilling construction can occur between these extremes.

The Social Value of Increasing Housing Supply at Scale

For most developing countries, urban expansion will be needed to allow cities to grow and keep costs in check. Consider the typical case of cities that grow in population by 2 percent per year and where households are willing to increase their housing expenditure by 2 percent per year.[16] To prevent prices from increasing, this 4 percent annual increase in demand implies a doubling in the amount of developed floor-space of housing every 18 years. Recent work by Lall, Lebrand, and Soppelsa (2021) on more than 9,000 cities worldwide covering 1990–2015 shows the elasticity of a built-up area to the combination of population and income to be 0.45. That means that if the city's

population and income both double, its built-up area increases by 45 percent. Most built-up growth in developing countries is taking the form of expansion. Hence, despite its lack of popularity among planners, urban expansion will need to be a big part of accommodating increasing demand for housing.

For many large-scale housing projects, however, the need to deliver housing units at scale has led to the development of sites completely disconnected from the existing urban area, often without access to transport and other utilities. In South Africa, to achieve delivery at scale, large subsidized housing projects were constructed in undeveloped greenfield areas at the city's outer edges. For example, a 5,000-unit development with an average property size of 200 square meters requires a site of 100 hectares for residential stand-alones, or closer to 140 hectares including roads and nonresidential uses. This creates a perverse incentive of poor location. For such large parcels of land to be affordable, there are strong incentives to build megaprojects far from the centers of economic activity, and hence far from access to jobs (Gardner 2018).

Brazil's large-scale MCMV program also suffers from suboptimal location, with housing located at the urban periphery, far from transportation and jobs. The choice of peripheral locations is driven by the amount and nature of subsidies, providing developers with incentives to minimize land costs to increase profits (Marulanda and Acolin 2015). In Mexico, the National Housing Commission (CONAVI) introduced location criteria in the government's Housing and Urban Policy in 2013 to discourage low-density and spatially disconnected urban expansion. While the Mexican program had historically been successful in incentivizing housing production, most of the new units were built in the outskirts of cities with minimal urban services and infrastructure, leading to low-density, leapfrog urban expansion. This model of urban expansion increased transportation expenditures for low-income households and raised costs of infrastructure provision for government. Municipalities with the lowest density spent nearly 1.5 times as much on public works and infrastructure per capita in 2010.

CONAVI incorporated location into the criteria for allocating subsidies as an attempt to curtail the trend toward urban expansion. The revised rules differentiated the direct support by location according to different zones (*contornos*), with higher support for "well-located" housing. Well-located housing refers to housing units in urban areas with high employment density and with access to basic services. CONAVI also made units located more than 900 meters from an existing infrastructure network ineligible for support from the program (World Bank 2013).

Valuing Increases in the Consumption of Housing

Many housing policies, especially on the demand side (such as direct subsidies), are often questioned given that housing is a private good whose consumption is both rival and excludable. There may be considerable deadweight loss when residents may prefer to consume other goods but their consumption choices are tied to housing. However, policies

that increase housing consumption can yield several significant benefits. First, unclear property rights make housing a stranded or nontraded asset. The relative certainty offered by titles and the option to resell a property if necessary foster incentives for households to invest in their accommodation. Without secure land and property tenure, poor residents—whether in squatter or informal settlements—have little incentive to improve their shelter conditions. The risk of evictions or demolition dampens investments that the urban poor can make to improve their homes. The regularization of land and property tenure for squatters and informal settlers has been associated with increases in land and property values, and significant investment in shelter consolidation, as well as other socioeconomic benefits, such as improved educational and health outcomes for children in many parts of the world (Galiani and Schargrodsky 2010). Further, the lack of clear rights could lock residents into a place even when their workplace may change. Reforms to functioning of land and housing markets can enable better allocations.

Further, confusion in land rights at the city's fringe poses major challenges for cities to expand and develop land at scale—an important component of scale economies. While most of the land in the periphery of cities in high-income countries is privately owned, a large share of land in low-income countries is owned through tribal or customary arrangements and by the public sector, adding to the transaction costs of land development (Lall, Lebrand, and Soppelsa 2021). Further, only 30 percent of cities in low-income countries have completed land registration in the urban periphery, compared with 84 percent in high-income countries (Angel et al. 2016).

While housing is generally a private good, residents may not factor in the benefits from less crowding, better location, and better housing. In Dhaka, for example, informal settlements are concentrated in locations at risk from flooding. In Bogotá, poor people face a disproportionately high burden of earthquake risk, as they sort into high-density, low-rent properties that are located in higher-risk locations (Lall and Deichmann 2011). On average, the city's poor live in locations that have twice the seismic risk compared with where rich households are located.

Also, housing is not only a roof over one's head but comes as a package of services including water, sewers, and roads, which are largely public goods associated with significant externalities. As discussed, reasonable access to such services is particularly important. Housing without access to these services is worth very little. Poorly located housing at scale in Brazil, Mexico, or South Africa typically resells at a price well below its construction cost (Buckley, Kallergis, and Wainer 2015).

Conclusion

This chapter illustrates the relevance and application of the Duranton-Venables framework in the context of place-based policies that pertain to transport corridors; economic clusters and special economic zones; and interventions to manage urban congestion. As discussed in chapter 6 and earlier in the volume, this framework serves

as a heuristic tool that can help policy makers examine the dimensions that should be taken into account when assessing place-based policies.

For transport corridors, it is critical to understand the mechanisms through which the corridor may bring about change (quantity effects) and look beyond immediate or direct effects of the transport corridor to induced changes in private sector behavior throughout the economy. It is also important to attribute value changes accurately, essentially by thinking clearly about opportunity costs, the value of resources in alternative uses, and the market failures and inefficiencies that motivate the policy intervention.

In the context of special economic zones, the following factors are important in understanding differences in performance: geographic location, reliable infrastructure, connections with local universities, and high-skill exports. While some interventions such as SEZs are often spatially distant from the built-up area of existing cities, their viability often depends on linkages with cities. Further, poorly located SEZs tend to aggravate fiscal risks for the municipalities on which they depend.

Efforts to leverage complementarities between transport, land use, and housing policies are central to managing urban congestion. Piecemeal interventions tend to exacerbate congestion and fragment urban labor markets, further dampening the potential for agglomeration economies.

Annex 7A. Using Spatial General Equilibrium Models to Quantify the Indirect Effects of Highway Corridors in Africa

Two recent studies use spatial general equilibrium models to quantify the indirect effects of highways corridors in West Africa and the Horn of Africa. Lebrand (2021) reviews the potential benefits of developing the Dakar-Lagos highway corridor between Dakar, Senegal, and Lagos, Nigeria, which crosses most coastal West African countries. The Dakar-Lagos corridor is part of the Trans–West African Coastal Highway, which links 12 West African coastal nations, from Mauritania in the northwest to Nigeria in the east, as well as two landlocked countries, Burkina Faso and Mali, with feeder roads. It mostly follows the coastline along more than 4,000 kilometers and connects the capitals of the 14 countries.

The expected economic impacts of the Lagos-Dakar highway corridor would differ across countries. Along the northern section between Dakar and Abidjan, Côte d'Ivoire, road improvements are expected to enable the transit of agricultural production from Senegal to neighboring countries The Gambia, Guinea Bissau, and Guinea. In Liberia, the corridor aims to reduce the isolation of rural areas and improve integration at the Côte d'Ivoire border. The southern part of the corridor between Abidjan and Lagos connects the most densely populated and economically active parts of the subregion and interconnects with a rail network, major ports,

and airports. It aims at strengthening regional trade and integration in West Africa by linking the hinterlands of the different countries, including providing landlocked countries with access to seaports.

Using simulations from the spatial general equilibrium model, Lebrand (2021) argues that the effects of the Dakar-Lagos highway corridor are mixed, given the disparities within countries. For most countries, increasing regional integration through trade and transport investments would reduce spatial disparities in both nominal and real wages. Disparities are expected to increase, however, in a few countries, such as Guinea-Bissau and Sierra Leone, following higher regional integration. The change in market access depends on two factors: the reduction in transport costs per origin-destination pair, and the locations to which transport leads. Given that locations differ in population and purchasing power, the economic impacts of improving roads depend on where they lead. Improving access to a populated and better-off location would increase sales opportunities more for local firms than improving access to a poorer and less populated location.

The varied effects across districts are captured by the change in market access measures for the Dakar-Lagos corridor. Improved market access through corridor improvement could be complemented with steps to remove delays in transit time or delays at the trade border. Corridor improvements without any complementary policies to address transit time and trade border delays would induce most of the change in the benefits of market access only in those locations along the corridor, while the benefits would disappear relatively quickly with distance. Adding trade facilitation policies to reduce transit and all border delays would spread the benefits to almost all locations. The most isolated places, the furthest away from the coast, would experience the smallest increase in market access.

Spatial general equilibrium models have also been used to assess the impacts of future transport infrastructure on structural change in the Horn of Africa, including four corridors in Djibouti, Ethiopia, Kenya, and Somalia: Kismayo-Lamu-Mogadishu; Assab-Djibouti; Berbera-Djibouti; and Mogadishu-Berbera-Bossasso (Herrera-Dappe and Lebrand 2021). The analysis suggests that the total share of employment in nonagricultural sectors at the country level would increase, but not in every subnational region. Lower transport and trade costs would increase market access and would lead to higher specialization from relative comparative advantage in one sector—but would also generate more competition from other regions in the country for the traded goods sectors. For some regions, better regional connectivity would translate into higher specialization in agricultural production.

Among countries in the Horn of Africa, the regions that tend to experience a decrease in nonagricultural sectoral shares from better connectivity are either isolated regions or border regions, mostly in northwestern Ethiopia and northeastern Kenya, that would benefit from lower transport costs. These analyses suggest that regions

benefiting from corridor improvements tend to specialize more in manufacturing and traded nonagricultural goods. However, not all regions that benefit from better connectivity would experience an increase in specialization in manufacturing. Additional investments to increase productivity, such as investments in electricity or internet connectivity, could help manufacturing in some locations prosper—instead of decreasing the associated increase in competition. When investment is limited to corridors, some regions would lose in terms of regional income, while others would gain. When complemented with reforms to reduce border time, a large majority would gain from lower trade costs and new regional trade opportunities.

Notes

1. While this chapter discusses how such transport investments can be assessed using the heuristic framework outlined in chapter 6, a broader treatment of the conditions under which large-scale investments in transport infrastructure can generate positive spillovers on local household income, jobs, equity, and poverty reduction can be found in a recent report by the Asian Development Bank, UK Department for International Development, Japan International Cooperation Agency, and the World Bank, *The WEB of Transport Corridors in South Asia* (ADB, DfID, JICA, and World Bank 2018). That report examines international corridors as well as domestic ones. It argues that the benefits are likely to be amplified with complementary investments in trade facilitation as well as soft policies that reduce frictions in capital, labor, land, and product markets or improve institutions such as public sector governance, contract enforcement, and access to social services.

2. The US data are from the American Road & Transportation Builders Association. Developing country estimates are from the World Bank, Roads Cost Knowledge System (ROCKS), Version 2.3.

3. In 1816, when the United States was just developing, it cost as much to move goods 30 miles overland as it did to cross the Atlantic Ocean. Consequently, the Erie Canal provided a stunning reduction in transportation costs, and in turn was supplanted by rail. Today, passengers can readily fly or drive to cities hundreds of miles apart, such as Los Angeles and San Francisco, so the benefits of rail are far more muted (Glaeser and Poterba 2020).

4. This would entail an exercise in which resource constraints are properly imposed, private sector responses are modelled, market imperfections are made explicit, and real income (utility) benefits are accurately calculated.

5. A growing literature on the spatial impacts of transport includes Fajgelbaum and Redding (2014) for Argentina; Donaldson (2018) for India; Lall and Lebrand (2020) for the Belt and Road Initiative in Central Asia; Balboni (2019) for Vietnam; and Herrera-Dappe and Lebrand (2019, 2021) for Bangladesh and East Africa, respectively.

6. It is not only the size and cost of accessing neighboring markets that matters, but also the intensity of competition and prices that prevail in those neighboring markets.

7. The standard approach taken by research is a regression of a change in outcome, such as local employment or productivity, on a change in infrastructure (or sometimes an initial level of infrastructure—a valid approach when adjustments are slow).

8. For a thorough discussion of identification issues for transportation projects, see Redding and Turner (2015).

9. Several countries attempt to measure induced changes in quantity in their transport appraisal methodologies. Doing so requires calculating the effect of transport on the effective density of each place, and then combining this with econometric estimates of agglomeration effects, as measured by the elasticity of productivity with respect to economic mass.

10. This is the case even though all the quantity changes described here are direct effects. If the project were to trigger new investments in the area, then making these projections would become harder and projections would be subject to greater uncertainty.

11. This refers to involuntary unemployment, so is not analogous to underdeveloped land. The labor market analogue of bringing unutilized land into use would be an increase in the labor force participation rate.

12. The discussion is based on a Project Performance Evaluation Report (PPER) prepared by the African Development Bank for the AfDB-funded Trans-Kgalagadi Road Project (AfDB 2011).

13. World Bank staff, personal communication.

14. See Duranton and Puga (2014) for an extensive review of this literature.

15. Many countries do not have a uniform system of land rights. In some African countries, they are administered by customary chiefs, many systems of rights coexist uneasily, and the trade of property assets is heavily restricted within a group (Durand-Lasserve, Durand-Lasserve, and Selod 2015).

16. Using national accounts for a large cross-section of countries, Dasgupta, Lall, and Lorenzo-Gracia (2014) show that housing investment as a fraction of GDP per capita is S-shaped and takes off at about $3,000, before tapering off at about $36,000. Low-income countries invest only about half what upper-middle-income countries invest in housing as a fraction of their GDP. Housing is often considered to be a normal good that experiences an increase in its demand due to a rise in consumers' income. However, it appears to be a luxury good at low levels of development. Thus, a 2 percent increase per year for housing expenditure at the household level is perhaps a conservative estimate in a low-income but growing economy. A 2 percent per year growth in population exceeds the level observed in the recent past in Latin America but seems very conservative for large African cities and some parts of Asia, including India.

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8. Local Economic Development Policies

Introduction

The previous chapters discuss physical infrastructure, transport corridors, special economic zones, and place-based policies aimed at urban reform at differing scales. While in all cases some component of physical investment anchors the project, all stress the importance of complementary "soft" investments in the skills and entrepreneurial capital of the people and the environment in which they operate. These complements range from human capital to enterprise support services, to well-functioning institutions, to fiscal incentives. Investments in these complementary areas can be broadly grouped under the heading of local economic development (LED) policies. Earlier literature defined LED policies as increases in the "local economy's capacity to create wealth for local residents" (Kane and Sand 1988). Over the years, the term has enjoyed flexible usage in the literature, ranging from capability building (Duranton and Venables 2018, 2020) to more comprehensive sets of industry and individual support measures affecting both labor demand and supply (Bartik 2012; Neumark and Simpson 2015).[1]

This chapter offers a comprehensive overview of these softer complements, especially those related to supporting enterprise and entrepreneurship. Abstracting for a moment from the defining issue of mobility between regions, this chapter returns to examine the question Lucas (1988) asks about differences in productivity between nations: Why is it that various types of capital—whether physical capital or knowledge capital (technology and innovation)—do not flow to viable regions?

Entrepreneurship: The Lifeblood of Local Economic Development

To begin, it is critical to remember that such flows of physical and knowledge capital are not disembodied; rather they are affected by entrepreneurs who are more or less able, and who function in contexts that are more or less conducive to the process of accumulation. This chapter focuses on entrepreneurship and firm growth at a local level, thereby taking a microeconomic approach to understand the extent and quality of regional development.

The literature on entrepreneurship at the national level is vast but is now emerging at the subnational level, as well. For the United States, Glaeser, Rosenthal, and Strange

(2010) find support for the role of stronger entrepreneurship on local growth, while Ghani, Kerr, and O'Connell (2014) and Duranton and Martin (2018) find the same for India and Colombia, respectively. Figure 8.1 suggests that the presence of more young firms per worker—a measure of entrepreneurship—in certain regions of India is closely related to job creation in these areas. Whether homegrown or imported from other regions or abroad, able entrepreneurship is the lifeblood of regional development.

FIGURE 8.1   Regional Entrepreneurship Is Critical for Growth of Local Employment in India

a. State level

b. State-industry level
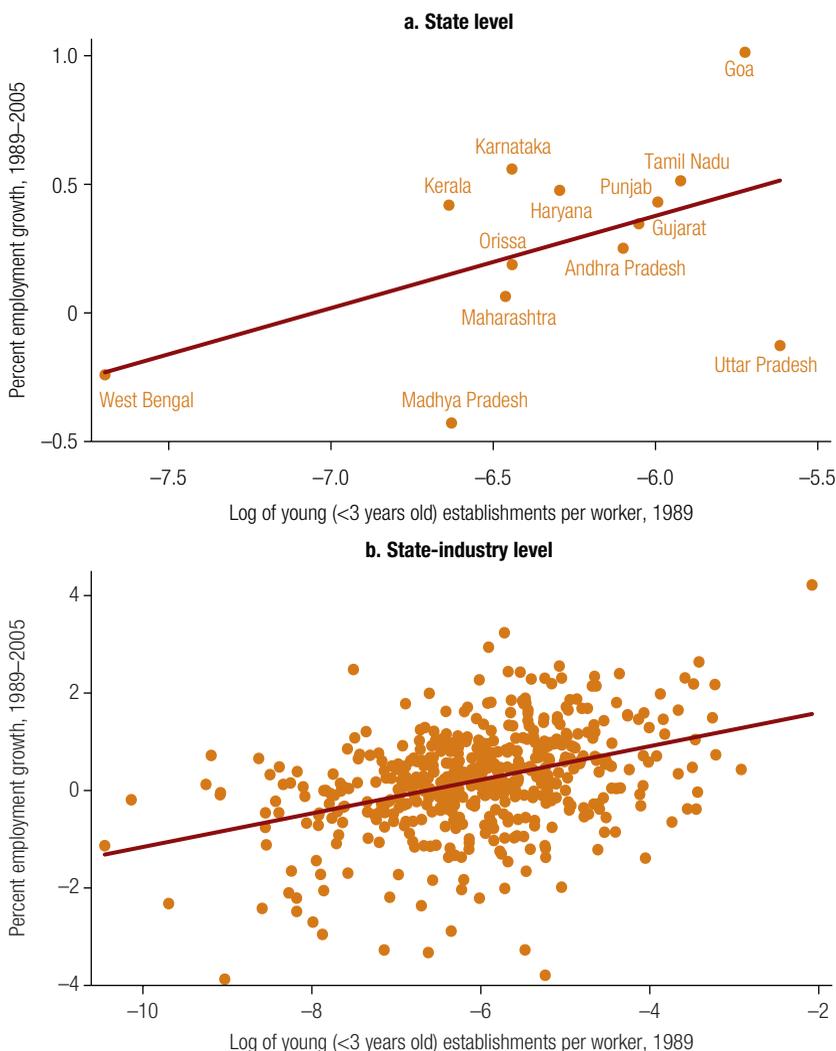
*Source:* Ghani, Kerr, and O'Connell 2014.

Note: The figure focuses on certain states in India. It uses the presence of more young firms per worker as a measure of entrepreneurship. Panel a regresses employment growth over the period 1989–2005 on a state-level count of young establishments in the initial period. Plotted points represent each state. Panel b repeats the same with state-industry data.

Figure 8.2 presents a simple framework for the decision of (potential) entrepreneurs to start or expand a business or business project and the elements of the "entrepreneurial ecosystem" needed to support such efforts. These elements are discussed in greater detail by Cusolito and Maloney (2018) in *Productivity Revisited*, but they remain important at the local level.

Like any investor, an entrepreneur is fundamentally placing a bet, comparing an entrepreneurial project (that is, starting or growing a business) with an expected rate of return and risks against other alternatives, such as "safe" salaried work for an individual entrepreneur or simply another project for an existing firm. As Kerr, Nanda, and Rhodes-Kropf (2014), among others, argue, entrepreneurship is a form of experimentation in which entrepreneurs learn about the viability of a product or process in the local context. Could Kenya grow coffee in the highlands? Could Guangzhou become a manufacturing hub? Could Peru export asparagus? Could Penang become a global center for high-tech firms? Such experimentation entails both a process of managing risk and a process of learning—about the investment, about running a firm, and about evaluating and managing risk (see Maloney and Zambrano forthcoming).

FIGURE 8.2 **The Determinants of Entrepreneurial Experimentation and Productive Entrepreneurial Activity Are Closely Linked**
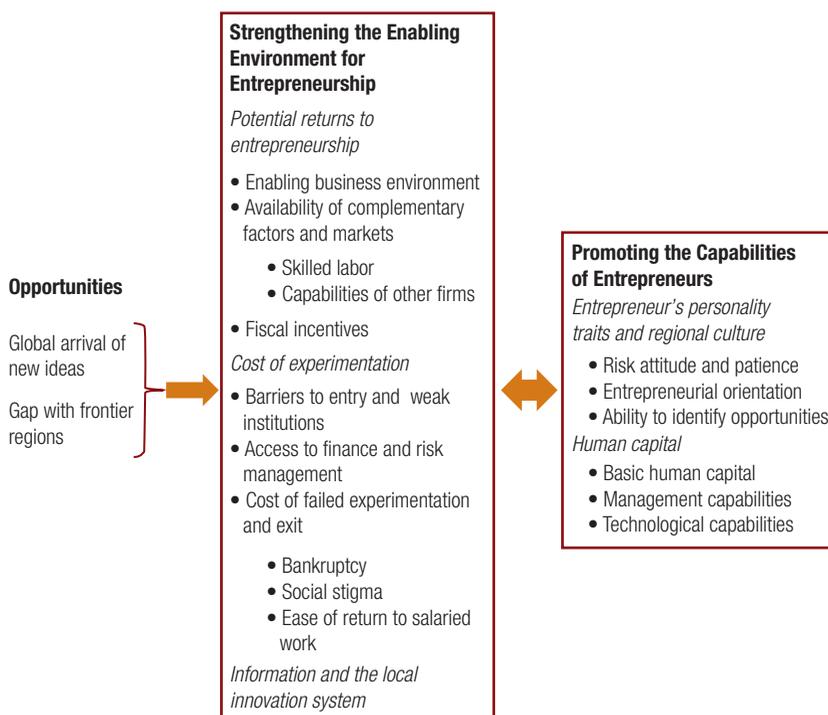
Source: Adapted from Cusolito and Maloney 2018.

Two sets of factors affect this experimentation: factors in the enabling environment (shown in the center section of figure 8.2), and factors pertaining to entrepreneurs per se—that is, human capital, very broadly construed (shown in the right-hand section of figure 8.2). Without a supportive enabling environment, capable entrepreneurs, either from the region or from outside, will not enter the market or thrive if they do. This is a critical consideration when contemplating fiscal incentives for firms to relocate. Conversely, even in a pristine experimental environment, dynamism will be limited without capable entrepreneurs.

This complementarity immediately highlights the complexity of appraising LED programs. In theory, any line in figure 8.2 can be considered an individual intervention, in the same way as building a road—although the indirect effects are often the focus more than the direct effects. The benefits of streamlining firm registration requirements can be measured in terms of the value of days saved, but beyond that, policy makers generally hope that new firms and industries will result as indirect effects, with potentially positive valuation effects from knowledge spillovers (see box 8.1). Raising the skills of a worker improves productivity—in ways that are measurable by standard individual (Mincerian) wage regressions, but the attraction of higher-tech local firms and global value chains (GVCs) is the ultimate goal, as well as the well-documented externalities associated with that added value. Managerial extension programs have been evaluated and shown to improve the productivity of firms, but externalities are important, too. A sizable literature, particularly focused on the Asian miracles, traces how firms, regions, and nations learning to use technology is a key to industrialization.

What differs from the appraisal of a transport project is that for LED investments, the complementarities are center stage. Policy makers may actually build a road purely to lower the costs of transport. This tends to be less the case for LED investments, where the analysis is often presented in the context of systems. *Doing Business* indicators take this systemic approach, serving as a global diagnosis of the business climate. Entrepreneurial ecosystems and national innovation systems are treated precisely as *systems of interacting actors and institutions*. Efforts to attract links of a GVC will approach infrastructure, training, regulation, and fiscal incentives as a systemwide package.

Hence, the discussion that follows highlights indirect and valuation effects that may be important to consider. However, given the systemic nature of LED investments, the discussion is not as didactic in employing the appraisal approach as in the previous chapters. This said, throughout the chapter, the discussion examines issues to keep in mind in designing and appraising LED-type interventions. The sections that follow discuss the complementary conditions needed to promote entrepreneurship, including the enabling environment at the subnational level and the local entrepreneurial capabilities.

The Positive Externalities from Improvements in Human Capital

A large body of literature on cities and regions in developed countries documents two important facts. First, a higher proportion of university-educated workers (or residents) in an area is strongly associated with higher wages, after conditioning for individual characteristics. This last qualification is important. This is a not a composition effect: the skills structure of an area affects the wages of its residents over and beyond their own skills (for a review of this literature, see Combes and Gobillon [2015]). Second, the share of university-educated workers in an area is a strong predictor of its future population growth (for a review, see Duranton and Puga [2014]). In both cases, the effects appear relatively large. A 1 percentage point larger share of university-educated workers in an area is typically associated with 0.5 percentage point to 1 percentage point higher wages. This is about the same magnitude as the effect of an individual's university education on an individual's wage. The same 1 percentage point larger share in university-educated workers is also typically associated with about 0.5 percentage point higher population a decade later.

Human capital locally may also affect amenities—arguably, positively. In this case, part of the measured effect on population growth is caused by the increased attractiveness of areas with high human capital. At the same time, the productivity effects measured through wages are underestimated because workers are willing to accept lower wages to live in places with better amenities, all else equal.

Research by Shapiro (2006) suggests that the bulk of the human capital effects measured in US cities are productivity effects rather than amenity effects. More generally, there is some evidence that these two relationships may be causal. Obviously, it is difficult to ascertain the direction of causality given that the share of university-educated workers in an area is not entirely exogenous. For US cities, the literature has focused on land grant colleges that were mandated by the 1862 Morrill Act to be set up in central locations of many US states and subsequently turned into large public universities (Glaeser and Saiz 2004; Moretti 2004; Shapiro 2006; Maloney and Valencia Caicedo, forthcoming). This also led to the development of college towns that are today highly educated and whose locations are plausibly exogenous.

Sources: Duranton and Venables 2018; World Bank staff elaboration.

Strengthening the Enabling Environment for Entrepreneurship

The ability of an entrepreneur to generate returns from the entrepreneurial "bet" depends, in part, on how supportive the enabling business environment is and on the costs of experimentation. These factors are depicted in the center section of figure 8.2 and are explored next.

Considerations for Improving the Returns to Entrepreneurship

Clearly, any of the classic frictions in terms of trade distortions, corruption, excessive taxes, and the like will reduce the expected return of an entrepreneurial project.

These can vary hugely across regions and generally do so around the world, as within-country and international *Doing Business* measures have shown.

Enabling Business Environment

The variation in potential returns is largely determined by the local application of national regulations, distinct local guidelines, and differences in the applied technology and automation of the processes. Capital cities or agglomerations usually stand out as top performers across all areas, mainly because of adoption of advanced technologies (such as electronic platforms) and simplified implementation procedures (such as one-stop centers).
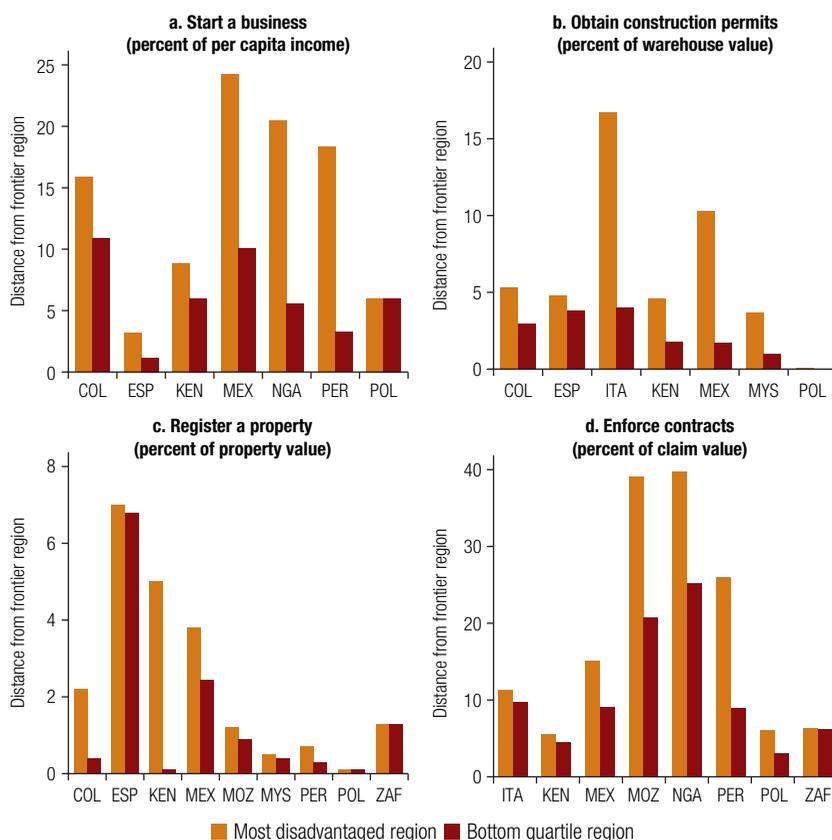
Furthermore, limited coordination between the relevant agencies in secondary locations hinders the efficiency of doing business procedures, making processes more burdensome for entrepreneurs. Figure 8.3 illustrates the huge spatial variation in the ease of starting a business, obtaining construction permits, registering a property, and enforcing a contract in several broadly representative countries. For example, the cost of starting a business could be 25 percent higher in the most disadvantaged (highest cost) region of Mexico than in the frontier (lowest cost) region, and 10 percent higher in the bottom quartile of regions. The corresponding figures in Nigeria are 20 percent and 5 percent. By comparison, these costs are more uniform in more advanced economies such as Spain and even Poland. Similar variance is found in the cost of obtaining construction permits, registering a firm (where differences across regions are substantial in Spain), or contract enforcement (where Nigeria and Mozambique show large differences from the frontier of up to 40 percent).

Availability of Complementary Factors and Markets

Skilled and Healthy Labor. The availability of complementary factors, and in particular skilled labor, also affects the return to investments, much as Lucas (1988) notes is the case internationally. Standardized measures such as the World Bank Human Capital Index suggest that variance within countries is very large (World Bank Group 2020). The overall Human Capital Indexes in Burkina Faso, Chad, Indonesia, Mali, Peru, and Romania range from 30 percent to 100 percent higher in the highest-performing regions than in the lowest. Underlying this aggregate, huge variance emerges in basic nutrition that leads to stunting and diminished cognitive function. Stunting varies by region in Niger from 18 percent to 43 percent of the population; in Angola, from 25 percent to 50 percent; and in Mali, from 24 percent to 41 percent. Stunting, along with the quality and coverage of schooling, combine to yield substantial variance in harmonized educational test scores, with the scores in the best regions often being 30 percent higher than those in the worst regions.

Human capital is broadly thought to have important productivity externalities, with emerging evidence confirming this for developing countries, China, India, and

FIGURE 8.3 **Subnational Differences in the Cost of Doing Business Vary Greatly**

a. Start a business
(percent of per capita income)

b. Obtain construction permits
(percent of warehouse value)

c. Register a property
(percent of property value)

d. Enforce contracts
(percent of claim value)

■ Most disadvantaged region   ■ Bottom quartile region

Source: World Bank staff elaboration based on World Bank subnational *Doing Business* indicators.

Note: The y-axis represents the differences in costs from the frontier (lowest-cost) region. These differences are measured with respect to the most disadvantaged (highest-cost) region or the region at the bottom quartile of the cost distribution (75th percentile of costs). Countries included in each panel are based on the latest available year data for Colombia (COL, 2017), Italy (ITA, 2020), Kenya (KEN, 2016), Malaysia (MYS, 2020), Mexico (MEX, 2016), Mozambique (MOZ, 2019), Nigeria (NGA, 2018), Peru (PER, 2020), Poland (POL, 2015), South Africa (ZAF, 2018), and Spain (ESP, 2015).

much of Latin America (Duranton 2016; Chauvin et al. 2017; Ferreyra 2017). The indirect effects are one channel through which this occurs. GVCs are unlikely to set up in regions where large shares of the students are malnourished and have educations that are low by often already low standards. The symmetric complementarities are likely large, as well. In a study entitled "Where Has All the Education Gone?" Pritchett (2001) postulates that increasing human capital in an environment that impedes firms from using it productively will have no impact on growth.

In fact, identifying the direction of causality is often difficult. The returns to investment in human capital are likely to be higher in prosperous and growing regions. Reinforcing the theme of the persistence of place running through the volume, box 8.2 shows that education decisions made 250 years ago by Jesuit missionaries affect

The Persistence of Education over Time: From Jesuit Education to Production of Genetically Engineered Soy in Brazil

Documenting the role of human capital in regional development and the mechanisms through which it works is difficult. Causality can run both ways. As economies grow, rising returns to education can induce more investment in education and drive the correlation between income or growth and education.

As a means of establishing causality, Valencia Caicedo (2019) looks at the impact on current income of educational interventions made 250 years ago by the Jesuit order that founded religious missions in 1609 among the Guaraní in modern-day Argentina, Brazil, and Paraguay. Before their expulsion in 1767, missionaries instructed indigenous inhabitants in reading, writing, and various crafts. Using archival records, as well as data at the individual and municipal level, Valencia Caicedo shows that in areas of former Jesuit presence—within the Guaraní area—educational attainment was higher and remains so (by 10 percent to 15 percent) 250 years later.

These educational differences have also translated into incomes that are 10 percent higher today. The enduring effects observed are consistent with transmission mechanisms of structural transformation, occupational specialization, and technology adoption in agriculture. Strikingly, figure B8.2.1 shows that the uptake of genetically engineered soy in Brazil today is highly correlated with distance to the nearest old mission sites. This suggests that educational tradition may be one source of persistence in spatial patterns.

FIGURE B8.2.1 **Uptake of Genetically Engineered Soy Is Highly Correlated with Distance to the Nearest Sites of Centuries-Old Jesuit Missions in Brazil**
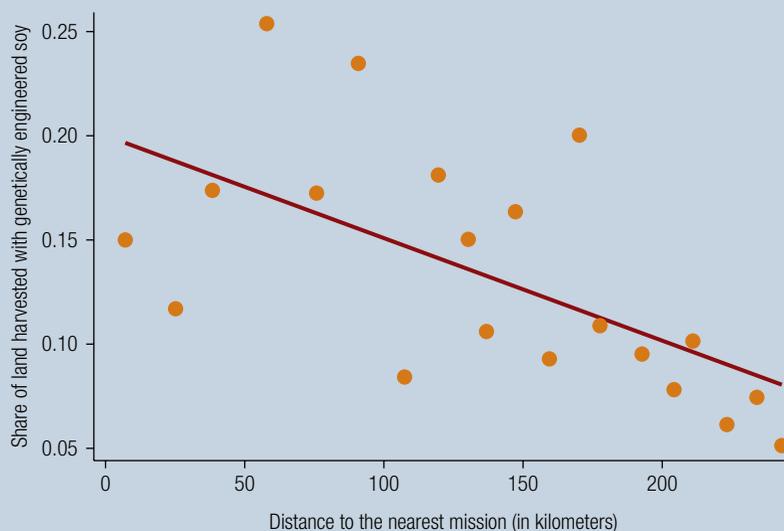
Source: Valencia Caicedo 2019.

Note: The figure presents an unconditional binned scatter plot of the share of land in farms planted with genetically engineered soy in Brazil in 2006 versus the distance (in kilometers) to the nearest Jesuit mission. The sample is restricted to the distance of 225 kilometers.

structural transformation and income today in Argentina, Brazil, and Paraguay. Similarly, regions in China whose applicants did well on the meritocratic *keju* exams during the imperial era have higher levels of schooling today (Chen, Kung, and Ma 2020).

Remedying human capital shortfalls is a challenge to national education and health ministries and is beyond the scope of this volume. What more often emerges in discussions of LED policies are training programs to ensure a skills mix that will complement other fiscal incentives or infrastructure to attract firms. Despite the popularity of business training among policy makers, evaluations offer a mixed picture. The early randomized experiments (Aakvik, Heckman, and Vytlacil 1999; Card, Kluve, and Weber 2010) could not detect statistically significant impacts of training on firms' profits or sales. However, in a review of recent findings, McKenzie (2020) suggests that training increases profits and sales on average by 5 percent to 10 percent—not insignificant given the short horizon, but small enough to escape detection by most experiments.

The impact almost certainly depends on the content, intensity, and modality of training programs (Grover and Imbruno 2020). As with policy, designing financing for training appropriately and harnessing market discipline help ensure that resources are aligned with intended beneficiaries, and encourage more transparent, efficient, and effective decision-making sensitive to firm needs and longer-term market trends.

Government support is often best allocated in a way that subsidizes fixed costs but leaves the prices that firms face (the marginal cost of provision) unchanged so as not to distort the market. For instance, to offset the negative externality that firms are unable to capture the full value of their training investments if workers can readily move to other jobs (worker mobility), the government funds basic infrastructure and equipment for the Penang Skills Development Centre in Malaysia, but private firms pay the individual student fees. Thus, if the private sector does not value the services provided, the center will not survive. Similarly, Pronatec, a technical and vocational training program in Brazil, explicitly incorporates input from firms in determining the location, scale, and skills content of training centers. It has much larger employment effects than programs that are not driven by demand because the informational input from firms allows the allocation of skills training to better match *future* growth in skill demand, O'Connell et al. (2017) show. Colombia's National Training Service (SENA) offers a contrasting model in which the government underwrites the full cost of government-designed training programs, but firms must choose government-provided services with their mandatory training budgets. Firms complain of poor alignment of training classes with corporate needs, and they have limited recourse to alternate providers.

A final area of under-researched policy relates to noncognitive skills such as grit, self-control, self-management, effective communication, and prosocial behavior that

can be central not only to economic outcomes but to life outcomes more broadly (World Bank 2018). A meta-review of firm surveys shows that while employers value all skill sets, increasingly they demand socioemotional skills more than basic cognitive or technical skills (Cunningham and Villasenor 2016). Developing these skills is a longer process, beginning with the family and cultivated across the educational trajectory.

Capabilities of Other Firms. Most of this volume suggests that in well-functioning cities, there are large benefits to being around other firms, including from supplier networks or due to Marshallian and Jacobian knowledge spillovers. This implies, again, that the subsidies needed to move firms to a relatively undeveloped area will be high. The amount of the subsidy is likely to depend on the type of firm. The low elasticities of physical total factor productivity with respect to the population found in several developing countries in chapter 2, in addition to a dearth of human capital that could actually share ideas, may also reflect the lack of sophistication of firms that a new firm might learn from. A city composed mostly of low-tech micro firms is unlikely to offer much knowledge to share.

Fiscal Incentives

Fiscal incentives seek to close the gap between the private rate of return to potential investors and the social rate of return, offsetting the costs associated with transport and logistics, weaker infrastructure, higher factor prices, lower levels of public services and amenities, and weaker business climates. Because they are sometimes included as LED investments and conceptually are an incentive to entrepreneurship, they are discussed in a separate section toward the end of this chapter.

Considerations for Reducing the Cost of Experimentation

Moving down the center section of figure 8.2, the next set of points emphasizes the factors that affect the cost of experimentation to find out whether an entrepreneurial project is viable: barriers to entry and weak institutions; markets for financing and diversifying risk; and the cost of failure.

Barriers to Entry and Weak Institutions

Lower costs of experimentation stimulate entry, yet myriad barriers, badly conceived institutions, and unproductive norms that discourage risk-taking can make that difficult. The literature has identified insecure property rights (Estrin, Korosteleva, and Mickiewicz 2009), onerous start-up procedures, and poorly designed regulations (Dreher and Gassebner 2013; Djankov 2009; Klapper, Laeven, and Rajan 2006) as all impeding firm entry and dynamism. Further, uncertain rules of the game, or lack of trust more generally, lessen the quality of entrepreneurship by making owners

unwilling to hire better professional managers, leading to a decline in firm productivity (Iacovone, Maloney, and Tsivanidis 2019). The large spatial variation within countries in the costs of firm entry is illustrated in panel a of figure 8.3.

Access to Finance and Risk Management

Clearly, the ability of entrepreneurs to finance projects across the various stages of starting up a venture is critical. Risk and returns are correlated. Poor countries tend to take on products and processes that are less risky (Krishna, Levchenko, and Maloney 2020) and regions are likely to show similar patterns. Financial markets are an important way of diversifying risk and limiting liability. For example, as discussed in chapter 4, having better access to finance substantially increased the impact of the Golden Quadrilateral highway program on young firms in India (Grover, Maloney, and O'Connell 2021).

Cost of Failed Experimentation and Exit

In theory, firms decide to exit the market when the present value of the expected future benefits from continuing to operate exceeds the exit costs plus the present value of the best outside option. Any barriers to the entry of higher-productivity firms that could challenge low-productivity incumbents will also lower the exit of these low-productivity firms.[2] What is often overlooked is that the cost of exiting an unproductive firm importantly determines the cost of experimentation. For instance, one explanation that multinationals in Penang, Malaysia, give for their inability to cultivate local suppliers is that Malaysian bankruptcy laws are harsh and societal reputational costs of failure are high. Similarly, highly distorted labor markets that restrict job creation and make reentering the salaried labor market difficult can lower the attractiveness of entrepreneurship. If reentry into a salaried job is difficult, unemployment becomes part of the downside risk. These factors combine to make the downside costs of entrepreneurship intimidating and thus limit the risk, overall. If, however, bankruptcy laws allow an entrepreneur to walk away from a failed endeavor with minimal debt and easily rejoin the salaried work force, entry will be encouraged.

Considerations for Improving Information and the Local Innovation System

The availability and quality of information play a central role for understanding the likely risk-return profile of a project, or even conceiving of it in the first place. Having knowledge about which technologies or possibilities exist and then what might be feasible is the necessary first step to catching up with the frontier.

The mechanisms through which this occurs are changing rapidly. The circulation of people has proved important. In the twentieth century, most significant industries in

Latin America were started by immigrants (Maloney and Zambrano forthcoming). More recently, the high-tech clusters in Cork, Limerick, and Galway, Ireland; Chennai, India; and Taiwan, China, were all started by bringing home the diaspora from places like Silicon Valley. The Japanese Meiji miracle was kick-started by Satsuma students who had gone abroad to acquire expertise (see Cirera and Maloney 2017).

Foreign direct investment and GVCs offer another way of bringing advanced knowledge to regions if actively engaged. A study of the drivers of technological transfer in Brazil, Senegal, and Vietnam (Cirera, Comin, and Cruz, forthcoming) finds that exposure to multinationals proved an important source of ideas, and the probability of being exposed to these ideas was higher in more technologically sophisticated regions (figure 8.4, panel a). Even with exposure to multinationals, as panel b of figure 8.4 indicates, whatever led to actual adoption of technologies also varies by region—suggesting, again, important missing complements in lagging regions.

Establishing universities has also been as an important source of knowledge transfer. The land grant college system in the United States played a huge role in the transfer of new agricultural and mechanical technologies, particularly in the South. However, Kantor and Whalley (2019) find that the impact of these colleges has fallen over

FIGURE 8.4 **Lagging Regions Are Less Likely to Be Exposed to Multinational Corporations, and Such Exposure Is Associated with Better Adoption of Technology in Both Lagging and Leading Regions**
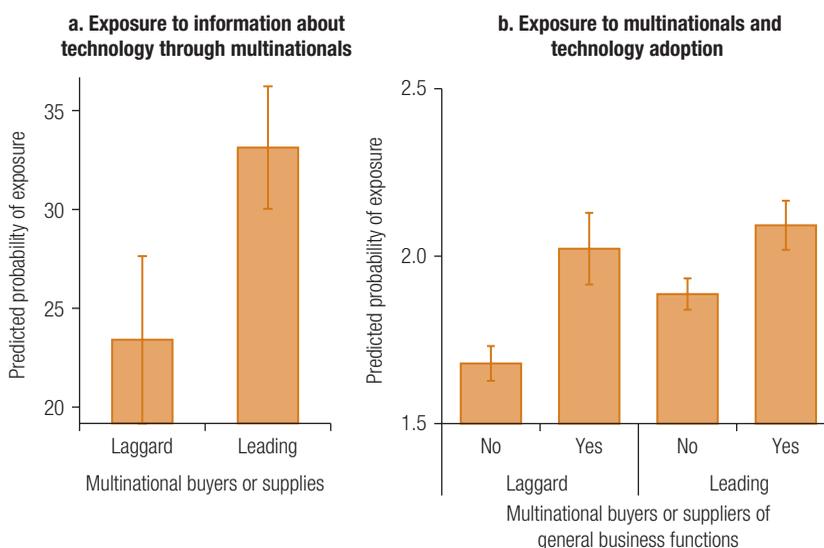
Source: Cirera, Comin, and Cruz, forthcoming.

Note: Leading regions are defined as those above the median average productivity. The technology adoption measure is regressed on the firm's exposure to multinationals controlling for sector, size, country, and regions. All estimates are weighted by sampling and country weights. The tick-marks around the point estimates represent the 95 percent confidence intervals. These estimates are based on a sample of firms from Brazil, Senegal, and Vietnam.

time—suggesting that proximity has become less important as telephones, automobiles, and other technologies have facilitated information flow.

However, as regions advance, universities, think tanks, and other knowledge-related institutions become more central to growth. When they function well, these institutions support the experimentation that facilitates the introduction of new products or processes to the region or, in some cases, innovations that are new to the world. Increasing the often-poor performance along these dimensions is often considered to be one dimension of regional support policies, although arguably with an inappropriate emphasis on high-level research and development (R&D) activity. There is a clear market failure in what is called the nonappropriability of knowledge: that is, the inability of firms to protect an innovation from imitation. Firms may underinvest in innovative activity because they are generally unable to capture the social benefits that arise from increasing the stock of knowledge either by invention or "discovering" existing ideas, and thus fostering further innovation.

In advanced regions, a credible patenting regime, tax write-offs, R&D subsidies, or matching grants can redress this gap between social and private benefit. However, in lagging regions, a suite of other complementary factors also must be in place, such as human and managerial capital, financial markets, or a welcoming enabling environment (see Cirera and Maloney 2017). A low level of innovation in a region may simply reflect the low returns to investment such as R&D resulting from an absence of these factors—and have nothing to do with classical innovation-related market failures (see Goñi and Maloney 2017). This suggests that simple policies to subsidize R&D in poorer regions with the idea of stimulating their rapid convergence through local innovation are likely to be pushing on a string. From a national growth perspective, scarce innovation resources ideally would be channeled to regions with the highest potential rate of return, which is unlikely to be a lagging region. Hence, the appropriate "innovation" support policy will depend highly on what type of region is contemplated. In lagging rural regions, the appropriate policy is likely to be basic agricultural R&D combined with a host of complementary policies in extension, human capital development, finance, and marketing, especially in the context of GVCs, as contemplated by Fuglie et al. (2019). Areas with a nascent manufacturing base may emphasize investing in managerial and technological upgrading programs, as contemplated by Baron, Kantor, and Whalley (2018) and Bartik (2020).

As an example of regional innovation policy, the European Union's Smart Specialization Strategy has been seen as a way of building capabilities and promoting competitiveness more equally across a disparate set of regions, for more spatially balanced economic development. EU experiences confirm the importance of horizontal fundamentals at the national level, but also the presence of these foundations and specific capabilities and advantages at the local level (such as agglomeration economies, connectivity to international markets, skills, access to quality services, and natural advantages).[3] As annex 8A suggests, the rationale for using public money for several

successful cases is that they are entrepreneurial explorations, experiments, and discoveries that undertake considerable risks and create public benefits through the learning that takes place, which markets will not adequately facilitate. The incentives provided by the government are neither aimed at supporting the whole sector nor one single firm but at the learning and the growth of a new activity. This focus achieves two things: it (indirectly) improves the general performance of the sector, while building capabilities to succeed in new fields. A similar approach informs Manizales Más, a regional program to strengthen the entrepreneurial and innovation system in Caldas, Colombia (see box 8.3). Again, the goal is not to support a particular product but to strengthen entrepreneurship and technological capability and to redress market failures, such as in finance.

BOX 8.3

Strengthening a Regional Entrepreneurial and Innovation System for a Midsize City: Scale Up Manizales (Manizales Más) in Colombia

In 2013, the municipality of Manizales in the department of Caldas in central Colombia embarked on a program named Scale Up Manizales (Manizales Más) to strengthen its entrepreneurial and innovation system, partnering with two US universities in the Boston area—Babson College and the Massachusetts Institute of Technology (MIT)—and local institutions. Manizales's status as a medium-size city (population 434,000) is an important part of the story because even in 2050, megacities will still number just a few dozen, while thousands of midsize cities (with 500,000 to 5 million people) will house 92 percent of the world's urban dwellers (Isenberg and Onyemah 2017). Similar programs—Scale Up Milwaukee (United States), Scale Up Rio (Brazil), and Scale Up Vaud (Switzerland)—have followed.

Though Manizales passed through a period when dynamism slowed, it has a solid enabling environment. Located at the north of an excellent highway linking the prosperous cities along the coffee axis (*Eje Cafetero*) and with decent connections abroad, it has a long tradition of coffee entrepreneurship; a solid industrial base anchored in Luker Agricola, a major agro-export processer whose foundation supported the program; and a large number of universities. It has among the highest *Doing Business* indicators in Colombia—so starting and growing businesses is relatively easy.

Scale Up Manizales tackled several dimensions to improve the local entrepreneurial and innovation system. It worked to strengthen university preparation of entrepreneurs; attempted to shift cultural norms to support entrepreneurship; developed an accelerator program to boost growth in existing businesses, including initiating exports; and offered business ecosystem training for local leaders in all levels of government, universities, and financial institutions. It also introduced Start Up Más to help students formulate business ideas; AddVenture-Más to accelerate start-ups with product concepts; and Scalerator programs to stimulate rapid growth within established ventures. It initiated a Finance Innovation Task Force to develop innovative debt-equity financial instruments, developed a platform with the MIT Venture Mentoring Service

(Box continues on the following page.)

Finally, annex 8B details how New York moved into second place in innovation eco-systems in the United States by focusing not only on the specifically high-tech aspects of the ecosystem, but also the more mundane but equally vital issues of maintaining amenities, low-enough rents, and continued skills accumulation.

Nonetheless, as Gruber and Johnson (2019) note, for nearly 50 years, much of America's growth has been concentrated in a handful of large and already prosperous coastal cities such as New York, widening the nation's economic and cultural divides. "Superstar cities" are also among the most expensive places to live in the United States, and many parts of the country feel left behind, especially in light of technological changes and job losses due to automation. To this end, Gruber and Johnson (2019) propose a suggestive exercise to measure the relative potential for various places to develop as technology hubs. Using data on 382 metropolitan statistical areas, they rank the 102 potential technology hubs in the United States by a broad set of necessary complements, including concentration of educated young people, inexpensive hous-ing, short commutes, low crime rates, and strong university science and engineering education. They believe that these 102 places could potentially be viable technological hubs.[4]

Promoting the Capabilities of Entrepreneurs

Beyond the operational environment, various factors are important for entrepreneurial experimentation. Figure 8.2 and the discussion that follows explore two main sets of factors.

Entrepreneurs' Personality Traits and Regional Culture

Fundamentally, regions need people who can experiment with potential industries, evaluate the likely risks and returns, and successfully implement projects. Certain psychological, personality, or cultural traits of individual entrepreneurs affect their abilities to carry out these tasks. Three broad entrepreneurial characteristics have been found in the business and economics literature to be especially important: risk attitude and patience; entrepreneurial orientation (drive or grit, including aggressiveness and proactivity, autonomy, and innovativeness); and the ability to identify opportunities (see Grover, Medvedev, and Olafsen [2018] for a more detailed exposition). Regional differences in the distribution of these characteristics are frequently asserted—the Gujaratis in India or the Paisas (Antioqueños) in Colombia, for example—and closely associated with the relative prosperity of the region. Because the roots of such differences are often not well understood, the policy levers are still being explored.[5]

Human Capital

In addition, entrepreneurs require an array of human capital, ranging from general analytic and communication skills to sophisticated entrepreneurial and technical training.

Basic Human Capital
To recognize a new technological opportunity and make it a business opportunity requires the ability to collect and interpret information; organize the project logistically; analyze the technical feasibility; form the long-term risk-return profile of the project; and compare it with other alternatives; as well as to navigate property rights, financial markets, and government regulation. Various other forms of human capital are explored next. In each case, a variety of market failures may impinge, reducing the socially optimal amount and depressing entrepreneurship.

Managerial Capabilities
Sophisticated entrepreneurship will typically require general analytical skills at a high level. An additional skill required to arbitrage technological opportunities is the ability to make decisions that are neither routine nor repetitive. This is as central to entrepreneurs' success as is their efficiency in acquiring information and in formulating and

acting upon their expectations (Schultz 1980). This capability is likely to involve higher-level generic skills. The role of education here is likely larger than the direct impact on worker productivity as usually measured. There are both larger private returns to entrepreneurial education (in the form of profits) and possibly also social returns through external spillovers (Gennaioli et al. 2013). The emerging literature on managerial quality (Bloom and Van Reenen 2007; Bloom et al. 2013; Maloney and Sarrias 2017; Grover and Karplus 2021) clearly stresses the importance of sound basic business strategies and human relations policies, but also the ability to view a longer horizon and to cope with crises. *The Innovation Paradox* (Ciera and Maloney 2017) and *High-Growth Firms* (Grover, Medvedev, and Olafsen 2018) emphasize the need for building managerial capabilities as a critical complement to innovation and hence a strategy for generating healthy firm dynamics.[6] Weak capabilities impede the take-up of ideas and the generation of new economic activity that could percolate in these regions.
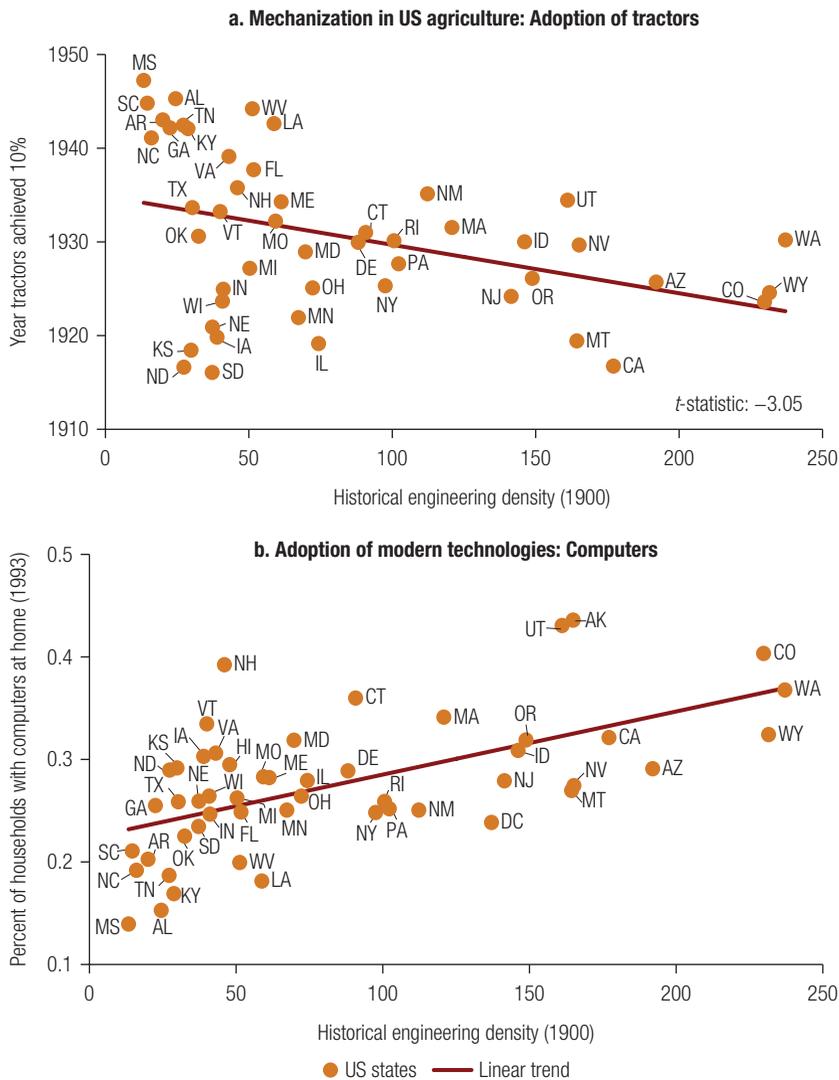
Recent studies find that management extension services tend to generate very high rates of return. Key channels through which skills improve firm performance include helping managers make better investment decisions—such as whether to invest in new plants or new machines—which made their production more efficient. Such decisions raised firm productivity 11 percent in one year in the Indian textile industry (see Bloom et al. 2013). However, two market failures appear to impede firms from taking up management extension services themselves. First, managers face an acute information asymmetry: They "don't know what they don't know." Managers believe themselves to be far better informed and skilled than they are and hence neither realize how they could improve nor the likely returns to doing so. Second, given that such programs can be expensive, uncertainty about the quality of the provider also makes firms hesitant. Perhaps for this reason heavily subsidized management support programs have proliferated throughout the advanced world that encourage firms to benchmark and then upgrade their practices. Such programs were central to the productivity policies in Japan and Singapore. Here again, the design of such programs is critical. Those guided by market discipline and provided privately are more likely to succeed. Recent studies suggest that programs where firms learn collectively from one another as well as consultants can be much less expensive and potentially more effective, suggesting important spillovers and hence valuation effects (Iacovone, Maloney, and McKenzie, forthcoming).

Technological Capabilities

Being able to recognize technological opportunities requires a minimum level of technological capability that general firm management skills may not offer. Again, history provides dramatic examples of the importance of such a capability. Technical capability (as proxied by the share of engineers) in the population in 1900 is associated with

income levels today and structural transformation and use of technology across subnational regions in the United States and Latin America (Maloney and Valencia Caicedo forthcoming). As examples, figure 8.5 shows for the United States that the year when 10 percent of farms had tractors in the middle of the twentieth century and the share of households with computers as of the mid-1990s are both closely related to the density of engineers in 1900.

FIGURE 8.5 **Technical Capabilities Are Associated with Technological Adoption**

a. Mechanization in US agriculture: Adoption of tractors

b. Adoption of modern technologies: Computers

● US states ── Linear trend

Source: Maloney and Valencia Caicedo forthcoming.

Note: Data pertain to the states in the United States. Panel a plots the year that tractor use reached 10 percent of farms against historical engineering density (a proxy for technical capabilities), measured as engineers per 100,000 male workers. Panel b plots the share of households with a computer in the house in 1993 against engineering density in 1900.

The United States, through the Morrill Land Grant program launched in 1862, created educational institutions that began teaching agricultural and mechanical expertise and continue to drive higher regional incomes today. Many eventually morphed into some of the most important engineering departments in the country, among them the Massachusetts Institute of Technology (MIT) and the University of California (UC) Berkeley. On returning to Colombia from UC Berkeley, engineer and future president Pedro Nel Ospina established the Escuela Nacional de Minas (National School of Mines), which provided managerial and technical expertise for one of the three most important centers of industrialization in Latin America. Brazil's steel industry was given new life by the establishment of the Escola de Engenharia do Exercito, established in 1930. These effects appear generalized. A study of 15,000 universities in about 1,500 regions across 78 countries finds that a 10 percent increase in a region's number of universities per capita is associated with 0.4 percent higher future GDP per capita in that region. Positive spillover effects flowed to geographically close regions. These effects were mediated through an increased supply of human capital and greater innovation (Valero and Van Reenen 2019).

Does this imply that building universities is sound regional development policy? Perhaps. With the advent of better communication technologies and online learning opportunities, proximity of universities, especially if not at the cutting edge, may become less critical. The impact of extension programs diminished in the United States with improved means of communication (Kantor and Whalley 2014). Instead of establishing a new research university, which will take years to rise in quality, Baron, Kantor, and Whalley (2018) propose that lagging communities should focus on transferring productivity-enhancing knowledge to their local employers from existing research universities near their regions. To help achieve this goal, they propose a regionally targeted expansion of the 1988 US Manufacturing Extension Partnership that would encompass a broader range of sectors. As with worker training, design of such programs is critical.

A similar conclusion might be drawn about science parks, which are thought to stimulate the regional growth of high-tech clusters. However, the impact on hosted firms varies greatly by location and results are highly uneven (for a review of the literature, see Albahari et al. [2017]). In perhaps the most systematic examination of the characteristics driving success, Yang and Lee (2021) exploit a panel of 145 Chinese science parks from 2007 to 2014, and apply Hsieh and Klenow's (2009) methodology to calculate the determinants of R&D efficiency (misallocation) across science parks. They find a decreasing trend for R&D efficiency across science parks, particularly since 2011, when China began to accelerate the establishment of new parks. The findings suggest considerable R&D misallocation caused by trying to cover all geographical areas. In general, science parks that are larger, are older, or have a higher quality of human capital experience lower R&D misallocation, and the involvement of a high-quality university seems critical. Most of the less R&D efficient science parks are newly

established or have been upgraded from provincial-level industrial parks. They are often located in cities without nationally renowned universities and research institutes, whereas the first science parks are located in big cities such as Beijing, Shanghai, and Nanjing.

Improving Fiscal Incentives

Fiscal incentives conceptually seek to close the gap between the private rate of return to potential investors and the social rate of return. They aim to offset the costs associated with transport and logistics, weaker infrastructure, higher factor prices, lower levels of public services and amenities, and weaker business climates. They may also be used as a coordinating mechanism, for instance, to motivate a first mover—an anchor firm to locate and catalyze a local cluster. A successful cluster will generate spillovers between firms, increasing agglomeration and productivity growth. These spillovers can work horizontally, with a large number of firms in the same sector building up thick labor markets and other agglomeration economies, as well as vertically, with co-location of input suppliers and the development of forward and backward linkages.

Fiscal Incentives to Attract Foreign Direct Investment and Global Value Chains

Attracting a value chain is a way of reducing the dimensionality of policy, as noted in chapter 7. For instance, the Israeli intervention in the Guajira region of Colombia in part reduces both the information and entrepreneurial quality issue, allowing the government to focus on other elements of the enabling environment that are critical for these firms (see box 5.3 in chapter 5). In the Mekong Delta in Vietnam, the rice value chain anchored by the An Giang Plant Protection Company reduces the risk and information barriers in new fertilizers and seeds and the final market, and provides financing, leading to rapid growth in farmer incomes. As stressed in *Harvesting Prosperity* (Fuglie et al. 2019), for rural areas, value chains—both local and global—can provide coordinating anchors and offer an important tool for reducing policy dimensionality. By virtue of being more advanced firms, they can remove some constraints, such as entrepreneurial ability, financing, or marketing. Hence, more focus can be placed on other needed elements, such as providing infrastructure and upgrading worker skills.

A critical attractor of value chains is the local contracting environment. As panel d in figure 8.3 shows, it can vary in credibility substantially across regions within countries. No firm wants to provide these services and then have suppliers sell their outputs to someone else at a higher price. Hence, the security of the contract over delivery and prices is fundamental.

But fiscal incentives of various types are also a tool to attract GVCs. There are some successes. Box 8.4 describes how the Hawassa Industrial Park in Ethiopia, working closely with the world's second-largest apparel company, Philips-Van Heusen, has

**Fiscal Incentives to Overcome First-Mover Coordination Problems:
The Case of Hawassa Industrial Park in Ethiopia**

An industrial park in Ethiopia illustrates how a government might overcome first-mover problems by attracting a catalytic large investor—in this case, Phillips-Van Heusen (PVH), the world's second-largest apparel company. The government worked closely with PVH to identify areas of mutual interest and delivered interventions to create an attractive environment for PVH in the new Hawassa Industrial Park (HIP). They included the following:

- Demonstrating government commitment by raising capital, building facilities fast, and delivering world-class factories with high environmental standards as agreed
- Delivering strong access to international markets (particularly important for the fashion industry), including the Everything but Arms (EBA) agreement for duty-free and quota-free market access to the European Union; the 10-year extension of the African Growth and Opportunity Act; streamlined customs procedures; extension of the new Djibouti–Addis Ababa rail line to Hawassa; and improving the Addis Ababa–Kenya highway on which Hawassa lies
- Exploiting abundant hydropower to undercut regional competitors in electricity price and reliability (electricity is a major cost in the garment industry)
- Complementing the large pool of local labor with employee selection and training programs run jointly by PVH, the government, and donors
- Offering tax holidays.

Thanks to PVH's investment, 18 foreign and 5 domestic supplier companies have already committed to follow it to HIP, and more are expected. HIP was inaugurated in July 2016 and is planned to create 60,000 direct jobs on $1 billion worth of export sales from the park.

Source: Adapted from Duranton and Venables 2018.

targeted improvements in transport, energy, and skills that may lead the firm to put down deep roots and develop linkages. Beyond other support in terms of infrastructure and worker training, tax holidays are also offered, although these were considered "icing on the cake" rather than key elements of the place-based investment decision (Duranton and Venables 2018).

In the United States, South Carolina's automotive cluster dates to 1992, when BMW chose the state for a $600 million assembly plant and received an incentive package worth $100 million, including nonfinancial incentives. The local airport runway was also extended, and a new employment training program was created. The objective was to create enablers that would ensure the success of BMW's first plant outside Germany and thereby attract an anchor industry that would further develop the nascent supply capacity of the region. The initiative is thought to have generated between 25,000 and 35,000 jobs in the area (McKinsey 2019).

Both examples point to a strategic use of resources to remove barriers to making the locales viable and to complement the effort with infrastructure and human capital investments. The highest payoffs from business-attraction efforts come from projects that are part of a holistic strategy targeting certain sectors or removing barriers to the emergence of certain sectors (McKinsey 2019). These sectors can then create agglomeration benefits that attract other companies in a supply chain that would benefit from sharing the space. Necessary complements include infrastructure improvements and targeted workforce development programs.

In general, however, there is little conclusive empirical evidence to suggest that fiscal incentives have succeeded in transforming the fortunes of lagging places (Neumark and Simpson 2015; Kline and Moretti 2014; Ehrlich and Overman 2020). Part of the problem is due to the persistence in the local economic geography highlighted throughout this volume. Direct grants have only limited influence on location decisions if they are not large enough to offset localization benefits in existing agglomerations (Devereux, Griffith, and Simpson 2007). Some of the problems are due to poor design without clear targeting. Studies such as Hanson (2009) and Neumark and Kolko (2010) find that tax incentives have little effect on employment in enterprise zones. However, when tax incentives are complemented by traditional supports for economic development (such as technical assistance, location or site analysis, special staffing, and marketing), the intervention can be more effective (Wilder and Rubin 1996; Neumark and Kolko 2010). In their review of the efficacy of place-based policies, Neumark and Simpson (2015) document that discretionary subsidies targeted to businesses in underperforming areas in European countries and location-based subsidies in the United States can spur investment, employment, and productivity spillovers. The discretionary nature of these subsidies—such as the federal New Markets Tax Credit program channeled through banks, as discussed in Freedman (2012)—may help explain their success because applications for subsidies pass through an initial scrutiny, and targeted outcomes can be monitored so that payment of the subsidy is contingent on job or investment targets being met. Nonetheless, correctly calibrating these mechanisms is very challenging. Governments must always be wary of the risks of simply subsidizing uncompetitive, unsustainable industries.

Brazil, for example, has attempted to attract "dynamic" industries to the North and Northeast regions by providing fiscal incentives, fiscal transfers, and direct investments in infrastructure and developed land on the order of $3 billion to $4 billion a year in "constitutional funds." Evaluations of aggregate outcomes, such as changes in GDP per capita, suggest limited impacts (Ferreira 2004). Carvalho, Lall, and Timmins (2006) find that the allocation of constitutional funds did induce the entry of manufacturing establishments into lagging regions, but that the effect was strongly conditioned on close proximity to firm headquarters: the firms were already important in the North. Further, these funds were dwarfed by industry subsidies that tended to concentrate in the advanced regions.

Between 1970 and 1980, the Mexican government offered firms a 50 percent to 100 percent reduction in import duties and income, sales, and capital gains taxes, as

well as accelerated depreciation and lower interest rates if they located outside the three largest urban agglomerations of the Mexico City Metropolitan Area, Guadalajara, and Monterrey. Reviews of the program show that the impact on decentralization was either insignificant or undesirable (World Bank Group 1977; Scott 1982). Taxes such as import duties on raw materials and capital goods were very low to begin with. Additional reductions had no effect on private location decisions and may thus have resulted in unnecessary losses of public revenues.

Overall, participation in GVCs is strongly and significantly associated with increases in urban concentration, despite the success of a handful of second-tier cities such as Suzhou in China and Bintan Batam in Indonesia. Evidence from the Organisation for Economic Co-operation and Development Trade in Value Added database suggests that economic upgrading and a higher knowledge intensity of participation in GVCs leads to a higher concentration of urban agglomeration (figure 8.6) (Grover and Lall 2021).

This finding is also consistent with the specific evidence from developing countries Mexico and Vietnam, where economic integration across national borders is associated with greater spatial concentration within national borders (World Bank 2020) (map 8.1). The reason is clear: while GVCs can resolve numerous market failures, they

FIGURE 8.6 **Participation in Knowledge-Intensive Global Value Chains Is Associated with Higher Spatial Concentration**

Re-imported domestic value added (DVA) in research and design services
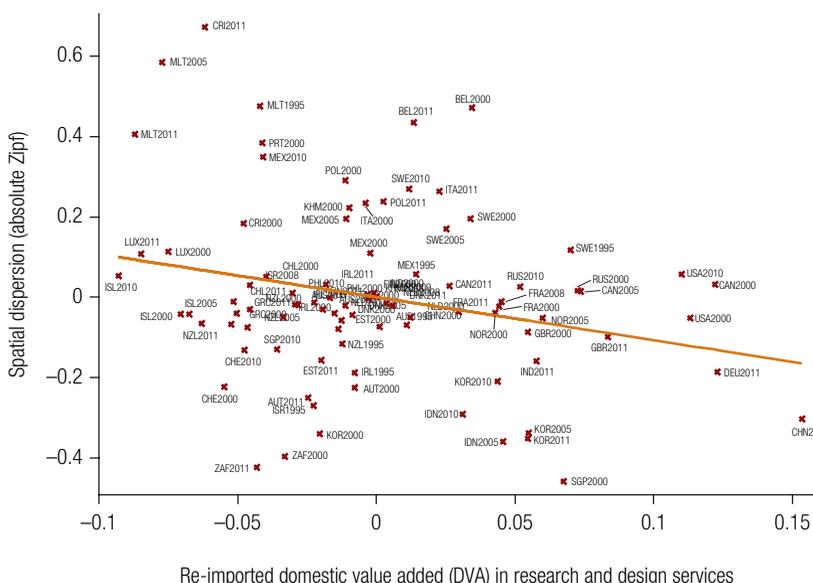
Source: Grover and Lall 2021.

Note: Coefficient = −1.0724309; (robust) standard error = 0.44720585; *t* = −2.4. The figure shows a scatter plot of regressions of an absolute measure of spatial dispersion (Zipf coefficient) on an index of participation in global value chains (GVCs), Re-imported DVA. The data for estimating spatial dispersion in population through the Zipf coefficient come from http://www.citypopulation.de/. The measure of participation in GVCs is sourced from the 2015 edition of the Trade in Value Added database compiled by the Organisation for Economic Co-operation and Development (OECD), which covers 61 countries (33 OECD economies and 28 non-OECD countries) for the years 1995, 2000, 2005, and 2008–11.

MAP 8.1   Global Value Chains Are Spatially Concentrated in Mexico and Vietnam

a. Mexico, 2015

b. Vietnam, 2014

% of firms that
participate in GVCs,
by state

- 3.7 to 5.5%
- 2.9 to 3.7%
- 1.4 to 2.9%
- 0.7 to 1.4%

Log of employment
of GVC firms per
capita, by province

- −3.3 to −1.2%
- −5.3 to −3.3%
- −7.3 to −5.3%
- −9.3 to −7.3%
- −11.3 to −9.3%
- No data
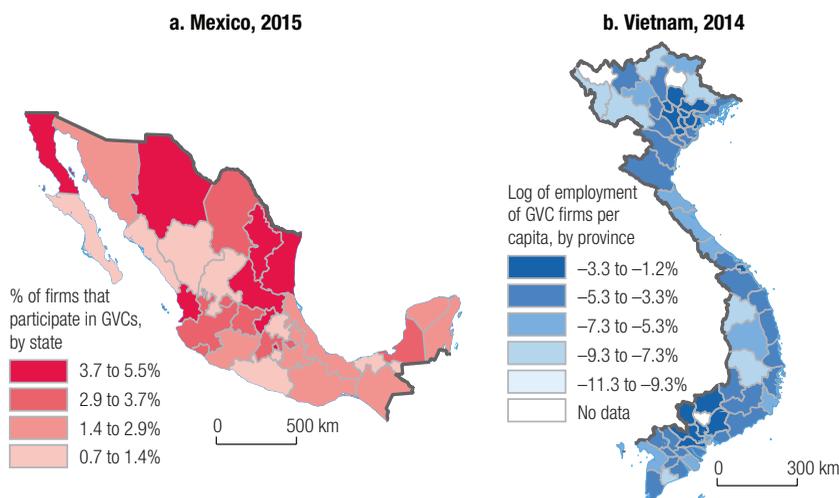
Source: World Bank 2020.
Note: GVCs = global value chains.

are attracted to areas with better connectivity and lower transport costs. For instance, lower transport costs, including digital information and communication technology, has facilitated the emergence of GVCs, driving the growth of megacities such as Shenzhen and other Chinese coastal cities, while the inland western provinces remain less plugged in. In light of the findings of sterile agglomeration in chapter 2, this pattern is not necessarily bad: GVCs can spur the structural transformation missing in the agglomeration process of many developing countries.

Trade-offs between Fiscal Incentives and Other Interventions

Fiscal incentives also have trade-offs with other desirable interventions. Thus, their cost-benefit ratio needs to be compared to alternative initiatives. To this end, a detailed analysis of such costs and benefits by Bartik (2018) suggests that a 10 percent cut in business taxes may create jobs at a cost of $18,000 per job per year. However, because such cuts need to be financed by either other tax rises or budget cuts, the lost employment resulting drives that cost to $38,000. If they are financed by cuts to educational expenditure, then the costs rise to $230,000. If financed by tax increases that fall mostly on the top decile of the population, then costs fall substantially. However, if financed by generalized taxes, then the lost employment arising from the reduced multiplier effect of spending is $24,000. Targeting incentives through subsidies to job creation tax credits or property tax abatements lowers costs dramatically to between $10,000 and $20,000, largely because they are no longer subsidizing firms that are already there and

can be targeted at export-oriented firms. Given that jobs created in export-oriented firms have a multiplier of roughly two or more in the United States, Bartik estimates that the cost per job per year is more on the order of $8,000.

Bartik's exercise is useful not only in thinking through the design of fiscal incentives, but also for reflecting on their value relative to other possible interventions. In the end, Bartik argues that fiscal incentives are less cost-effective than, for instance, the underwriting of business-targeted services that raise the productivity of firms (such as customized job-training programs and manufacturing extension programs) or human capital development services targeted at households (such as high-quality preschool education, improvements in the quality of K–12 education, and demand-oriented job training programs). For areas that already have a manufacturing base, Bartik's estimates suggest that customized business services cost roughly one-seventh to one-third as much per job per year created relative to business tax incentives—again, depending on how they are financed. This is consistent with the evidence from Hawassa that these other complements were more important. While Moretti (2010) shows that attracting higher-tech and higher-wage industries has higher job multipliers—implying that targeting those types of firms might lower the cost per job further—high-tech firms go where they can find skilled workers, ample amenities, established universities, and excellent logistics, as in Boston and Detroit (see chapter 5). Financial incentives become secondary.

An important issue pertains to horizontal coordination across jurisdictions to avoid "beggar-thy-neighbor" tax competition, where footloose firms drive down the margin of social benefits by shopping for the best incentive package from each subnational government. Spatial reallocation of industries can drive productivity improvements if the movement is in response to the underlying distortions. In the early twentieth century, the movement of the textile industry from New England to the American South indubitably helped the latter develop, but it hollowed out employment in the former region—one of the factors that weakened Boston's economy. To the degree that this was driven by a desire to escape collective bargaining agreements in the North, or simply that the "selling of the South" reduced information asymmetries that allowed substantially better allocation of capital and knowledge, then arguably this may have improved welfare at the national level.

Although not the case in New England, such reallocations can be done in a deliberate and equitable fashion. In Sweden, management and unions agreed to outsource lower-skill jobs while displaced Swedish workers were retrained for emerging higher-productivity industries (Hjalmarsson 1991). The gains are far less clear when similar cities compete by offering subsidies to attract high-tech firms from other locales.[7] Einiö and Overman (2020) find substantial displacement effects stemming from the 2006 UK Local Enterprise Growth Initiative, which sought to increase entrepreneurial activity in deprived areas, support growth, reduce exit rates among local businesses, and attract investment. This can result in a zero-sum game where each jurisdiction gives up

revenues to keep its economic growth from declining. Further, if fiscal competition displaces activities and resources from their most productive uses to less productive ones, these will be negative-sum efforts. Subnational jurisdictions are likely to reduce their ability to finance local public goods and services, while not increasing their tax base.

A classic case of such fiscal competition is in Brazil, where states have historically been active in promoting economic development. One of the most controversial cases of unfettered fiscal wars among states is the Ford Motors plant in Bahia, originally planned to be built in Rio Grande do Sul. The package of incentives offered by Rio Grande do Sul included a R$210 million Brazilian reais ($R) (about US$200 million) loan from the state to Ford at extremely favorable conditions (6 percent interest, 15-year repayment period), additional state expenditures of R$234 million on infrastructure and public works, an additional assured loan from the national economic development agency (BNDES) of R$500 million, and exemption from local taxes for 10 years. In 1997, the state government tried to renegotiate the deal, claiming that the conditions were too generous for Ford and too expensive for the state. When Ford did not accept the new conditions proposed by the state, it moved to Bahia, which offered a package similar to the original one (Alves 2001). In the end, traditional subsidies used to attract (usually foreign) investors to regions lagging or suffering from trade adjustment have largely been ineffective, both because the level of necessary subsidy would be prohibitive and because of the beggar-thy-neighbor competition with competing regions.

Given all the factors at work in local economic development and their interactions, analysis of LED initiatives can prove difficult. Box 8.5 describes how a World Bank–financed project in Mozambique incorporated several features of the Duranton and Venables (2018, 2020) appraisal framework.

BOX 8.5

Applying the Duranton-Venables Framework to Design a Project to Support Businesses in Mozambique

The Economic Linkages for Diversification project in Mozambique aims to strengthen the performance of micro, small, and medium enterprises by developing both upstream and consumption linkages with extractive and large firms in the lagging regions of the country—the provinces of Cabo Delgado, Nampula, and Tete—while addressing and mitigating some of the drivers of fragility and conflict. The project is a good-practice example that includes several features of the Duranton and Venables (2018, 2020) framework.

(Box continues on the following page.)

Applying the Duranton-Venables Framework to Design a Project to Support Businesses in Mozambique *(continued)*

The project develops a clear narrative of the intervention based on an *assessment of market failures* through a firm-level survey of both formal and informal firms, and the country private sector diagnosis. It finds that information asymmetry, moral hazard, coordination failures, externalities, and spillovers inhibit matches between buyers and suppliers. For instance, local suppliers are unable to meet the quality standards expected by globally linked large buyer firms. Buyer-supplier relationships can be established with support programs such as providing access to more sophisticated customers (including large firms or multinationals) and encouraging buyer firms to facilitate exchange with local suppliers and public procurement programs.

The project also fully describes the *direct effects* expected in the context of the project. In the short term, the interventions to improve firm capabilities are expected to help firms strengthen their capacity, adopt higher quality standards, and attain better access to finance. In the long term, the trained firms are expected to have higher sales and employment and greater economic diversification. In addition, the project also targets *indirect effects* (but does not quantify or value these changes) to justify the intervention. For example, the project expects that the following effects will occur:

- Local businesses and entrepreneurs will benefit from spillover effects of improved economic activity and increased linkages.
- Sectoral clusters, business associations (including women's associations), and private sector associations will benefit from the increased knowledge and economic activity.
- Technicians and professionals across lagging regions will benefit from increased capacity of firms.
- Business development service providers, professional organizations, and civil society organizations will benefit from increased capacity and opportunities for delivering on their mandates.

To ensure that the targeted region has *complementary conditions* for fostering firm growth, the project also includes interventions supporting localized infrastructure investments and digital solutions for private sector development. The benefits of these interventions will include better access to markets for firms, increased employment, reduced transaction costs, and increased inclusion of communities and the youth. Furthermore, the project is implemented in coordination with several other World Bank projects that focus on issues relating to governance and fiscal linkages, workers' skills, spatial development, and so on.

Finally, *displacement effects* of the project are also considered. This is why the project takes a nationwide approach rather than focusing narrowly on the lagging region. That is, prioritization of lagging regions provides some edge to local firms, but it does not limit participation to those located within the region. Allowing firms from other regions to participate may displace activity from other parts of Mozambique; however, it would also let nationally competitive firms expand in lagging regions and create knowledge spillovers for local firms.

Source: World Bank staff synthesis of Economic Linkages for Diversification project in Mozambique.

Conclusion

This chapter focuses on "soft infrastructure"—the skills and entrepreneurial capital of the people and the environment they operate in. These are the necessary complements to the programs of infrastructure, city renewal, or special economic zones covered in previous chapters. These elements are often omitted from discussions of regional development policies, but without them, roads or other hard infrastructure may be built, and development may not follow. Though more diverse and by their nature, harder to quantify and less straightforward to build, they nonetheless can be located within the appraisal framework used throughout the volume and should be part of the appraisal of any regional initiative.

Annex 8A. Clear Rationales for Certain Regional Development Projects in Europe

Several interventions undertaken by the European Union through its Smart Specialization Strategy (S3) illustrate the value of developing and pursuing clear rationales for focusing on new economic activities and redressing market failures.

1. *Basque country.* S3 in the Basque country supported firms in the plastics industry to explore diversification from the car industry to biomedical applications. The plastics industry as such was not prioritized, but rather the activity of exploring diversification opportunities toward biomedical applications.

2. *Finland.* S3 supported the development of nanotechnology to improve the operational efficiency of the pulp and paper industry, including in the less developed eastern regions. The priority is not the pulp and paper sector as a whole, but the activity of developing nanotech applications for the pulp and paper industry.

3. *Norte, Portugal.* The benefits of pursuing broad innovation and skills development can be seen in the case of the textile and footwear industry in the Norte region of Portugal. In the 1980s, the region was the most industrialized in Portugal, specializing in labor-intensive, low–value added, traditional industries in the textile and clothing sector. However, competition from low-cost countries eroded these advantages, reduced GDP, and led many entrepreneurs to divert investments to nontradable sectors, which were profitable and secure. At that time, the Norte region had a severe lack of basic infrastructure and the lowest levels of schooling in the country, high drop-out levels, limited professional training, the lowest rates of secondary and university attendance, and low investment in R&D. Its transformation started with investments in the R&D system, which were channeled to the three public universities, funding new buildings, laboratories, scientific equipment, and industrial parks. Regional gross expenditure on R&D rose from 0.23 percent to 1.51 percent of GDP

from 2000 to 2010. Investments did not select any particular activity, but were more broad-based across sectors, including telecom, information and communication technology, and health. By 2013, the region ranked third among the seven Portuguese regions in the Regional Competitiveness Index. Significant improvements have been made in infrastructure, and the younger workforce is more qualified, creative, and flexible. The region is home to several universities and internationally reputed research institutes.

Source: World Bank staff synthesis based on European Regional Development Fund project good practices.

Annex 8B. New York's Innovation Ecosystem to Support Start-Ups

Over the past 15 years, New York City has developed a thriving digital technology entrepreneurship ecosystem. Today it is the second largest of its kind in the United States, after Silicon Valley, with $4.5 billion in venture capital investments in start-ups as of 2014. The ecosystem has created more than 2,200 tech companies, directly employing more than 50,000 people (about 1 percent of the city's workforce) and generating more than $18.1 billion in successful start-up exits.

The rapid growth of tech start-ups in New York has changed the city's economics and competitiveness in three main ways. First, the tech start-up sector has generated new business models in several subsectors, most related to local New York industries and addressing challenges in the city, urban living, and local needs. Second, the tech start-ups have generated new direct employment and crowded in larger technology companies, such as Google, which has opened a large R&D lab in New York. Third, the tech start-ups have regenerated neighborhoods in New York. As start-ups have become more successful and attracted more mature industries, rents and economic development have increased in areas such as the Meatpacking District in Manhattan and Dumbo and the Navy Yard in Brooklyn. The tech sector has become the largest office leasing sector in the city.

The New York City government has been heavily involved in the development of the city's successful innovation ecosystem, deliberately taking an ecosystem approach to address four main areas of weakness it had identified in the city's tech innovation: lack of technology-specialized talent; insufficient sources of seed capital for start-ups; lack of physical space for entrepreneurs; and a limited and uncoordinated community of tech-led innovators and entrepreneurs. In addressing all these areas, the government's philosophy has been to act as an enabler and to build the market.

Following the success of the past decade, the New York City government today maintains a strong policy focus on keeping affordable space available, maintaining urban amenities, ensuring that the different needs of scale-up enterprises (not just

start-ups) are met, and continuing to grow the skills base. The costs for start-ups must be kept low (particularly in real estate), and space must be available—a constant challenge in built-up urban areas.

Source: Mulas and Gastelu-Iturri 2016.

Notes

1. Bartik (2003) defines LED policies more narrowly as "economic development programs" that (1) provide customized assistance targeted at individual businesses with greater economic development benefits; and (2) strategic initiatives (such as general tax, spending, and regulatory policies) to promote growth among local businesses.

2. Dunne et al. (2013) find that entry costs faced by potential entrants, fixed costs faced by incumbent producers, and the toughness of short-term price competition are all important determinants of long-term benefits and exit. Also, as the number of firms in the market increases, the value of continuing in the market declines and the probability of exit rises.

3. For example, Loewen and Schulz (2019) compare the impact of EU structural funds during the period 2007–13 and find that, despite some positive effects on convergence, the policy did not start a sustained virtuous cycle of improved innovation capacity in Eastern European countries to close the gap with more advanced neighbors in Western Europe, and several countries have experienced growing inequality between leading and lagging regions.

4. The Jump-Starting America website (https://www.jump-startingamerica.com/) also has an interactive feature that allows users to see how changes in criteria change the attractiveness of various places for technology development. Such an approach is intended to illustrate opportunity that already exists and to help start a more detailed conversation on whether, where, and how to jump-start the creation of more good jobs.

5. These characteristics have been probed by the recent psychological literature and are explored in greater depth in *Productivity Revisited*, along with recent policies claiming success in inculcating them (Cusolito and Maloney 2018).

6. Maloney and Sarrias (2017) further show that raising these capabilities on average is not simply a question of eliminating weak firms. In many cases, it is the best firms that lag the frontier more than the weakest. Not only are spatial differences between the capital city and the lagging region large in Croatia, for instance, but management capabilities also weaken with firm age, Grover, Iacovone, and Chakraborty (2019) find. This suggests the lack of pro-competitive forces, especially in lagging regions.

7. For a review of the literature, see Einiö and Overman (2020).

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9. Conclusion

Concluding Remarks

Myriad factors support a successful place. Cortés's wonder upon entering Tenochtitlán extended from the superiority of the roads and canals that connected it, to the skills required to build the magnificent temples and plazas, to the extensive markets supplying every need, to the system of magistrates who resolved commercial disputes and the auditors who verified weights and measures. It was a clear explication not only of why the city endured, but also of how different elements worked together to form a great and productive place. Not only did the hard infrastructure such as roads and the built environment matter, but the softer elements—liquid markets, ample skills, and well-functioning institutions—were essential, as well. Such successful urban concentrations tend to persist, importantly anchoring the distribution of economic activity across countries over long periods of time. Economic geography is lumpy and persistent, and efficiently so.

However, inequalities also tend to persist, with some lagging regions never catching up. The persistence of the spatial landscape—whether over centuries, as in the case of the Aztec capital, or thousands of years, in the case of Japan, Europe, and the Middle East and North Africa—moderates ambitions of radically reshaping it. Other regions and localities, by contrast, have had their underlying fundamentals undermined by shocks such as automation, trade, or climate change, leading to contraction, joblessness and its correlates, and political instability. The demands to "do something" about these regions features importantly on policy agendas.

Altering economic geography means first understanding its drivers. This volume explores the three main drivers—agglomeration economies, migration, and distance—and discusses how the ways in which they interact have evolved over the past century in developing countries. As for agglomeration—aside from examples like ancient Tenochtitlán and modern-day Shenzhen, China—many cites in developing countries appear to be less productively concentrated than merely crowded, accruing all the negative aspects of urbanization in terms of crime, congestion, and pollution, without the productivity gains that traditionally have pulled along national development. The original analysis done for this volume shows that, in fact, the productivity gains from agglomeration in many developing countries are effectively zero, while congestion costs are rising steeply. This is partly a result of premature urbanization: that is,

urbanization without structural transformation, the stagnation of rural productivity, and deficient service provision to rural areas. This suggests not only a robust urban reform agenda, but also an economywide productivity agenda, including the agricultural sector, as well as a review of service delivery.

Migration is potentially the great equalizer, allowing workers and families to leave lagging regions for more prosperous areas. Here, too, this volume finds that there is less mobility than has historically been the case, and that means that the equilibrating reaction to negative shocks is weak, leaving populations stranded in areas with no jobs and arguably little future. However, even if migration were very fluid, the finding that moving people into "sterile" agglomerations leads less to increasingly productive density than just overcrowding complicates the message for lagging regions to "invest in people, not places." This problem makes us look harder at possibilities such as broadly stimulating agricultural productivity and enhancing human capital, but also highlights the point that more generally, the long-term amelioration of poverty in lagging regions requires advancing the overall national agenda of structural change and productivity growth. Only then will there truly be more productive places for people to move to.

Finally, how distance affects the location of growth poles is radically changing. Previously, high costs of transport might lead to a relatively even dispersion of growing cities serving their local area. Globalization and the dramatic fall in transport costs has reduced the need for local cities and growth is increasingly concentrated in a few megacities, primarily on the coast serving the international market.

Each of these changes presents challenges to policy makers seeking to extend well-being to the least prosperous areas of their territory. To this end, policy makers in developing countries are increasingly attracted to place-based policies that claim to promote economic development in particular geographical areas. Such policies often fail to achieve their desired outcomes, especially when they are not shaped by a thorough understanding and application of current economic knowledge. And because they are often expensive, failure can have severe fiscal consequences—including the opportunity costs that divert scarce money, time, and energy from better policies. Extensive empirical analysis and informed theory presented in this book support a powerful conclusion: *spatial transformations can be effective in tandem with economic transformation—but without it, they can achieve little.*

This volume provides a *heuristic framework* to inform policy makers' initial assessments of place-based policy proposals—enabling them to clarify more precisely the implications of various options and alternatives, to think critically about policy design priorities, and to navigate related challenges. The framework can help policy makers steer away from truly nonviable proposals. It can also help them identify the complementary packages that are needed to make potentially viable policies work.

The framework can be summarized as a sequence of four steps. Each step is broken down further within the more detailed and technical presentation provided in chapter 6, "A Framework for Appraising Place-Based Policies." These four basic steps are as follows:

1. *Prepare a clear explanation of the key challenges, grounded in economic geography and in the facts about productivity, mobility, and connectivity*. These are the fundamentals that drive the potential a place might have for agglomeration economies, the reasons that limit people from improving their welfare, and the constraints on economic development. The underlying viability of a region—whether its natural fundamentals, including distance from major cities, or the extant built and institutional environment, ranging from housing stock to universities to industrial clusters—affects the returns to spatial investments and, fundamentally, the likely success of any initiative. Another way of saying that a region is fundamentally unviable is that no package of place-based policies will yield a rate of return competitive with other policy priorities. Hence, whether a place has a latent source of comparative advantage waiting to be unlocked, is reeling from a bad trade or technological shock but could recover, or is in fact nonviable is what a sound appraisal must ascertain. This task is challenging, but the world is littered with badly placed special economic zones and inert lagging regions absorbing resources that could have been better directed elsewhere.

2. *Pick instruments to meet the challenges.* This choice should be supported with clear distinctions between direct and indirect effects, with quantitative projections (as far as is possible), and by a thorough analysis of needed complementary factors. Across the volume, the chapters attempt to provide systematic guidance to answer the question of whether the best solution is a place-based intervention or alternative policies such as facilitating outmigration from a region with medium-term income transfers and provision of services to help families find better prospects elsewhere. Policy makers need to ensure that alternatives to spatially targeted policies are considered on an equal footing. It should still be borne in mind that *some seemingly spatially blind policies addressing other social ends, such as income taxation, minimum wages, or carbon taxes, can generate spatially biased distortions.* The analytics in this volume can help policy makers assess such policies, as well. A related question is what type of place-based policy might be appropriate: building a road, organizing an export processing zone or transport corridor, or engaging in a multidimensional "big push" program. Policy makers should ensure that spatial targeting is supported by economically well-founded, quantitative projections of positive outcomes for the people it seeks to benefit, and a realistic assessment of negative externalities, opportunity costs, and trade-offs.

3. *Ensure that any spatially targeted policy package includes all needed complementary factors*—including nonspatial factors as well as any that are spatially or locally

determined—*and that its implementation is supported by coordination among all critical actors*. Some complements may already be present. Others will need to be developed. If they cannot be, place-based policies are sure to fall short of their envisioned outcomes. In many cases, interventions will need to be complemented by investments in spatial "software" (such as worker skills, access to finance, entrepreneurial abilities, trade facilitation) to improve the skills and entrepreneurial capital of people and firms and the environment in which they operate.

4. *Assess the feasibility of implementing the place-based policy using a lens of government capabilities.* No place-based policy can deliver its desired impacts unless governments have the *capabilities* to identify market failures and design a policy package to redress them, as well as to implement a multidimensional package that may span various ministries and levels of government. The dilemma is that developing countries face more missing markets, distortions, and failures, yet possess more limited capabilities to redress them all. This implies that regions that might be viable with a carefully crafted multipronged program in a place like Switzerland may not be viable in places with less government capability.

The volume highlights the necessity of undertaking as comprehensive, objective, and well-grounded analysis as possible to determine the likely returns to place-based intervention—tempered by a caution that the analytical tools to do this are rudimentary. All the elements discussed here are included in the assessment framework used throughout the volume to enrich and discipline assessment of place-based policies. However, the examples offered also show how very difficult it can be to confidently identify the market failures, distortions, or missing factors, and then assess their importance as confounding factors to a program, and further estimate the hoped-for indirect and valuation effects. Despite these difficulties, the examples also demonstrate that the framework has value—if only to highlight the elements policy makers need to keep in mind as they choose among place-based policies, and the relative importance of those elements.

In the end, the choices policy makers face when addressing lagging regions, or places traumatized by technology, trade, climate, or other shocks, can be hard, both analytically and politically. Some places will need one or two interventions to kick-start them or get them back on their feet. It is the ones where this is not the case that pose the greatest challenges. As has been stressed elsewhere and is reiterated here, *equity per se is not a sufficient motivation for spatial policies.* Over the short to medium term, fiscal transfers and service provision can help reduce the welfare gap between leading and lagging regions. Over the longer term, moving people out of unviable regions—investing in people instead of places, as suggested by the 2009 *World Development Report* (World Bank 2009)—may be the best course because place-based policies in certain lagging areas are being used to serve a fundamentally person-based motive:

supporting poor households. Addressing this goal would be more efficiently achieved by making the tax system more progressive or strengthening means-tested transfer programs. Politically, such conclusions may not be palatable. The hope, however, is that the analysis and framework offered in this volume of the World Bank's productivity project will help inform and discipline the decisions.

Reference

World Bank. 2009. *World Development Report 2009: Reshaping Economic Geography*. Washington, DC: World Bank.

Place matters for productivity and prosperity. Myriad factors support a successful place, including not only the hard infrastructure such as roads, but also the softer elements such as worker skills, entrepreneurial ability, and well-functioning institutions. History suggests that prosperous places tend to persist, while "left-behind" regions—or those hurt by climatic, technological, or commercial shocks—struggle to catch up. This division gives rise to demands to "do something" about the subsequent spatial inequality. Such pressures often result in costly spatially targeted policies with disappointing outcomes because of a lack of analysis of the underlying barriers to growth and structural transformation and a fair appraisal of the possibility of overcoming them.

The latest volume of the World Bank Productivity Project series, *Place, Productivity, and Prosperity: Revisiting Spatially Targeted Policies for Regional Development* makes three broad contributions. First, it provides new analytical and empirical insights into the three drivers of economic geography—agglomeration economies, migration, and distance—and the way in which these drivers interact. Second, it argues that these forces are playing out differently in developing countries than they have in advanced economies: urbanization is not accompanied by structural transformation, leaving cities crowded and accruing all the negative aspects of urbanization without being concentrated productively. Long-term amelioration of poverty in lagging regions requires advancing the overall national agenda of structural change and productivity growth. Third, it provides a heuristic framework with which to inform policy makers' assessments of place-based policy proposals, helping them identify the regions where policy is likely to have an impact and those that would remain nonviable. The framework enables governments to clarify the implications of various policy options; to think critically about design priorities, including necessary complementary policies; and to navigate the implementation challenges.

"This is an extremely welcome book. Three experts lay out the principles behind spatially targeted policy and the experience of countries using such policies. A must-read for anyone interested in spatial inequality and policy to address it."

Anthony J. Venables
Professor of Economics, University of Manchester, and Research Director, The Productivity Institute

"Delivering better livelihoods for all requires tapping into the economic potential of every place, including those losing out or lagging behind. This, however, cannot be done effectively without a sound theoretical and empirical framework. *Place, Productivity, and Prosperity* is the right book to look for such a framework."

Andrés Rodríguez-Pose
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