

From connectivity to **OPPORTUNITY**

Leveraging regional corridors to support
growth and development in **Guinea**



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Program

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Executive Summary

The objectives of this study are to (1) assess the impact of regional and internal connectivity on jobs and access to services and (2) to provide recommendations for policy reforms and investments. This analysis uses quantitative and qualitative approaches to understand the opportunities that better connectivity provides for secondary cities in Guinea, what factors might constrain the potential for growth and, how policy makers at different levels of government should respond to maximize the benefits of economic corridors. This analysis also aims to provide a better understanding of the relative impact of transport improvements and direct trade facilitation reforms. Finally, the study assesses complementary reforms, investments, and overall policies to develop practical and implementable recommendations that could be deployed to enhance the returns to better trade and connectivity to urban areas in Guinea.

The analysis and recommendations presented here also support Guinea's transition towards a more diversified and higher-value-added economy. An underlying focus of this study lies in how to strengthen and leverage Guinea's robust mining sector to support the development of other sectors in and around Guinea's secondary cities. Economic sectors such as agriculture, processing of goods, and other services have high potential. However, weak management of Guinea's secondary urban agglomerations and the poorly understood potential of these regions constrains the country from reaching its potential for diversification at both the sectoral and spatial levels. As this report develops below, to prepare for potential diversification, secondary cities must lower the cost of doing business and bring in more investment across sectors, including entry into the market for other tradeable goods.

The report begins with a quantitative analysis, which identifies the expected impacts from potential investments in road infrastructure or trade facilitation reforms, and the opportunities these would represent for secondary cities in Guinea. Quantitative models are used to estimate these impacts by comparing a baseline scenario (representative of current travel times) and the associated costs to different scenarios integrating either (i) infrastructure improvements or (ii) a reduction in transit times and/or border delays. The models quantify the gains (or losses) from a spatial perspective, disaggregating impacts for individual Guinean cities, and evaluating the impact of these factors separately and in combination.

The quantitative analysis uses two approaches: first, a gravitational market access (MA) model based on the Donaldson and Hornbeck (2016) methodology, and second, a spatial general-equilibrium (GE) model to estimate wider gains and spillover effects based on Lebrand (2021).¹ The two models complement one other, with different spatial, structural, and temporal perspectives. The MA model measures access between cities within Guinea and with other West African cities, while the spatial GE model focuses on access at the subnational (or prefecture) level within Guinea and over the West African region. With the MA model, we focus on the gains to Guinean cities, and we use the GE model to make transnational comparisons. In addition, the MA model provides a static picture on the impact of transportation and trade reforms, while the spatial GE model uses a dynamic approach that incorporates longer-term general equilibrium wage and population adjustments.

Our findings indicate that overall gains linked to infrastructure investments are low, unless accompanied by trade facilitation measures. With both models, the gains from improved transport infrastructure are higher *within* countries than *between* countries. On the other hand, the gains linked to trade facilitation measures are much greater and have a more uniform impact across cities. While infrastructure-only investments generate a maximum of 2.1 percent increase in real wages, when combined with trade facilitation measures, the gains are far higher at more than 8 percent. Essentially, the gains from reducing border delays would magnify the gains of road upgrading. This underscores an important point: upgrading physical infrastructure and creating more fluid borders should be a package of policies to improve domestic and regional connectivity.

The qualitative analysis illustrates the pre-existing local conditions in secondary cities that would enable (or constrain) exploiting the potential opportunities from better connectivity. Four secondary cities are selected for in-depth case studies – serving as archetypes of the broader set of urban areas in the country. The case study methodology is based on interviews with local government, local businesses, and other relevant stakeholders. These interviews allow for diving deeper into the material, where empirical data is lacking, and thus provide a fuller understanding of local realities and capacities. Thus, concrete policy recommendations can be provided, allowing for more detail and to ensure that these are implementable.

1. Lebrand (2021). Economic gains from investing in road corridors in West Africa

Four case study cities (Kankan, Mamou, Boké, and Nzérékoré) were chosen for this analysis. These cities are broadly representative of secondary cities in Guinea, and their selection was reiterated by stakeholders in Guinea. These cities showed potential for gains from better connectivity, they are well distributed across different regions in Guinea, and they represent different typologies. Kankan is the second largest city in Guinea, located along the transport corridor connecting Guinea to Mali. Mamou is centrally located and is a hub for most of the major transport corridors in Guinea. Like Conakry, Boké is located in the Maritime region close to the coast and is a major mining center, and Nzérékoré is in Forested Guinea close to the border with Côte d'Ivoire and Liberia.

Constraints hampering economic growth across the case study cities include a lack of spatial planning and coordinated investments which contributes to urban fragmentation, poor and unequal access to public services, and most importantly, a lack of capacity and financing at the local government level. The lack of spatial planning means that agglomeration economies remain unrealized. Large levels of urban expansions have placed an even larger burden on public service delivery due to this fragmentation as surface areas have grown without direct contact to better serviced parts of the city. A low concentration of tradable activities also amplifies a lack of competitiveness, especially with the lack of reliable public services (particularly provisions for electricity and running water). The limited levels of public services make serviced land scarce, a key constraint to local businesses. Potential agricultural and other exports are hampered by poor road maintenance and the lack of available cold storage equipment and infrastructure.

In addition, local initiatives undertaken by cities in Guinea are impeded by a small administrative remit, limited capability to implement that remit, and a lack of financing for investments. Both capacity and legal constraints impede local government policy initiatives. In other words, the 'mayor's wedge,' or the policy remit available to local leaders, is small. Under the *Code Communale*, communes have fourteen distinct local administration powers, including the ability to provide for small-scale public services and infrastructure provisions such as the rehabilitation of school and hospital buildings. However, despite the powers explicitly decentralized under the *Code Communale*, in practice, local governments are highly dependent on national government structures operating at the local level. Transfers from the national government to LGs are based on opaque rules, meaning that communities have rarely benefited from these transfers, except in mining areas where real transfers have enabled new infrastructure development.²

2. UNECA (2009). Finances publiques locales: Expérience Guinéenne. [Link](#)

Based on the analysis of opportunities and the underlying constraints, the study prioritizes the following policy improvements – reforms and investments. These are provided in Table 1. The recommendations are organized into 3 categories - necessary actions (*highlighted in red*), desirable actions (*highlighted in orange*), and strategic bets (*highlighted in blue*).





- a. Institutions & Regulation:** To attract private investment, Guinea should complete the ongoing reforms to the Public Private Partnerships (PPPs) framework, including the establishment of a new specialized unit to help advance the many pipeline PPP projects, notably in energy and transport.³ Additionally, several interventions can help to increase local government capacity such as increasing sources of own-source fiscal revenues⁴ and other local revenues. Finally, improvements to standards regulations and associated facilities will help agriculture companies address downstream buyer requirements. At the national level, the full implementation of a single window system for customs (in Conakry and at land borders around the country) will streamline both imports and exports to support firms across industries. Implementation of trade policy reforms will also help to improve competition policy, along with investment promotion, protection, and retention.⁵
- b. Infrastructure & Land:** Better spatial planning and reducing and improving regulations around land use will improve the environment for potential investors and allow for an inventory of public land, buildings, and infrastructure. Provisions such as reforms in the energy and water sectors and the use of performance-based contracts to ensure better quality of constructed infrastructure can also help to address constraints to public service delivery.
- c. Skills & Innovation:** Skills training programs for the local population to help address skilled labor requirements in the mining sector. Since agriculture is a high potential sector, extension services will help to improve the quality of production for specific crops with downstream demand (e.g., food provisions for mining companies).
- d. Enterprise Support & Finance:** Provisions for investment promotion will help to attract potential investors. Additionally, support should be provided for local small and medium enterprises (SMEs), including financing and technical, management, and basic business development training.

3. Also, a main recommendation of the Guinea Country Private Sector Diagnostic (CPSD) 2020.

4. Local government own source revenue is defined as revenue raised by a local government from its own imposition of a tax, a license, a fee, or any other charge.

5. Mattoo, Aaditya; Rocha, Nadia; Ruta, Michele. 2020. The Evolution of Deep Trade Agreements. Policy Research Working Paper; No. 9283. World Bank, Washington, DC.

TABLE 1**Summary of recommendations**

	 Institutions & Regulations	 Infrastructure & Land	 Skills & Innovation	 Enterprise Support & Finance
Central government	<p>Full implementation of more favorable environment for PPPs</p> <p>National standards and certifications</p> <p>Business environment reform</p> <p>Trade policy reforms</p>	<p>Land use regulations</p> <p>Spatial development planning</p> <p>Improvements to public service infrastructure</p>	<p>Skills development programs</p> <p>Industry-targeted support</p>	<p>Investment promotion</p> <p>Access to finance and SME development programs</p>
Local government	<p>LG capacity building</p>	<p>Improvements to local public services</p>	<p>Skills development programs</p> <p>Industry-targeted support</p>	<p>Access to finance and SME development programs</p>

Key: **Necessary actions**, **Desirable actions**, and **Strategic Bets**.

Several open questions remain, beyond the scope of this study. Actions to assess and support better environmental sustainability, along with interventions for better climate change adaptation and mitigation were not considered as part of these analyses. The study also does not include detailed value chain assessments for any of the case study cities or surrounding regions. These areas should be considered as part of future work to inform the development of secondary cities in Guinea.



1

Overview

1.1

What are the objectives of this study?

The main objectives of this study are to (1) assess the impact of regional and internal connectivity on jobs and access to services, and (2) to provide recommendations for policy reforms and investments. First, the analysis examines the relative impact of improvements in transport improvements and direct trade facilitation reforms. Second and importantly, the study also assesses the complementary reforms, investments, and overall policies to be deployed in urban areas to enhance the returns to better trade and connectivity. It focuses on how such interventions can be prioritized, and how coalitions can be developed for implementation. The recommendations aim to be practical, implementable, and realizable given the current country context.

1.2

Why, Where and How?

Guinea is endowed with considerable natural resources relative to its GDP but remains one of the poorest and least competitive countries in the world. Although Guinea benefits from large deposits of iron ore, bauxite, gold, and diamonds, and large hydro-power potential, 43.7 percent of its population lives below the national poverty line, with a poverty rate of about 55 percent in rural populations and about 35 percent that are extremely poor. Access to basic services is low, with only a small share of the population benefiting from access to electricity (33 percent)⁶ and improved sanitation (20 percent). Gender inequality is a challenge, with only 40 percent of girls enrolled in secondary education (compared to 50 percent for boys). According to the 2018 Global Competitiveness Report, Guinea ranks 126th out of 140 countries, with large gaps in the quality of public and private institutions, infrastructure (transport, electricity, telecommunications), education, market size, and innovation capability.

For the domestic private sector to flourish and create jobs, Guinea urgently needs to (i) leverage the resources of its mining sector to develop other sectors of the economy and (ii) improve domestic economic connectivity. Mining accounts for a large share of Guinea's GDP and exports but provides few jobs, and revenues from the sector are not adequately distributed across the country. By contrast, most of the population is employed in the agricultural sector, which suffers from low productivity. Conakry operates as the main economic center of the country, while economic connectivity to and among secondary cities is constrained by poor road and transport infrastructure. Agriculture and agri-business activity are held back by poor infrastructure along critical domestic corridors between secondary cities and Conakry. Critical domestic corridors are usually congested due to flooding, poor road maintenance, and single lane bridges, discouraging trading activities.⁷ Improving economic connectivity among Guinea's network of secondary cities is needed for private sector development and productivity improvements.

With a land mass of approximately 246 thousand square kilometers, Guinea is the 77th largest country in the world, larger than the United Kingdom. According to several local businesses, better connectivity among the country's secondary cities and with Conakry could foster greater trade and growth, making these cities more attractive to investors and helping to alleviate poverty in these areas. The latter mechanism could also serve as a break on rural migration to Conakry, which has been struggling to keep up with the growing needs of its citizens.⁸ Difficulties in accessing secondary cities, such as Kankan and Mamou, were cited as the primary reason that several agriculture firms cannot be located closer to ideal areas of production.⁹

6. Direction National des Investissements Publics, Guinea

7. Interview conducted with local government officials in Nzérékoré

8. Avner, P. and Mukim, M. 2019. "Guinea Urban Sector Review : Planning, Connecting, Financing in Conakry", World Bank Group. [Link](#)

9. Interviews conducted with three Guinean agribusinesses headquartered in the vicinity of Conakry

In the context of planned and potential connectivity investments, Guinea's urban agglomerations represent an important untapped opportunity to bring about structural transformation in the country. The 2019 Guinea Urban Sector Review¹⁰ found that urban areas in the country do not currently act as engines of growth and competitiveness and fail to provide public services for their residents. In addition to Conakry (with more than 1.8 million inhabitants), densification within Guinea's secondary cities continues at a high rate, especially from increased urban-rural linkages. Conakry and other urban clusters have the potential to provide opportunities for growth based on economies of scale and deep markets. However, there remains limited understanding of the market potential of these urban agglomerations, including the possibilities for vertical linkages between different types of cities and rural areas. Urban agglomerations in Guinea have yet to generate the expected benefits from productive economies of scale and become the engines of growth and job creation.

Despite geographic advantages, the high cost and inefficiency of trade logistics limit Guinea's regional and global integration. Guinea's largest trading partners remain outside the region (70 percent in Asia and 26 percent in Europe) with less than 7 percent of its formal imports and 2.6 percent of its exports occurring within Africa. Major barriers to regional trade include the extremely poor road network, and the lack of harmonization of customs systems with bordering countries. For trade outside the region, the port of Conakry is among the most expensive in the region. Abidjan, Dakar, and Nouakchott are cheaper. The port is also highly congested, with occupancy rates of above 70 percent for all berths but two and is located on the city's crowded peninsula, contributing to major traffic jams.

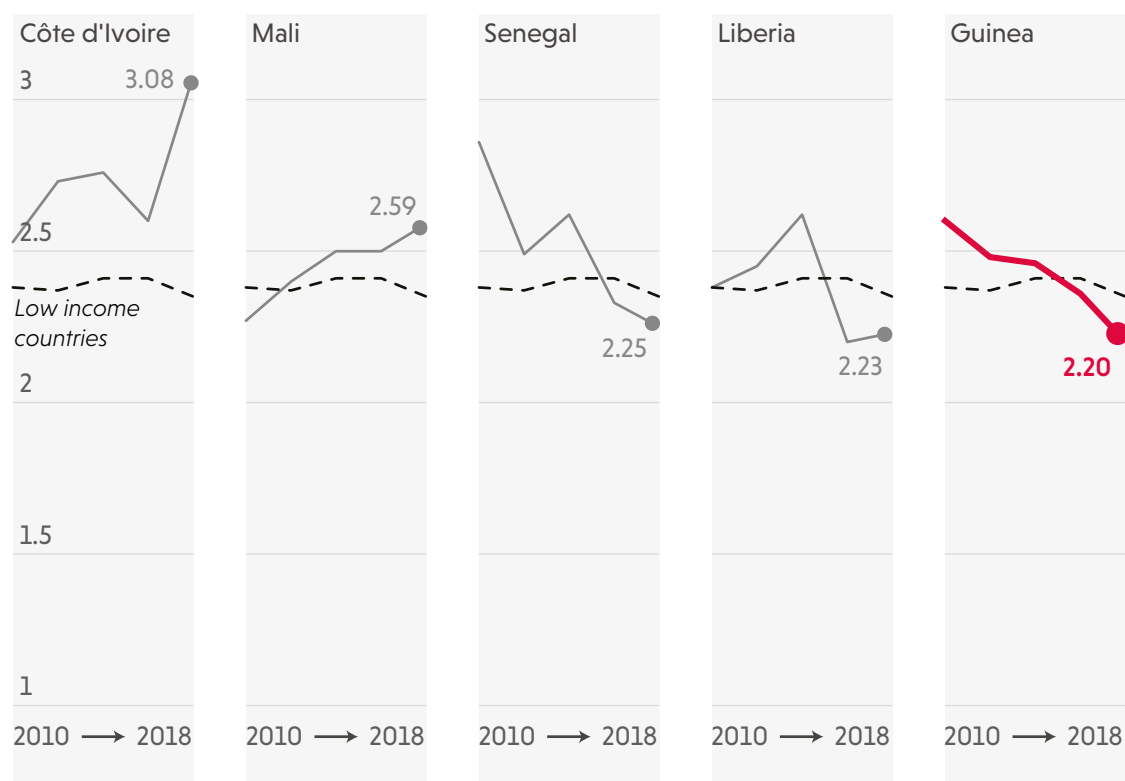
Moreover, Guinea's trade and transport infrastructure has fallen behind those of its peers. According to the World Bank's Logistics Performance Index (LPI, 2018), which measures the effectiveness of logistics across ports, railroads, roads, and information technology, Guinea's performance has declined sharply in recent years, falling behind averages for regional and income group peers (Figure 1). This decline is primarily due to falling road and infrastructure quality, especially relative to regional peers. In addition, at 2.9 km per 100 square kilometers, Guinea's national road density is well below benchmarks (5.1 km in Côte d'Ivoire, 6.2 km in Ghana, and 6.8 km in SSA on average). Furthermore, less than one-third of national roads are paved, and those that are paved have been deteriorating over time. In 2004, only 35 percent of Guinea's national paved roads were in good condition, according to available data. This share declined to 25 percent in 2012, and to just 16 percent in 2014. These challenges are confirmed by the Guinea's very low LPI ranking (129th out of 160 countries), with low scores for the quality of its trade- and transport-related infrastructure, as well as the efficiency of the clearance process by border control agencies.¹¹

10. Avner, P. and Mukim, M. 2019. "Guinea Urban Sector Review : Planning, Connecting, Financing in Conakry", World Bank Group. [Link](#)

11. World Bank (2020). Guinea Country Private Sector Diagnostic (CPSD)

FIGURE 1**Guinea's trade and transport infrastructure lags behind that of its peers.**

Logistics performance index (LPI, 2018)

**In addition, Guinea should spend more on maintenance of its existing road network.**

In 2019, the Government allocated about GNF289 billion (USD 30 million or 0.25 percent of GDP) to the maintenance of roads, whereas a minimum of 1 percent of GDP is normally required and more if roads have deteriorated and the network is extensive. Routine maintenance of deteriorated roads requires surface repairs that are more expensive. There is also a correlation between the size of a properly maintained road network and the GDP of the country. Developing countries with a GDP of around USD 10 billion can reasonably afford the proper maintenance of a network of about 20,000 km, not 45,000 km as in Guinea. For Guinea, in 2020, the road investment/maintenance ratio reached 8:1 due to the severe underfunding of road maintenance.

Examination of historical cases shows that transport corridor development can have a strong impact on economic development of cities and regions but that outcomes are shaped largely by complementary policies and investments. Studies of positive connectivity shocks report generally positive impacts on real income, poverty, consumption, and jobs, although exceptions do exist. The cases also show that complementary policies shape and define the economic transformation: the scale of the impact, the locations where the impact is felt, and the industrial transformation that takes place. As such, recommendations as to what investments and policy interventions should accompany transport investments must be grounded in the local context. **Box 1** provides a summary of the different complementary policy options applied in several historical cases.

BOX 1

Description of historical cases considered

- a. **Vietnam:** The National Highway No. 5 (NH-5) was developed in the 1990s as a transport corridor connecting Hanoi with Hai Phong Port to its east. This case highlights the importance of business environment reforms, combined with proactive investment promotion, and the use of industrial parks to address bottlenecks in the efficiency of land markets.
- b. **Mozambique and South Africa:** The Maputo Corridor connects several South African provinces to Maputo and is also used by Swaziland and Zimbabwe for access to the sea.¹² Investments in this corridor underscore the importance of industry focused investments to improve firm efficiency and the use of spatial development clusters and industrial parks to attract investment.
- c. **India:** The Golden Quadrilateral and North-South-East-West highway systems was launched in 2001 to connect the four largest economic centers in India: Delhi, Mumbai, Chennai, and Kolkata. This case points to the importance of the development of the logistics industry, along with addressing constraints in land markets and the need to support human capital with skills development programs.
- d. **Thailand:** In the late 1980s, Thailand began construction on several infrastructure investments including a new deep-water port at Laem Chabang and highway construction to connect the port to Bangkok. The transport investments were accompanied by industry incentives for auto manufacturers and business environment reforms, along with the development of private industrial estates along the new highway, emphasizing the importance of industry-targeted policies and business environment reforms.
- e. **Malaysia:** The Northern Corridor Economic Region attempts to address spatial inequality issues by connecting industrial hubs with transport investments. This approach emphasizes business environment reforms, especially customs reform, in addition to labor market development.
- f. **China:** The development of high-speed rail through Gui Zhou province in Western China connected it to all 88 counties in Western China. Through both national and provincial level policies, this rail infrastructure, along with highway and airport development, helped spur an industrial shift in Gui Zhou province. This case illustrates the use of spatial development planning, such as economic zones and industrial parks, to address land market constraints, alongside investment promotion and SME development efforts.

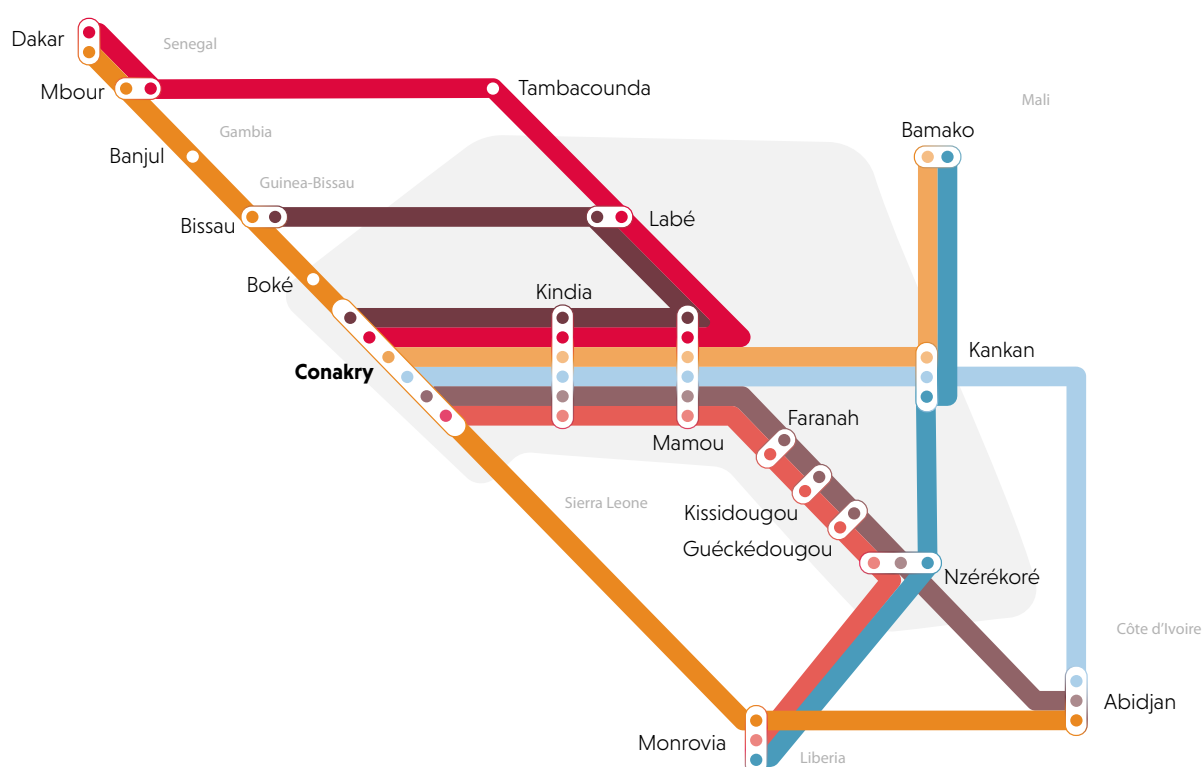
12. Sequeria, S., O. Hartman, and C. Kunaka. 2014. "Reviving Trade Routes: Evidence from the Maputo Corridor." Discussion Paper 4, Sub-Saharan Africa Transport Policy Program (SSATP), Washington, DC.

The geographic scope of this study is limited to those corridors that are crucial to better integrating Guinea within the West Africa region. There are several potential corridors, proposed and existing, in West Africa.¹³ To keep the study manageable, only corridors that traverse Guinea or touch Guinean borders, and thus could directly¹⁴ impact cities in Guinea are considered. The Economic Community of West African States (ECOWAS), the West African Economic and Monetary Union (WAEMU) and the African Development Bank (AfDB) have designated several transport corridors as being a priority for improving access in the region. Guinea is a member of ECOWAS, but not of WAEMU. The selection of corridors affecting Guinea covers those that pass through its territory, which include corridors defined by ECOWAS and the eventual extension of corridors in the case of certain WAEMU corridors, such as the Conakry-Abidjan corridor (see Figure 1). The study also looks at the universe of corridors defined by the African Union and the Trans-African Highway network,¹⁵ a product of the cooperation between the United Nations Commission for Africa, the African Union, and the AfDB.

Therefore, after careful consideration, the following corridors were selected for the study (see Figure 2 and Annex 1 for details on the motivations for the selection of each corridor):

FIGURE 2

Selected Corridors



13. For a comprehensive list, see Annex 1 and associated maps.

14. Guinean cities could also be affected indirectly, for instance with trade diversion through corridors outside of its territory. However, these corridors are not under the geographical scope of the study.

15. Wikipedia [Link](#)

1.3

How?

This analysis uses a combined quantitative and qualitative approach to identify opportunities and constraints for different locations in Guinea. To establish causal explanations, the study looks to establish causal *effects* (i.e. the correlation between causes and outcomes) and causal *mechanisms* (i.e. to *explain* the 'how' and 'why' of processes by which causes determine outcomes).

The quantitative analysis aims at identifying the impacts that could be expected from potential investments in road infrastructure or trade facilitation measures and therefore the opportunities this would represent for Guinea cities. The quantitative models used in the study to quantify the impacts compare a baseline scenario (representative of current travel times) and associated costs to different scenarios integrating either (i) infrastructure improvements or (ii) a reduction in transit times and/or border delays. The models quantify the gains (or losses) from a spatial perspective, disaggregating impacts for individual Guinean cities. In addition, nighttime lights data were aggregated at the city level to integrate city-level GDP in the model and therefore take into account the level of local income.

Case study analysis supplements the quantitative analyses by providing the direct local context regarding the opportunities and constraints faced by each city. This methodology is based on interviews with local government, local businesses, and other relevant stakeholders. These interviews allow for a deeper dive approach and a fuller understanding of local realities and capacities. Thus, policy recommendations can be provided with more detail and in a more concrete manner. These interviews also provide insights on how different levels of government interact and work together. They also give stakeholders the opportunity to present their ideas on local level constraints, which can differ considerably from the constraints cited by officials at the national level.

Using this mixed methodology approach can also help to identify specific policy interventions to address constraints or leverage opportunities. The balance between quantitative and qualitative analysis allows for a more nuanced understanding of the potential, what could be done to reach the potential, who could implement policy changes, and how. Given the multiple demands on a small public purse, coupled with low capabilities, the study focuses attention on the highest potential interventions that ought to be, and importantly, could be, implemented at the local level, with examples of how these could be made to work given the local and national context.

1.4

What does this mean for policy makers?

This study provides critical inputs to support Guinea's agenda for creating growth poles centered on secondary cities. For Guinea to capitalize on planned corridor investments, complementary coordinated investments are required for wider economic benefits. As detailed in the World Bank's *Regional Integration and Cooperation Assistance Strategy*,¹⁶ supporting Africa's transformation requires addressing gaps in hard and soft infrastructure, as well as supporting the private sector to capitalize on these opportunities. A recent review of corridor projects suggests jointly tackling a range of non-infrastructure impediments, including customs reforms and targeting producers and processors' constraints to leverage the benefits of improved physical connectivity.¹⁷ This can in turn attract additional private financing into productive sectors, generate trade, and support job creation.

The context of the COVID-19 pandemic amplifies the importance of this study. The pandemic has resulted in global supply disruptions and is likely to exacerbate pre-existing factors of fragility and widen inequalities and imbalances. As noted in the WBG's Crisis Response Approach Paper, investments in hard and soft infrastructure to support regional trade and local value chains are critical to stimulate recovery.¹⁸ Complementary policies (i.e., soft infrastructure) will help to ensure business growth and job creation, bolstering economic resiliency and stimulating private sector recovery.

16. World Bank. 2018. *Supporting Africa's Integration: Regional Integration and Cooperation Strategy FY18-23*. World Bank. The strategy suggests (i) "building regional infrastructure connectivity" by focusing on developing economic corridors; and (ii) "promoting trade and market integration", by focusing on accelerating intra-regional trade, developing regional value chains, and addressing diseconomies of small financial markets.

17. Melecky, Martin, Bougna, Xu. 2018. "Transport Corridors and Their Wider Economic Benefits: A Critical Review of the Literature" Policy Research Working Paper No. 8302, World Bank.

18. World Bank Group COVID-19 Crisis Response Approach Paper: Saving Lives, Scaling-up Impact and Getting Back on Track (English). Washington, D.C.: World Bank Group. [Link](#)



2

What are the opportunities?

2.1

Understanding the theory and the models.

Intra-national and regional transport costs have been shown to be a main obstacle to regional trade in West Africa.¹⁹ The historical lack of investments explains the limited availability and quality of roads in the region and due to the colonial legacy, many countries have inherited networks that remain distorted towards access to the main ports at the expense of regional connectivity.²⁰ Decades of colonization have shaped the transport network towards exports of raw resources towards the rest of the world. Little was done to increase regional connectivity outside of the corridors reaching the sea. As such, the distribution of regional corridors remains suboptimal for the geography and distribution of comparative advantages of current economies.²¹

On the other hand, checkpoints and border frictions represent another important obstacle.²² Travel time between cities are less dependent on the average speed at which a truck operates than on border delays.²³ Therefore, more important than slow speed is the time a truck is idle while waiting for administrative procedures to be performed (at borders or at terminals during loading or unloading). For example, numerous checkpoints along the Ghana-Togo-Benin coastal belt road reduce the accessibility of multiple border cities (Aflao, Lomé, Come, and Aneho). These checkpoints constitute obstacles to the effective implementation of the Abidjan-Lagos transport corridor as planned in the future by states and regional institutions.²⁴

By promoting trade across countries with thick borders, especially in places that have been physically and economically distant from global markets, large transport investments can improve welfare, but they also create internal challenges. It is well established that investing in transport will reduce costs leading to an increase in productivity and shifting the economy to a higher growth equilibrium.²⁵ In Sub-Saharan Africa, Dorosh et al (2012) found that reduced travel time to the nearest market (proxied by a city with at least 100,000 people) leads to an increase in agricultural production.

19. Atkin, David and Dave Donaldson, "Who's Getting Globalized? The Size and Implications of Intra-national Trade Costs," NBER Working Papers 21439, National Bureau of Economic Research, Inc July 2015; Teravaninthorn, Supee and Gael Raballand, "Transport Prices and Costs in Africa: A Review of the International Corridors", Num. 6610, World Bank, 2009.

20. Bonfatti, Roberto, Yuan Gu, and Steven Poelhekke, "Priority Roads: The Political Economy of Africa's Interior-to-Coast Roads," Technical Report 2019.

21. Ibid

22. OCDE, "Accessibility and Infrastructure in Border Cities," West African Papers 23, OECD Publishing April 2019.

23. Teravaninthorn, Supee and Gael Raballand, Transport Prices and Costs in Africa : A Review of the International Corridors number 6610. In 'World Bank Publications.', TheWorld Bank, November 2009.

24. AfDB-UEMOA, "Benin/Togo multinational project to upgrade the Lomé-Cotonou route and facilitate trade and transport on the Abidjan-Lagos corridor", 2017.

25. See Murphy et al, 1989, and Agenor, 2010.

However, because of transport costs and labor mobility frictions within countries, not all regions and workers evenly benefit from greater integration with global markets. Workers move towards better opportunities, benefiting the regions that can offer better amenities and higher wages. Labor mobility frictions, however, prevent workers from benefiting equally from these new opportunities, with some having greater access to new economic gains than others.²⁶

To analyze infrastructure and trade facilitation effects, we employ two approaches.

The first approach applies a gravitational market access (MA) model based on the Donaldson and Hornbeck (2016) methodology. While the appraisal of transportation projects typically focuses on the direct benefits of a project (e.g. reductions in travel time, vehicle operating costs, carbon emissions and accidents, etc.), the market access approach can quantify the wider economic benefits: namely that new or improved trade policies and investments link population centers, which then have greater opportunities to trade.²⁷ In order to calculate gains in market access from either infrastructure improvements or trade facilitation measures, this approach relies only on the following data: (i) a GIS map of the transportation network, (ii) GDP estimates for each node (city) in the network; and (iii) parameters defining speeds, freight costs, and delays associated with trade, such as delays at border crossings. See [Annex 2](#) for more details.²⁸

To complement the analysis, a spatial general-equilibrium (GE) model was developed to estimate wider gains and spillover effects from large transport and border infrastructure investments in West Africa. The analysis focused on four regional corridors and is based on Lebrand (2021).²⁹ This model uses the quantitative economic geography framework from Redding (2016) with trade within and across countries, and mobility of people within countries to assess the economic impacts of a reduction in trade costs from road and border infrastructure investments.³⁰ Better roads improve driving conditions, but many hours remain lost around land borders and at final destinations for goods to reach final customers. This analysis distinguishes between transit delays incurred by trucks crossing borders on their way and final border delays incurred in the destination location. This analysis therefore complements the estimated gains from better transport infrastructure by estimating the gains from lower land border delays. The analysis considers a subset of four corridors that would improve regional connectivity: Conakry-Bamako, Bamako-Monrovia, Conakry-Abidjan, Labé-Dakar. See [Annex 4](#) for a detailed description of the model and its assumptions.

26. Lall, Somik V. and Mathilde Lebrand, "Who wins, who loses? Understanding the spatially differentiated effects of the belt and road initiative," *Journal of Development Economics*, 2020, 146 (C).

27. Roberts, Mark and Bougna, Theophile and Melecky, Martin and Xu, Yan, *Transport Corridors and Their Wider Economic Benefits: A Critical Review of the Literature* (January 17, 2018). World Bank Policy Research Working Paper No. 8302

28. Donaldson and Hornbeck (2016) developed this approach to study the effects of expanding the railway network in the United States at the end of the 19th century.

29. Lebrand (2021). Economic gains from investing in road corridors in West Africa

30. Redding, Stephen J., "Goods trade, factor mobility and welfare," *Journal of International Economics*, 2016, 101 (C), 148–167.

While the spatial GE provides important insights, it is also important to note the assumptions made and some of the limitations of the model, especially due to data constraints. In an ideal scenario, the model would have been calibrated using existing data on trade flows. Unfortunately trade flows in most West African countries are only very imperfectly observable at best. When trade data between countries do exist, they cover only official trade that is legally registered. In addition, data for within-country trade are very rarely available, which limits the amount of data that can be used to create a baseline. Considering that some studies have highlighted that informal trade can represent up to 40 percent of total trade, the existing official data remains a very low bar of the existing non-captured trade that occurs between countries in the region. In that case relying on modeling assumptions based on gravity forces that have been verified in many contexts is an acceptable assumption.³¹ Finally, the model implemented here does not differentiate economic sectors and is therefore based on a single sector assumption. It favors geographic granularity, and all possible trade exchanges, at the expense of a more detailed economic structure.

The two models complement one other, with different spatial, structural, and temporal perspectives. The market access (MA) model is a gravitational model, relying on city GDP to measure market access. The spatial general equilibrium (GE) model, by contrast, examines subnational units (or prefectures),³² incorporating land-use variables and GDP at the subnational level (including the agricultural sector). Thus, the MA model measures access between cities within Guinea and with other West African cities, while the spatial GE model focuses on access at the subnational (or prefecture) level within Guinea and over the West African region. With the MA model, we focus on the gains to Guinean cities, and we use the GE model to make transnational comparisons. In addition, the MA model offers a static picture of the impacts of transportation infrastructure investments and reductions in border time delays, while the spatial GE model is dynamic and allows for adjustments in wages and displacements of populations. Therefore, the former concentrates on immediate effects, while the later examines medium-to-long term general equilibrium effects.

31. World Bank (2015). Women and trade in Africa: Realizing the Potential

32. For Guinea, the sub-national level used is the "prefecture". Guinea is divided into 33 prefectures plus Conakry.

2.2

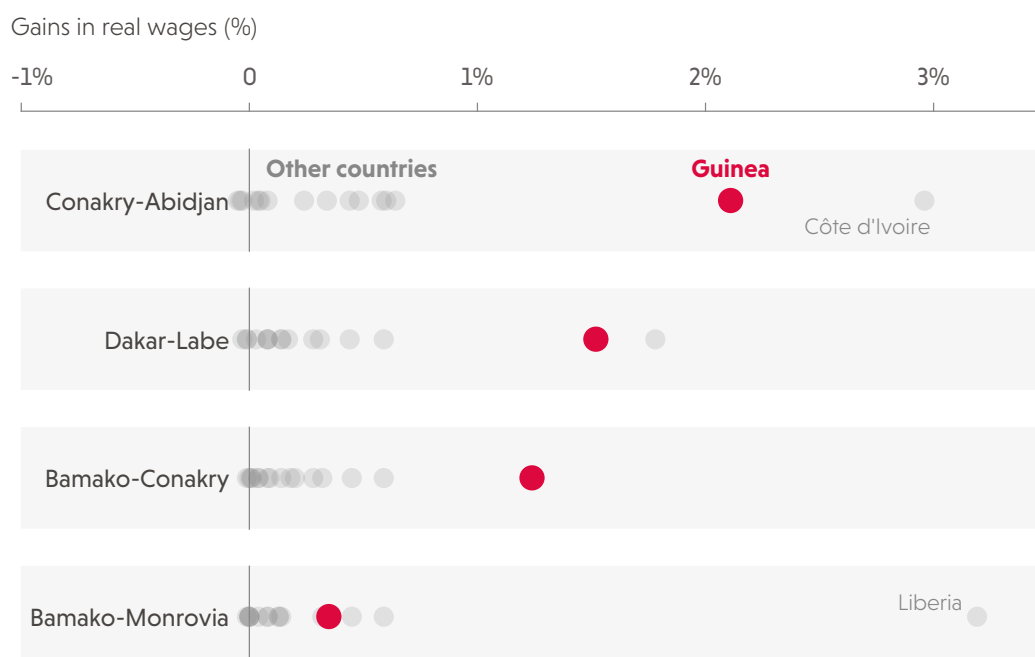
What do the results illustrate?

...for infrastructure investments

While Guinea appears to be one of the countries that benefits most from potential infrastructure investments in the region, the impacts of such investments remain marginal. The spatial GE model highlights the large gains for Guinea compared to regional peers. While some countries such as Mauritania, Niger, and Mali lose out from infrastructure investments, in terms of relative comparative advantage as economic activity moves across space, Guinea gains from all interventions. However, the gains are marginal, with a maximum of a 2.1 percent increase in real wages associated with the Conakry-Abidjan corridor, followed by the Conakry-Bamako and Labé-Dakar corridors. Gains on the Bamako-Monrovia corridor are minimal (Figure 3).

FIGURE 3

Benefits from potential infrastructure investments in the region will remain marginal for **Guinea**, while some countries are expected to lose.

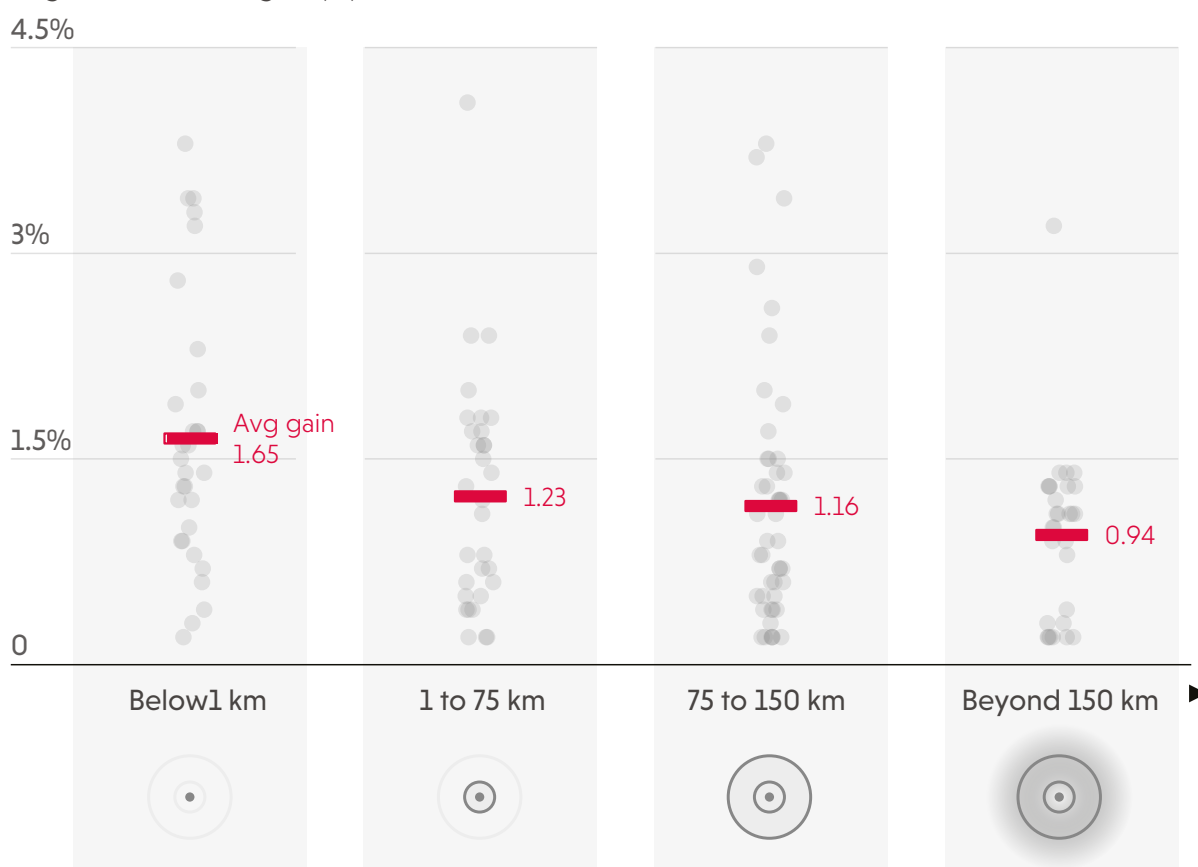


Similarly, gains in market access from investments that focus exclusively on infrastructure are minimal, varying between 0 percent and 4 percent for Guinea and tend to be highly spatially segregated with cities located on the improved corridors benefiting from the largest increase in market access (Figure 4).

FIGURE 4

The closer cities are from a corridor, the bigger the market access gain will be for them.

Avg. market access gain (%)

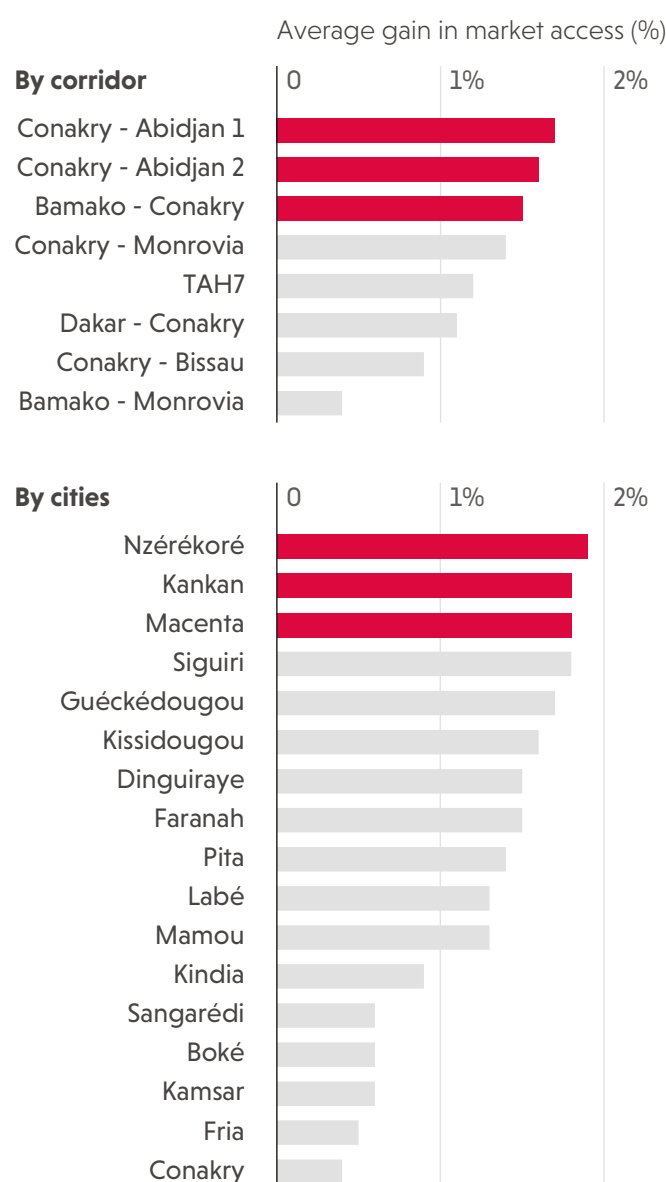


While overall gains linked to infrastructure investments are low, impacts are highly segregated spatially and improvements of corridors connecting Conakry to the eastern part of the country generate the highest gains in market access, resulting in larger gains for Nzérékoré, Kankan, and Macenta (Figure 5). When considering average gains in market access per city for each corridor and average gains for each city, the three corridors of Conakry – Abidjan 1, Conakry – Abidjan 2 and Bamako – Conakry display the highest impact on Market Access with average gains per city above 1.5 percent for Guinea cities.

In addition, when looking at the average impact of all scenarios for each city in Guinea, the three cities of Nzérékoré, Kankan, and Macenta, located in the eastern part of the country experience the highest increases in market access (above +1.8 percent). See Annex 3 for a more detailed description of the results.

FIGURE 5

Improvements of corridors to the **eastern part of the country** generate the highest gains in market access.

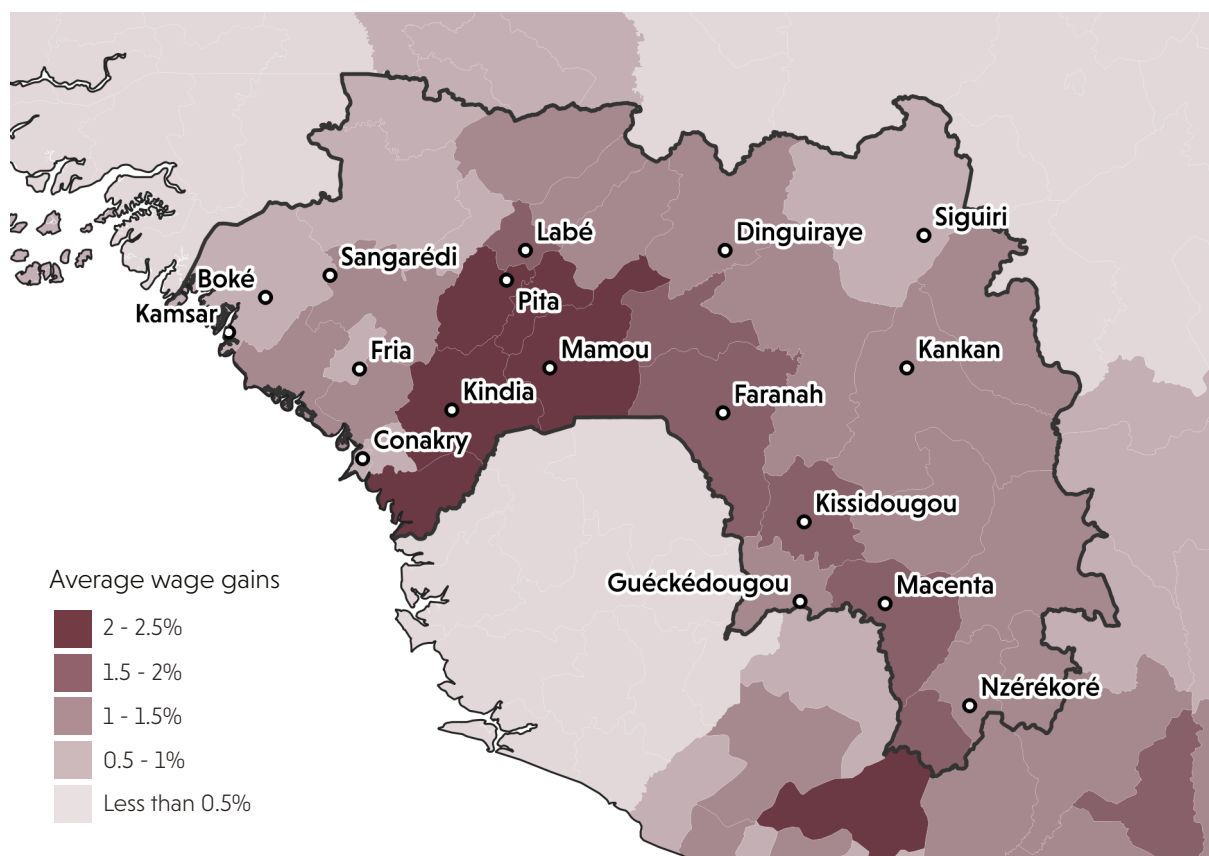


The spatial equilibrium model, which allows for wage adjustments and population displacement, also suggests that the spatial distribution of the effects is uneven.

The central regions of Mamou and Kindia concentrate higher gains, linked to their proximity to the capital and the fact that both are located at the junction of several transport hubs. The differences in the results between both models indicates that, while Nzérékoré, Kankan, and Macenta would enjoy high gains in market access in the short term, the adjustments in wages and movements of populations will ultimately favor the more centrally located regions of Pita, Mamou and Kindia (Figure 6). However, gains remain very low, barely above 2%.

FIGURE 6

Average gains in real wages from the spatial general equilibrium model considering only infrastructure investments.



(Source: Lebrand 2019)³³

33. The model was computed at "prefecture" level for Guinea which corresponds to the second national administrative level. To ensure a relatively similar geographical granularity for each country. The second administrative level was chosen as the default level for all countries except for The Gambia, Guinea-Bissau, Liberia, and Nigeria, for which the first administrative level (regions) was chosen as their size was the closest to the second administrative level units of other countries.

.... and for trade facilitation measures

Time lost at the border or in transit remain large obstacles to accessing markets.

Although the corridors under study connect and integrate the countries of the sub-region, they also serve to better connect cities within Guinea. In the models, the gains from improved transport infrastructure lead to improvements in access within countries rather than between countries. For example, in the market access model, for the Conakry-Monrovia, and the Bamako-Monrovia corridors, the gains in market access are limited on both the Liberian and Malian sides (lower than 2 percent) compared to the results obtained for cities in Guinea. Similar results emerge for the Conakry-Bissau corridor.

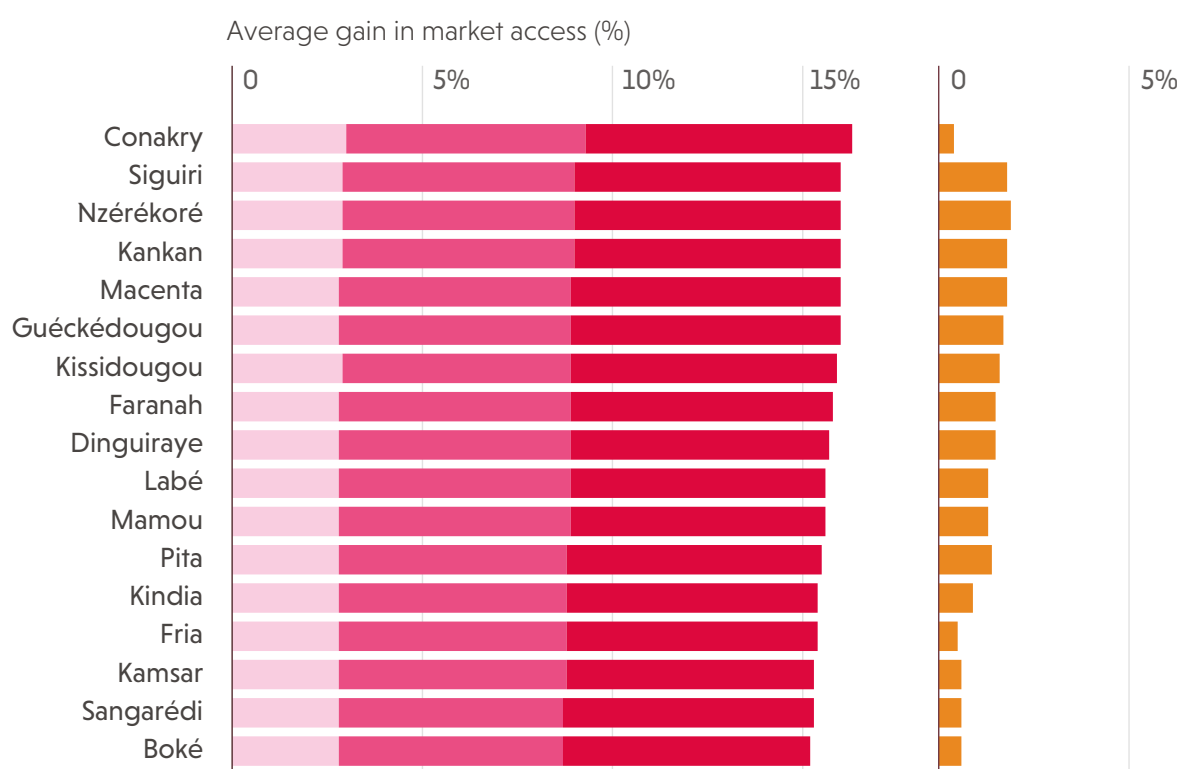
Contrary to infrastructure improvements, the gains linked to trade facilitation measures are much greater and have a more uniform impact across cities (Figure 7).

According to the MA model, 10 percent, 30 percent, and 50 percent reductions in border crossing delays are associated with gains in market access of 3 percent, 9 percent, and 15 percent, respectively, for every city within Guinea. Indeed, as displayed in Figure 6, gains for each scenario display very little variation across cities. Even with a 50 percent reduction, which is the scenario presenting the highest variation, the gap between the city with the highest gain and the city with the lowest gain is barely above 1 percentage point.

FIGURE 7

The gains linked to **reduction in border crossing delays** are much greater and have a more uniform impact across cities than **infrastructure improvements**.

Border delays reductions scenario: 10% 30% 50%



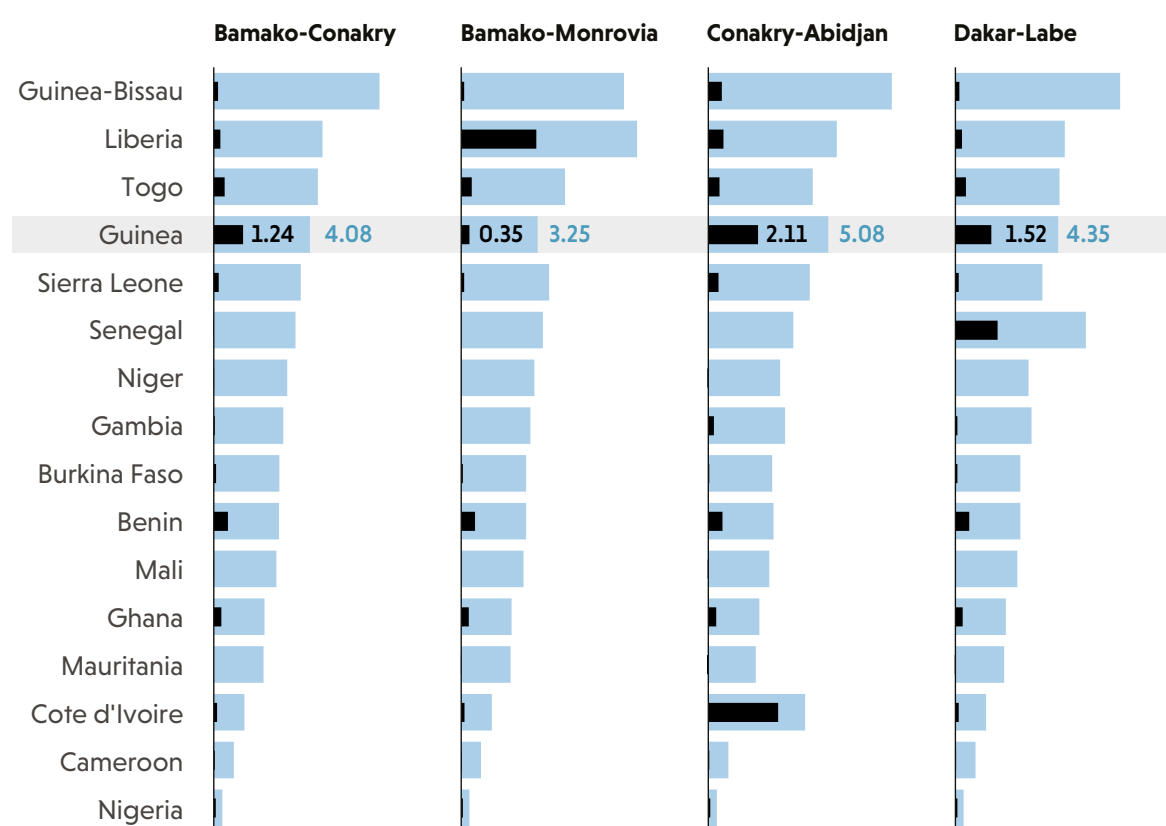
Similarly, with the spatial equilibrium model, gains in real wages are much larger from trade facilitation measures for each country and, regions in Guinea seem especially well positioned to benefit from those improvements (Figure 8). While infrastructure-only investments generated a maximum of 2.1 percent increase in real wages, the combination with trade facilitation measures allows to reach gains above 8 percent. Besides, the variation in gains between corridors is much smaller with the reduction in border and transit delays than it is without (Figure 9). Such findings support the idea that the time a truck is idling while waiting for administrative procedures to be performed (at borders or at the terminals during loading or unloading) is as, or more important, than slower speed along the roads of the regions.³⁴ The gains from reducing border delays would magnify the gains of necessary road upgrading. Both upgrading roads and more fluid borders are complementary investments to increase domestic and regional trade.

34. Teravaninthorn, Supee and Gael Raballand, Transport Prices and Costs in Africa: A Review of the International Corridors. Num. 6610. World Bank, 2009.

FIGURE 8

Gains in real wages are much larger from **trade facilitation** measures than **road corridor investments** and Guinea seem especially well positioned to benefit from those improvements.

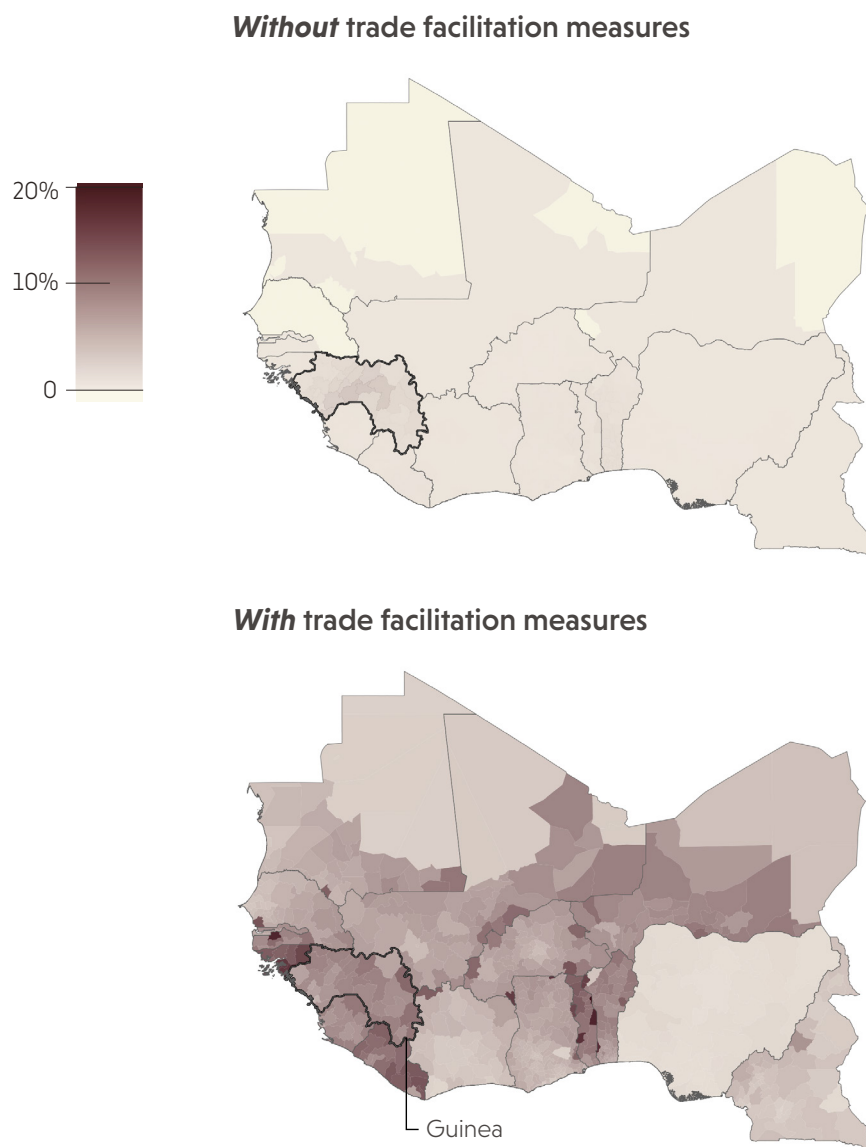
Average gain in market access (%) from
Corridor investments ■ **Trade facilitation** ■



(Source: Lebrand 2019)

FIGURE 9

GE Model: Spatial Gains in real wages from infrastructure investments: Bamako-Conakry corridor (in percent).



(Source: Lebrand 2019)

2.3

Summary of Results.

The results from the models demonstrate that Guinean cities are well positioned to benefit from lower travel costs compared to cities in other countries. This is more a function of trade facilitation measures, rather than infrastructure investments alone. Results of both models indicate that Guinea is one of the countries best positioned to benefit from improvements in infrastructure and trade facilitation. While the effect of infrastructure improvements without trade facilitation remains marginal, a combination of infrastructure improvements with a reduction in border and transit delays has a strong impact on real wages, generating significant gains in Guinea. Breaking the results down spatially within Guinea, while the cities in the eastern part of the country would benefit the most in terms of market access, once wages adjustments and movements of populations are accounted for, it is the central parts of the country that display the highest gains. Finally, while model results are a good starting point to show the magnitude of untapped gains, deeper analyses at the sectoral level would be required to identify specific reform and investment opportunities.



3

What are the constraints?

This chapter evaluates the underlying constraints that limit the potential positive impacts of trade and transport policies and investments along the corridor. The potential impact of better connectivity for cities in Guinea will be determined jointly – by improvements in trade facilitation and infrastructure investments – and by initial conditions. These initial conditions include the existing institutional and policy environment impacting input and product markets. A special focus is on the dynamics of the local economies of secondary urban agglomerations, to help identify potential policy interventions to magnify positive impacts associated with improvements in corridor connectivity.

As the previous chapter demonstrates, improvements in connectivity are likely to impact several cities in Guinea. Trade facilitation, however, favors larger cities, and those closer to the border. Based on this analysis, several cities were chosen for deep-dive case studies.

Case study cities were chosen following a set of selection criteria (detailed in Table 2) and summarized below³⁵:

- a. *Market access results*: All considered cities showed at least a 0.5 percent market access gain in the quantitative analysis.
- b. *Regional coverage and population*: Cities were chosen from across the top 10 cities in Guinea by population, each with at least 250,000 in population, and to ensure coverage across all of Guinea's natural regions. Conakry, the largest city, was excluded given that it has been the focus of several other recent studies.
- c. *Other factors*: The chosen case study cities include a range of ethnic demographics from across Guinea. These cities also have a high incidence of poverty.

TABLE 2

Criteria for case studies, by city considered

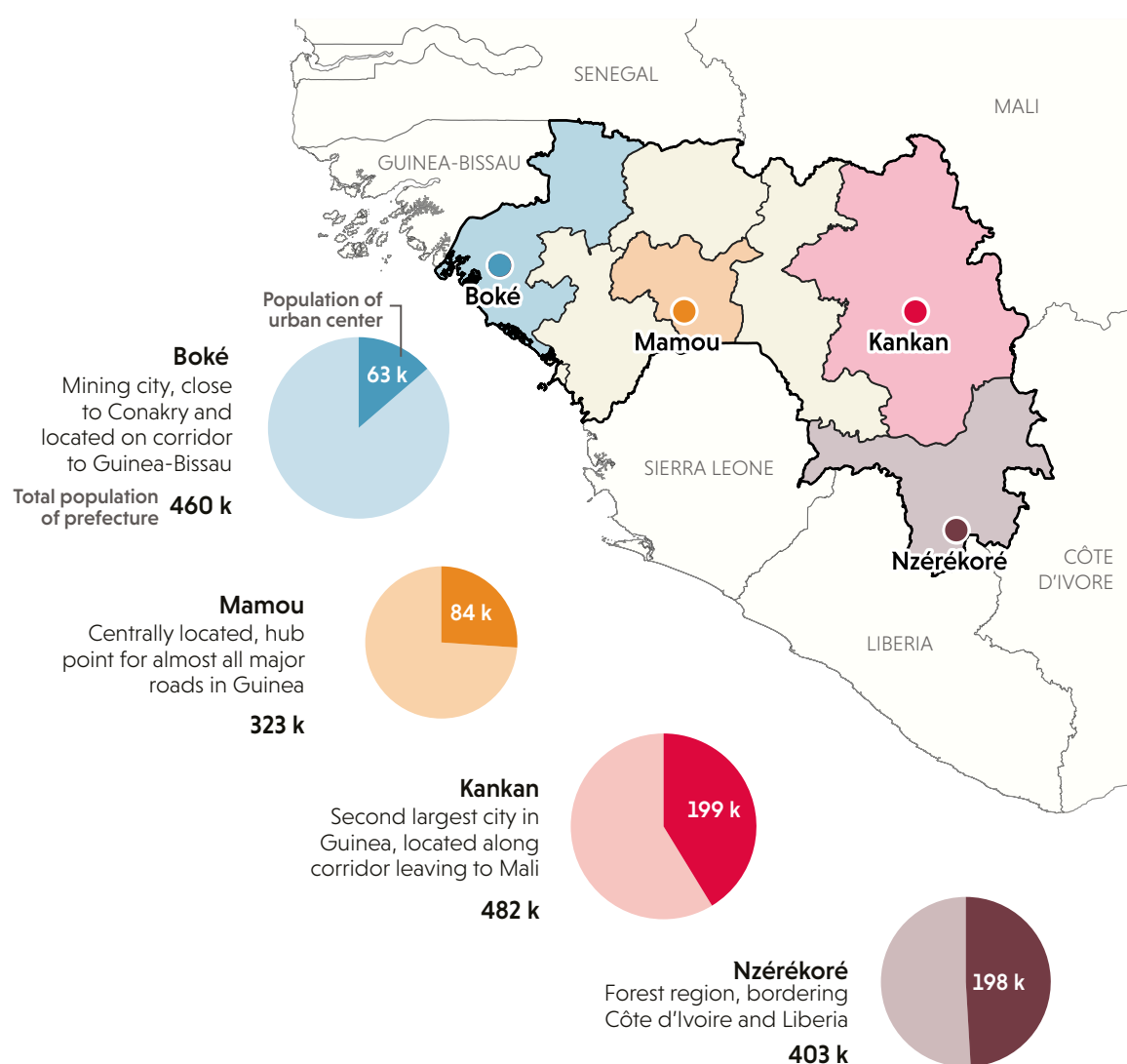
Market Access Average Gains MA Analysis (%)	Cities (selected for this study)	Rough Population	Natural Region	Administrative Region	Rough Demographic	Poverty Incidence	Poverty Headcount
1.5 to 2%	Kankan	500 000	Upper Guinea	Kankan	Malinke	48,7	889
	Gueckedougou	500 000	Forest Guinea	Nzerekore	Other	66,9	1031
	Nzerekore	350 000	Forest Guinea	Nzerekore	Other	66,9	1031
	Kissidougou	300 000	Forest Guinea	Faranah	Other	64,8	576
	Macenta	100 000	Forest Guinea	Nzerekore	Other	66,9	1031
	Siguir	40 000	Upper Guinea	Kankan	Malinke	48,7	889
1 to 1.5%	Faranah	300 000	Upper Guinea	Faranah	Malinke	60,8	576
	Labe	250 000	Mid-Guinea	Labe	Peuhl	60,8	627
	Mamou	250 000	Mid-Guinea	Mamou	Peuhl / Mix	62,5	438
	Dingiraye	50 000	Upper Guinea	Faranah	Malinke	64,8	576
	Pita	25 000	Mid-Guinea	Mamou	Peuhl	65	438
0.5 to 1%	Boke	500 000	Maritimie Guinea	Boke	Soussou	58,9	612
	Kindia	360 000	Maritimie Guinea	Kindia	Soussou	58,9	855
	Kamsar	200 000	Maritimie Guinea	Boke	Soussou	58,9	612
	Sangaredi	100 000	Maritimie Guinea	Boke	Soussou	58,9	612
0 to 0.5%	Conakry	2 100 000	Maritimie Guinea	Conakry	Mixed	27,4	438
	Fria	75 000	Maritimie Guinea	Boke	Soussou	58,9	612

In total, four case study cities were chosen for this analysis. Each of these cities can capitalize on local transport interventions due to location and a variety of other factors. Important factors that contributed to the choice of case studies, in addition to those shown in Table 2, are summarized below. Figure 10 shows the geographic location of these cities.

a. Kankan: The second largest city in Guinea, located along the transport corridor connecting Guinea to Mali, a major regional trading partner.

35. Conakry was not considered a candidate for a case study because other studies have focused on its importance as the primary trade and financial center in Guinea. This body of work includes World Bank, Republic of Guinea: Urbanization Review report, June 2018.

- b. Mamou:** Mamou is a smaller city, but one that is centrally located within Guinea and serves as a hub along most of the major corridors that pass through Guinea.
- c. Boké:** As the major mining hub in Guinea, Boké was chosen due to its proximity to both the capital city of Conakry and the border with Guinea-Bissau. The analysis focused on the Sangaredi-Boké Centre-Kamsar corridor as this represents the travel corridor for mining goods passing through the region.
- d. Nzérékoré:** Nzérékoré is located within the Forested Guinea region, on the border with Côte d'Ivoire and Liberia, and is therefore located on the main corridors connecting Conakry to Abidjan and Monrovia.

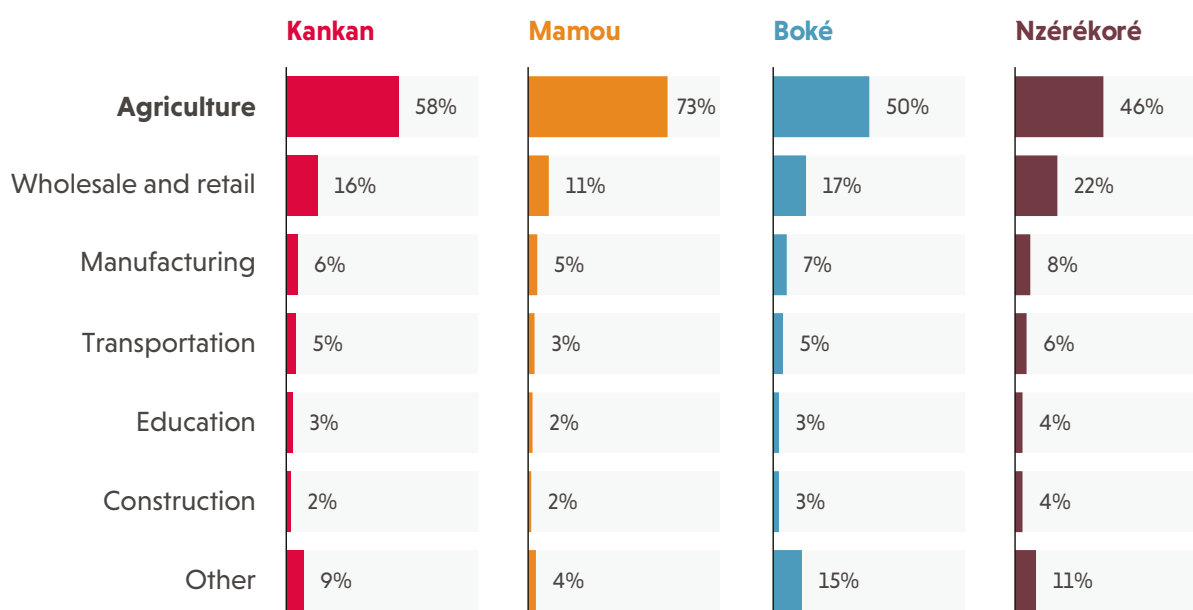
FIGURE 10**Location of case study cities.**

The economic structure of the regions where each of these cities are located is representative of the massive agricultural potential of the country, with each region specializing in a range of different products. The prefectures of Mamou, Kankan, and Nzérékoré have similar economic structures, with agriculture as the primary sector. While the Boké prefecture hosts important mining sector activities, the labor force still predominantly works in the agricultural sector, which underscores the potential of the agriculture and livestock sectors around this city as well.³⁶ The following figure shows the sectoral breakdown of labor for all four cities. Each is characterized by several high potential agricultural products, but minimal value-added production or agro-processing exists.

FIGURE 11

The economic structure of the regions where each of these cities are located is representative of the massive agricultural potential of the country.

Labor sectoral decomposition per prefecture



Source: Recensement Général de la Population et de l'Habitat (RGPH) 2014

Several constraints hamper economic growth across the case study cities. These include a lack of spatial planning and coordinated investments, which contributes to urban fragmentation, poor and unequal access to public services, and, most importantly, a lack of capacity and financing at the local government level. Each of these constraints are discussed below in further detail.

36. Stratégie développement durable Boké, 2018.

3.1

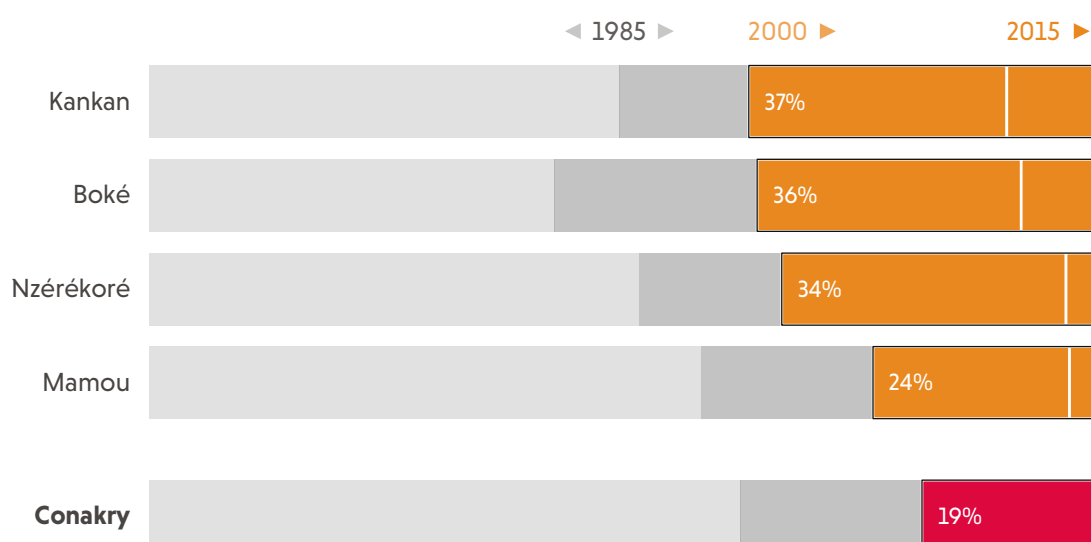
Agglomeration economies remain unrealized.

Cities have experienced rapid urban expansion since 1985, with on average, all four cities having doubled in size since 1985 (Figure 12). This growth seems to have been especially large in the last years with 10 percent of Kankan's total urban footprint having emerged from 2015 to 2019. While this rate of urban expansion is high, it mirrors considerable expansion of other cities in the region as well. In comparison, the city of Freetown expanded by only 43 percent from 1975 to 2014, while the city of Bamako has grown to ten times its original size. Within the context of such urban expansion, however, the adequate provisioning of public services becomes even more important. The speed of urban expansion has placed an even larger burden on public services because a large portion of this development has been fragmented, with major increases in the cities' surface areas without direct contact with better serviced parts of the city. Figure 13 show the amount of urban built-up fragmentation over the last years in Kankan.

FIGURE 12

Secondary cities have a considerably higher percentage of modern built-up (post-2000) than **Conakry**.

Current total built up recorded for each period (%)



Source: WSF

FIGURE 13

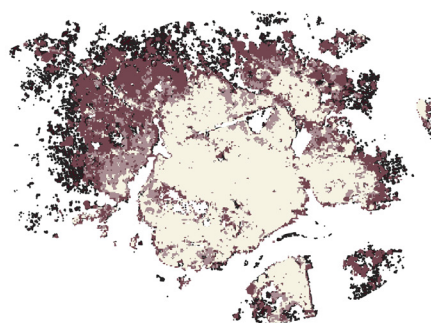
Urban expansion

As of
1985 2000 2015 2019

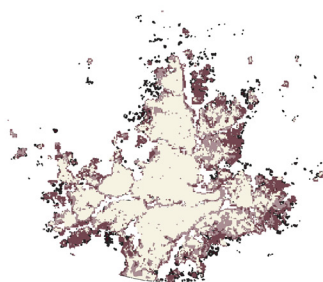
Boké



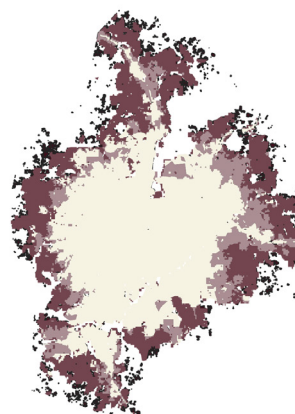
Kankan



Mamou



Nzérékoré



Source: WSF

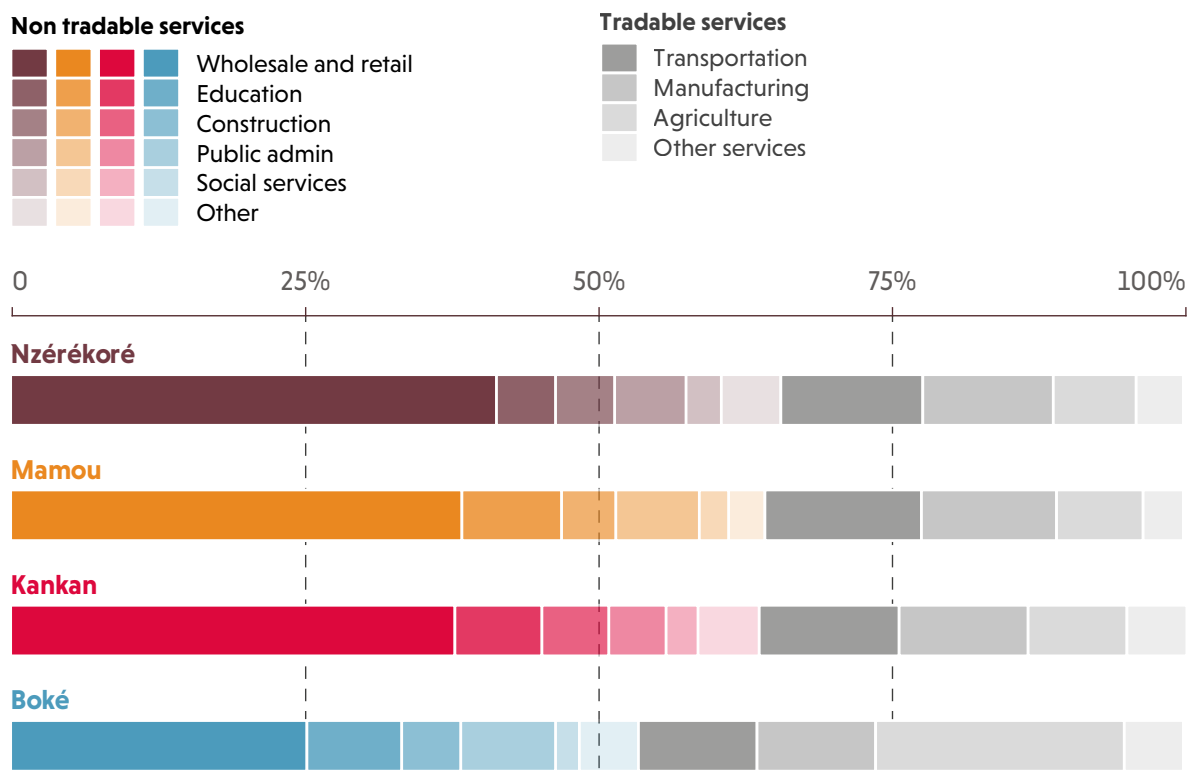
At the same time, the urban core of these cities is characterized by the prominence of non-tradable activities, which are not conducive to significant economic growth.

In each city, employment is dominated by non-tradable activities, mostly wholesale and retail trade activities, which represent around 40 percent of employment in Kankan, Mamou, and Nzérékoré, and 25 percent in Boké. As such, non-tradable activities represent around 70 to 80 percent of employment.

FIGURE 14

The urban core of these cities is characterized by the prominence of **non-tradable activities**, which are not conducive to significant economic growth.

Labor sectoral decomposition per sub-prefecture (urban core)



Source: RGPH 2014

BOX

Tradables and the City

A firm's business decision to produce internationally tradable goods and services will depend on its input costs. Among these input costs are urban costs: the added costs that workers face when living in a city. Urban costs include rent, commuting costs, and the high price of many goods. To attract workers, firms must raise wages to offset (or partially offset) these costs. Yet even as nominal wages climb to reflect high or rapidly rising urban costs, real wages remain low (see [Chapter #4](#) for a detailed discussion). When urban costs drive nominal wages too high, firms cannot compete in the tradable sector and will produce only non-tradables.

The non-tradable sector includes certain goods (for example local beer or cement), the construction trade, the retail trade, and many service sector activities, including informal sector employment. Demand for these goods and services comes from income generated within the city and its hinterland – but also from income transferred from outside, such as resource rents, tax revenues, and foreign aid.

The reason why a firm in a non-tradable sector can afford to pay higher wages – while a firm in a tradable sector cannot – is that the non-tradable producer can raise its prices citywide. By doing so, it passes its own cost increases on to consumers in the urban market. But such price hikes make the

cost of living in a city even higher, contributing to the workers' urban costs. This sequence can become a vicious cycle that keeps African cities out of the tradable sector and limits their economic growth. Often, proposed solutions to Africa's urban challenges focus simply on increased investments in structures or on reforming urban planning. These actions are necessary and urgent but by themselves are unlikely to lift cities out of the non-tradables trap. Why? In addition to poorly designed national regulations and / or trade policies, coordination failures at the local level could inhibit the formation of new clusters of economic activity, which are necessary for efficient tradables production. Given the dynamics described above, no firm wants to be the first to enter the tradables sector. Yet many tradable firms would become established if they could coordinate their entry. To enable coordination, a city needs a credible coordination agent: either a forward-looking group of firms that can harmonize their plans and make a move together, or a large-scale land developer or municipal government that can realize its vision through major infrastructure investment.

Sources: Henderson and Venables (2009); World Bank (2017): Africa's Cities: Opening Doors to the World.

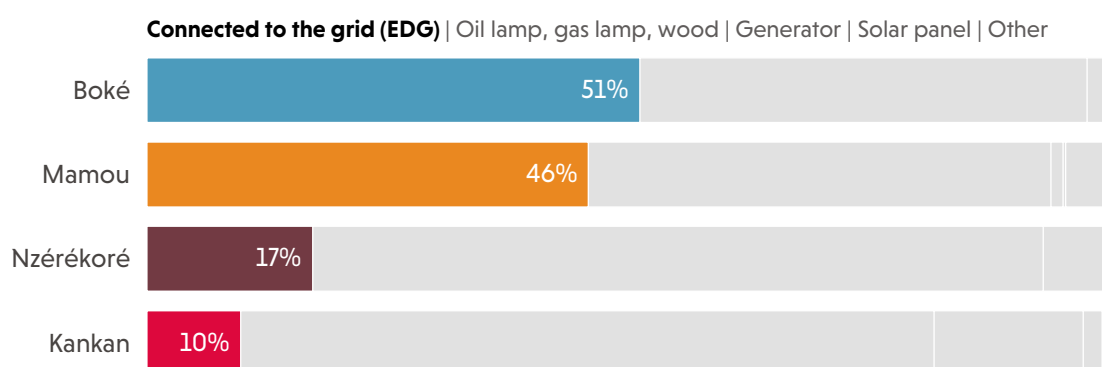
The very low concentration of tradable activities is a sign of low competitiveness, which can be linked to different factors, including the lack of reliable public services. For each city, the share of the population connected to the electrical grid is at best around 50 percent, while it can be as low as 18 percent in Nzérékoré and 9 percent in Kankan. Similarly, tap water (either inside or outside the dwelling) is only accessible to 50 percent of the population in Kankan, and access is even lower in the other three cities. For example, only 17 percent of the population has access to tap water in Nzérékoré. Moreover, access figures, while poor, disguise the extent of the problem, since both the extent of and quality of access are extremely poor. For example, areas connected to the grid in Mamou and Nzérékoré can reliably access power for only approximately six hours per day. In Kankan, the quality of access to electricity is even worse, with reliable access limited to about two hours per day.

FIGURE 15

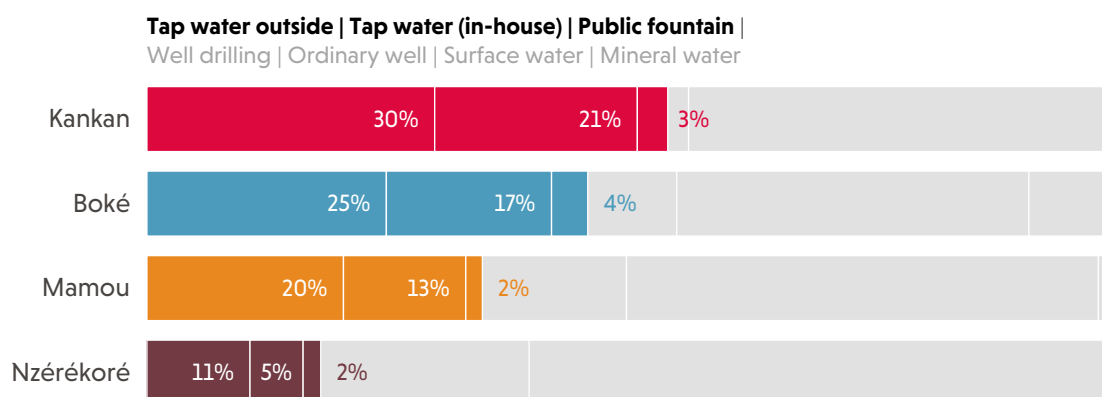
Lack of reliable public services is a contributing factor to the very low concentration of tradable activities, which is a sign of low competitiveness.

Share of population with access to each source of electricity (top) and water (bottom)

Electricity



Water



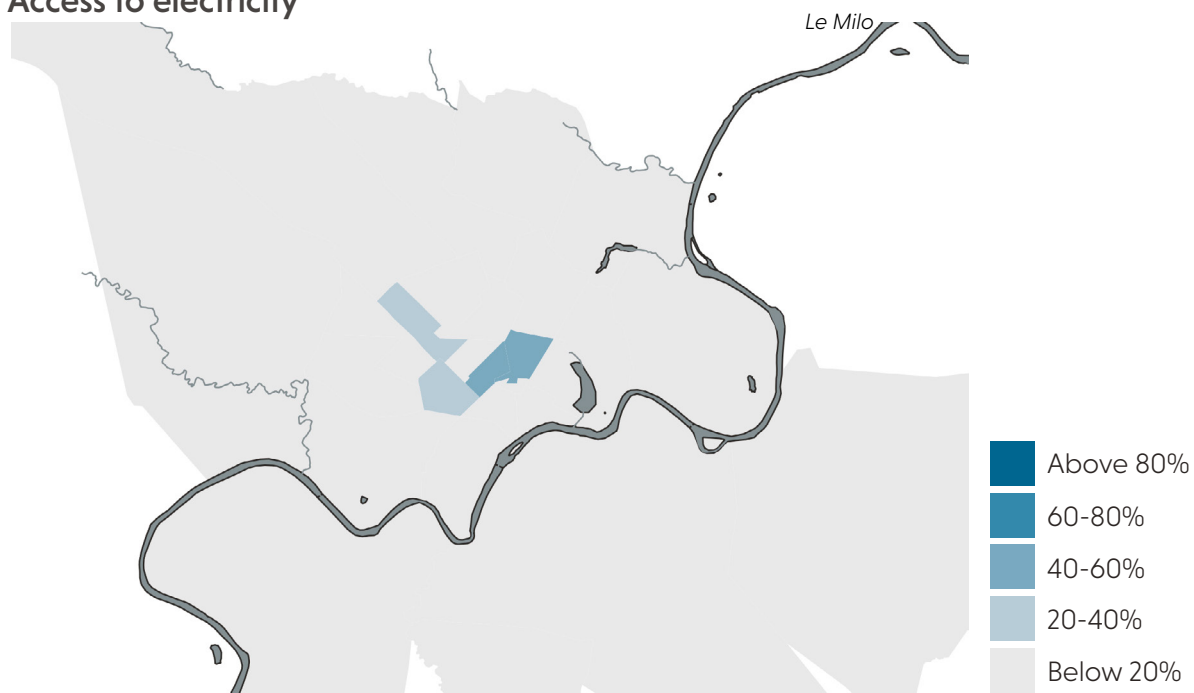
Source: RGPH 2014

The limited access to public services makes more scarce serviced land, which businesses need to operate. Only a small portion of each city is connected to the electrical grid or to the water network. In Kankan, access to water and electricity are extremely segregated geographically with under 15 percent of the total built up area being in zones with an access to electricity above 20 percent (Figure 16). Therefore, new business owners are often forced to the periphery of the city since land in the urban center is unavailable. Allotments of serviced land are often based on a non-transparent process, according to several local business owners in both cities. To service land in these more remote locations, businesses must invest in generators and drill wells to ensure access to electricity and water. Getting other supplies to these remote locations is also hindered by the lack of access roads, and poor maintenance of those access roads when they exist.

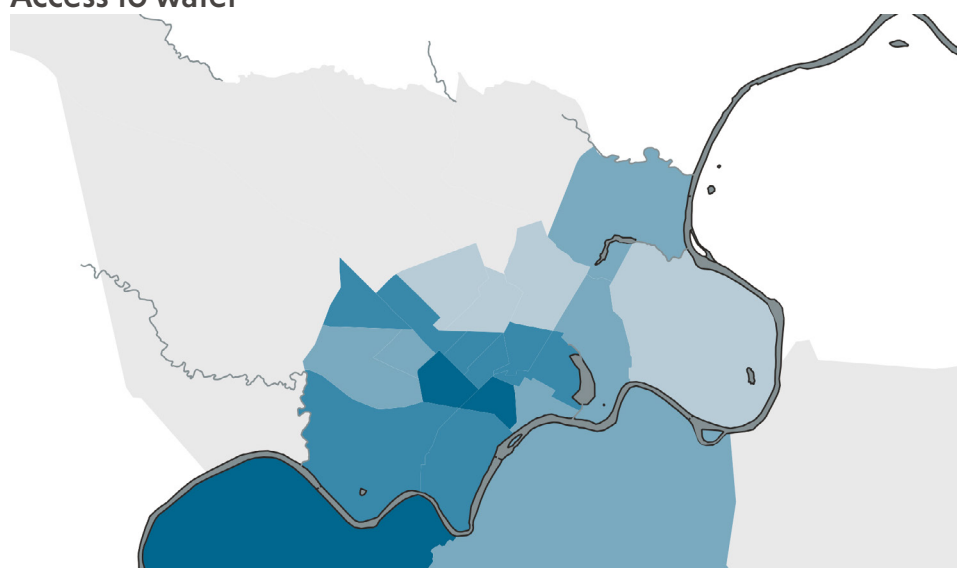
FIGURE 16

Geographical coverage of electricity and water public services in Kankan.

Access to electricity



Access to water



As such, lack of access to both electricity and running water provisions was continually cited as a major constraint across case study cities. Agro-processing is constrained by a lack of public services, including infrastructure for electricity and running water, and a scarcity of serviced land. This was also highlighted in the recently published Guinea Country Private Sector Diagnostic. Firms in all four cities noted that electricity was one of their most major costs and that this cost, and the required investment in generators, prevented their firms' expansion and the development of new processing centers. As explained by the owner of an agro-processing factory, *"Running my generator every day is very expensive, but without it, there wouldn't even be a factory"*.

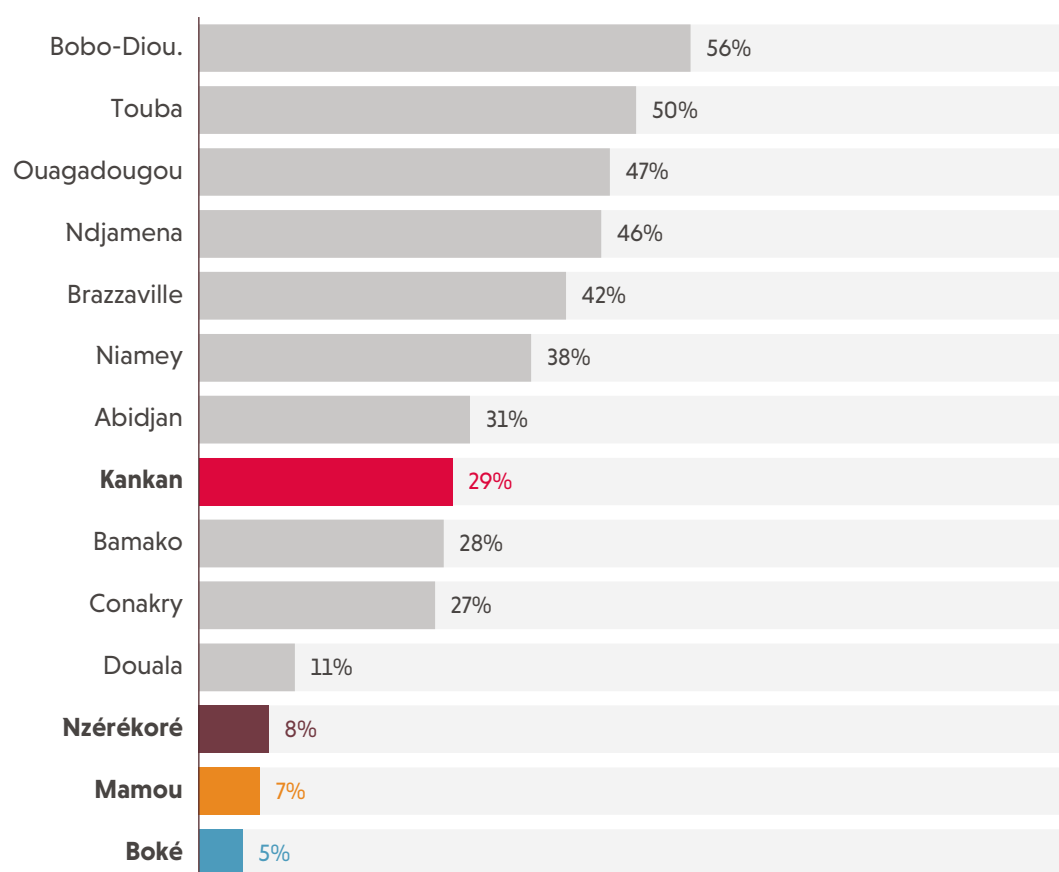
The aforementioned electricity and running water constraints extend to the large-scale preservation of agricultural products, which is further hindered by a lack of cold storage options (both warehouses and transport). For the livestock sector, few slaughterhouses exist for processing, and the cost of both electricity and water provisioning constrains the development of new factories. This also applies to mining companies, which highlighted public services as one of the primary constraints for larger mining firms evaluating potential investments in Forested Guinea around Nzérkoré. All the case study cities also highlight that communities on the outskirts of the cities are not connected to the electricity grid or the cities' water pipelines. Even for those communities that are connected to the grid and water pipelines, access is available only for part of the day (approximately 6-12 hours, depending on the city and neighborhood), and sometimes restricted to only certain days of the week.

The insufficient provision of public services can be linked to a wider lack of spatial planning. The share of gridiron (see Box 2) can be used as a metric to measure the level of spatial planning in each city. By comparing the four selected cities to other cities in the region, it is evident that spatial planning has been insufficient, with Nzérkoré, Boké, and Mamou displaying shares of gridiron below 10 percent. This reflects irregular road network layouts, the consequence of inadequate and inexistent urban planning, which, as discussed earlier, imposes costs on mobility for firms and households, and on the provision of essential services.

FIGURE 17

Compared to other cities in the region, it is evident that spatial planning has been insufficient in the four selected cities with **Nzérékoré**, **Boké**, and **Mamou** below 10 percent.

Share of gridiron per city



Source: Authors' calculations and Baruah, Henderson and Peng (2017)

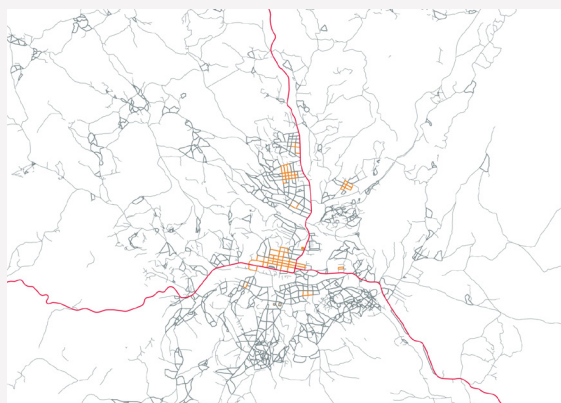
BOX 2

Gridiron methodology to measure spatial planning

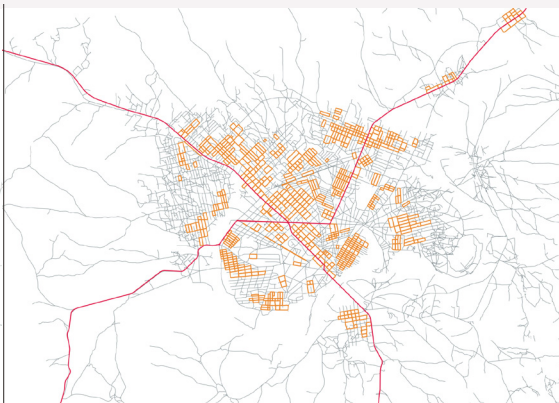
The gridiron methodology was used to generate a metric related to spatial planning for each city. It is based on the use of OSM data (of the road network) which is then categorized based on the rectangularity index of each block. Simply put, to be a gridiron block, a block must have a rectangularity index greater or equal to 0.9. See figures below. This method is based on Baruah, Henderson and Peng (2017).

Gridiron illustration in Kankan and Mamou

Kankan



Mamou :



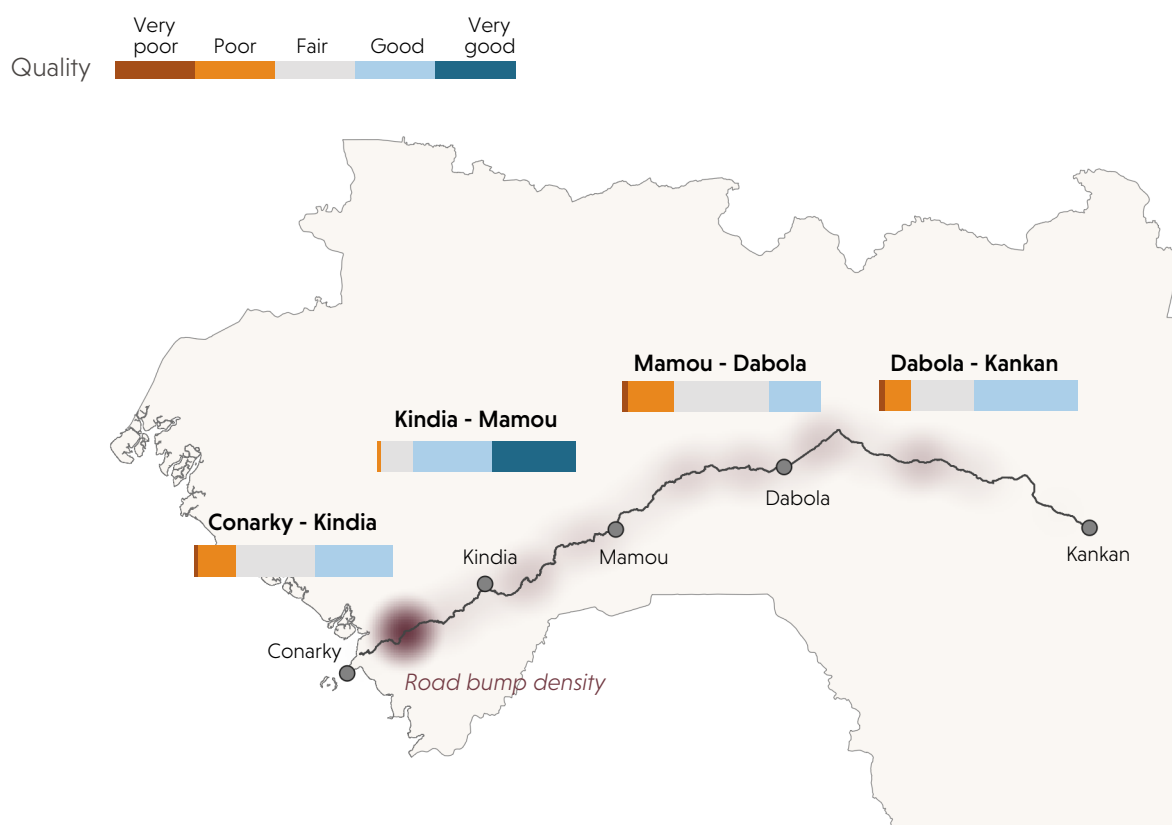
■ Gridiron
 ■ Non-gridiron
 — Primary roads
 — Local roads

The complexity and rigidity of land markets plays a significant role in the lack of planning and inefficient use of land. While a formal land tenure system with transferable ownership rights exists in some parts of the country, most of Guinea's tenure systems and types are based on informal and customary law. The customary tenure structures include a range of tenure forms, including individual and communal ownership, use rights, and pastoralist rights. The complexity and opacity of these laws results in very rigid land markets, which discourages efficient land use, resulting in lower urban density and lower potential tax revenues from efficient tax collection.

3.2

Low connectivity and poor infrastructure also constrain efficient development.

Potential agricultural and other exports are hampered by poor road maintenance and the lack of available cold storage equipment and infrastructure. Beyond public services, the most important constraints for potential growth in the agriculture sector are the poor overall connectivity and lack of key infrastructure (such as cold storage). This is linked to the lack of serviced land because electricity is required to operate cold storage equipment. While land that is not serviced is generally available, those parcels are also often not well connected to the main markets and surrounded by poor quality road infrastructure. Road quality data collected along the Conakry-Kankan corridor (Figure 18) highlights the very low quality and density of bumps along that corridor. As can be seen, there are extensive areas with high bump density and some sections of the corridor, such as the Mamou-Dabola section, display very poor quality with 26 percent of the road in poor or very poor condition.

FIGURE 18**Road quality on each section of the Conakry-Kankan corridor (December 2020)**

3.3

The mayor's wedge in Guinean cities is small.

Local initiatives undertaken by cities in Guinea are impeded by both (i) a small administrative remit and (ii) limited capability to implement that remit. Both capacity and legal constraints impede local government policy initiatives. In other words, the 'mayor's wedge,' or the policy remit available to local leaders, is small. Under the *Code Commune*, communes (or sub-prefectures) have fourteen distinct local administration powers, including the ability to provide for small-scale public services and infrastructure provisions, such as the rehabilitation of school and hospital buildings. One of the main powers provided to local governments (LGs) is the development and administration of annual investment plans for local asset inventory and maintenance, although these plans are subject to central government approval.

However, despite the powers explicitly decentralized under the *Code Commune*, in practice, local governments are highly dependent on national government structures operating at the local level. Interviews with the local prefectures and sub-prefectures across case study cities cited that the mayor's offices consistently reach out to the 'prefet' (*which is directly appointed by the president and represents the national government locally*) for support in managing local assets and small-scale public services. Within local government offices, an attitude of expecting the state to lead policy permeates the culture; discussions often centered on statements beginning with phrases such as "*L'État doit faire...*"³⁷. Additionally, corruption and extreme bureaucracy within local governments were cited as major challenges in interviews with business owners.

Transfers related to the mining sector is one exception where the central government has transferred funds to local communes, with real transfers enabling the development of new infrastructure.³⁸ For example, the National Local Development Fund (*Fonds National de Développement Local*, FNDL) is a US\$50 million fund raised through mining revenues being allocated across communes around the country as part of an overall national strategy to support community infrastructure and capacity. This fund is administered by the National Agency for Local Government Financing (*Agence Nationale de Financement des Collectivités*, ANAFIC) and receives 15 percent of national mining revenues and reallocates them to local governments. This reallocation is based on each local government's Annual Investment Plan (AIP), developed through a community-based consultation process. The Local Economic Development Funds (*Fonds de Développement Économique Local*, FODELs) are currently only available for communes in the vicinity of a mine, but there are plans to merge these into the FNDL. The intention is that these combined funds will increase considerably local government access to financing for public services but will be available only in those communes that demonstrate participatory budgeting, participatory monitoring, and a citizen's feedback mechanism.

37. Translated – The national government should do...

38. Guinea Country Private Sector Diagnostic (CPSD, 2020) and UNECA (2009). *Finances publiques locales : Expérience Guinéenne*. [Link](#)

Despite national funds used to provide allocations to local governments, municipalities remain constrained by a lack of financing for investments. The Local Authorities Code settles the principle of a financial transfer between the central government and the local communities based mainly on a global allocation covering operating expenses. In theory, the system should compensate for the increase in charges borne by local authorities: the amount established in the finance law is subsequently indexed to GDP or readjusted in the event of transfer of new responsibilities. However, in practice, transfers of resources from the central government to the LGs have often been based on opaque rules, making them volatile and uncertain, especially in terms of timing. Financial transfers were linked to operations and primarily concerned rebates granted by the central government (specific subsidies, operating subsidies). Therefore, often, communities do not benefit much from these transfers.



4

What should be done?

Improvement in internal and external connectivity, via economic corridors, has the potential to bring large benefits to urban areas in Guinea. To reiterate the objective provided at the outset, the study aims to disentangle the effect of possible improvements along the chosen corridors on specific cities (or regions) in Guinea, and how local and national policy makers might put in place interventions to amplify positive effects of connectivity investments. As demonstrated in [Chapter 2](#), improvements in trade facilitation and investments in transport corridors could support local economies, increasing opportunities for trade across the country. In [Chapter 3](#), the initial conditions within these secondary urban agglomerations was further explored via multiple case studies, with the constraints to harnessing the opportunities identified. Given competing demands on fiscal resources, whether at the national or local levels, how should cities and regions prepare for the opportunities and minimize any shocks to their local economies and households?

This section outlines the policy recommendations following from the research: what should be done, by whom, and how. It delves into providing more concrete actions for *how* each recommendation can be actioned, including the key actors involved. This section is organized as follows:

a. What policy interventions should be pursued and why? Policy interventions that have the potential to maximize the gains associated with potential investments and activities to increase internal and external integration. These interventions have been categorized according to the Competitive Cities framework,³⁹ and prioritized (in [Table 3](#) below) as follows:

- i) **Necessary actions** - actions that respond to impacts that are very likely to occur with increased connectivity (increased through traffic, population growth, overall growth of private sector activity etc.), or are needed to avert very negative consequences.
- ii) **Desirable actions** - actions that are associated with probable but not guaranteed impacts of increased connectivity (e.g., increases in FDI in the manufacturing sector), or considered highly beneficial considering the overall development trajectory of the city or cities).
- iii) **Strategic bets** - actions aiming to capitalize on the impacts of increased connectivity that are highly uncertain (impacts on a logistics cluster, agro-processing industry).

b. How and by whom? For each of the policy interventions, the focus is on how such an intervention could be implemented, including the key actors involved, including local, regional, and national government.

39. The Competitive Cities framework is used to categorize the recommended interventions as relating to: (i) Institutions and Regulations; (ii) Infrastructure and Land; (iii) Skills and Innovation; and (iv) Enterprise Support and Finance

4.1

Institutions and Regulations.

Full implementation of the national framework PPP law and the establishment of a new specialized unit to help advance the many pipeline PPP projects will be vital to lay the foundation for solidifying the gains from private investment activity. Economic gains from connectivity investments hinge on attracting increased investment, which necessitates an appropriate legal framework within which investors can participate, making this a high priority necessary action. Such a framework has recently been approved by Parliament; however, a concerted effort will be required to implement this, including operationalization of the organizations needed for the proper functioning of the law.⁴⁰ Appropriate implementation of this framework will help to ensure that Guinean cities are able to capture potential investments as connectivity improvements are planned and implemented. For example, both Boké and Nzérékoré have a high potential for growth in the palm oil value chain. In Boké, the initial investment required to begin harvesting approximately 20 million liters of palm oil is US\$30-40 million, yielding an annual revenue in the range of US\$25 million.⁴¹ A proper framework for receiving and overseeing such an investment at the national level would help to both attract the investment and manage the ongoing relationship with the investor. Such a framework would also help to improve investment protection and retention.

Although large-scale infrastructure is managed at the national level, improving local government capacity through a combination of technical and financial support alongside reforms to increase local government functions and responsibilities will help allow for increased investment at the local level. For example, communes that can plan and manage local assets and increase sources of own-source revenues will be able to reinvest these revenues, thus improving the state of local infrastructure and public services. For instance, communes manage the quality of local services such as health, education, and potable water; improvements in these services are likely to increase attractiveness of the area for new businesses and potential investments. The first step toward improved capacity for own-source revenues is developing asset inventories, followed by exploring revenue mechanisms such as increasing tariffs and taxes and/or building a better fiscal cadaster to improve coverage and collection. While this is not necessary for increased investment, improvements to local government capacity are a second-tier priority.

Programs to strengthen local government capacity should also include management of own-source revenue, digitalization, and better administration and maintenance of existing assets. These needs were underscored by local governments across the case study cities, given their scarce knowledge of how to invest and manage their revenues. This lack of capacity extends to the LGs' ability to administer, maintain, and manage local assets, including maintenance of the local road network and public service provisions. For example, the electricity and water networks in Sangaredi were financed and constructed by mining companies operating locally; however, neither the mining companies nor the relevant LGs can manage this infrastructure effectively.

40. Guinea Country Private Sector Diagnostic (CPSD), 2020.

41. Stratégie de développement durable Boké, 2018.

LGs also lack access to adequate IT and digital technology. For example, local government offices in Mamou have outdated IT infrastructure, with multiple employees required to share one computer.

In mining regions, LG support should include better planning for mining investments, support to better enforce environmental and social requirements, and better communications regarding local content. Better planning can be used to attract and improve engagement with potential investors. LGs also expressed a need to improve the enforcement of environmental and social consultations and impact assessments. Currently such consultations and assessments are required, but meetings with LGs highlighted the fact that follow-through and enforcement in these areas has been limited. Lack of knowledge and understanding related to local content requirements for mining contracts also contributes to civil instability—an important contributing factor to the frequent political protests in the Boké region. Better communication and citizen engagement on the nature of local content requirements, along with how such contracts are issued and managed, would help to address this problem. Better engagement on local content also pertains to how LGs manage their relationships with mining companies operating locally.

To support high potential industries such as agriculture and livestock, national standards and an associated certification process ought to be developed.

This involves setting up a national standards bureau, along with investments in laboratories to allow for product testing. Currently export companies are required to pay for sending their testing samples to other countries within the wider West African region. As such, ideally standards testing laboratories should be decentralized across the different regions in Guinea so that local companies are not required to transport their goods abroad or to Conakry for testing. In the short term, this problem could be addressed through subsidies to offset the cost of shipping these samples, which could be administered through the local government budget, or existing funding structures such as the FNDL.

Supporting access to required standards and certifications will help to improve competition as part of a broader set of trade reforms, a strategic bet to support these sectors. Regional meetings, such as within ECOWAS, take place to support and improve regional regulations. Improved conflict resolution and grievance redress systems within such bodies would help to improve overall operations and, as such, better facilitate regional trade. Better traceability systems would also help to particularly improve standards and certification processes, along with investments in cold chain and other storage facilities at key trade points. Use of one-stop shops at such trade points to facilitate export and import documentation would also help to facilitate trade, especially for key agricultural products. Such measures should also be accompanied by training for local actors to ensure that they are able to address and navigate these types of systems. The World Bank Program for Food Security and Resilience in West Africa (Programme de Résilience du Système Alimentaire de l'Afrique de l'Ouest, FSRP) aims to support this type of improved regional integration by strengthening capacity to prevent and manage food crises, promote agricultural resilience and productivity, and improve market integration and development of food value chains within the region. While the program's first phase does not include Guinea, Guinea will be included in the following phase.

Detailed value chain analyses should be undertaken to understand better the sectors where Guinea has a competitive advantage and how development of these sectors could be supported by the Government. The Guinea Agribusiness Deep Dive (2018) and Guinea CPSD (2020) highlighted several potential agribusiness value chains that Guinea could develop, such as: mangoes, pineapples, fonio, rice, coffee, and eggs. More analysis is needed to understand the opportunities and constraints to developing these chains and establishing agro-logistics poles in Guinea's main secondary cities, based on their connectivity, availability of human capital and supportive public services, and regulatory barriers. Such analyses should also quantify the time and financial costs associated with distinct parts of the agricultural export chains.

The analyses could also evaluate the potential for agro-logistics development in secondary cities to generate transformational impacts on the local economies by reducing poverty, increasing inclusion, and the number of wage-paying formal jobs, especially for women.

The full implementation of a single window system for customs to facilitate trade (in Conakry and at land borders around the country) would support firms across industries, alleviating constraints on both the import and the export side. Firms with better access to capital can pay high rates for international shipping companies to facilitate product exports. These shipping agents provide considerable support in dealing with requirements for trade, yet, the process is slow and cumbersome. For smaller firms, such services are out of reach, limiting their export potential despite demand. For example, a local jam and juice processor noted that, based on informal discussions with potential distributors and supermarkets, there is considerable demand for their product within the wider West African region, but they are unable to export because of the widespread and unclear trade requirements. On the import side, firms setting up industrial facilities must source most of their equipment abroad, and these imports can face considerable delays at customs. Since this equipment is essential to the setup of operations, long timeframes represent lost revenue, which could drive some firms out of business and/or delay their ability to service buyer contracts. A single window system would streamline the timing of these processes and provide a single location for all trade-related queries to be dealt with. As such, implementation of this action is a highly desirable action to support multiple sectors in Guinea. This type of system is in the process of being implemented in Conakry and has already demonstrated major increases in customs royalties; in January 2021, customs royalties totaled at about 8.4 billion Guinean francs relative to 370 million Guinean francs in January 2020. Expansion of this system to other border cities is envisioned in the near term, including Kamsar in the Sangaredi-Boké-Kamsar corridor, Dieke on the border with Cote D'Ivoire, and Kouremalé on the border with Mali. The Kamsar and Dieke locations will benefit Boké and Nzérékoré due to their proximity to these locations. While Kankan is not a border city, it is likely to benefit from the Kouremalé single window due to its location on the corridor connecting Guinea to Mali.

In addition to the various trade facilitation recommendations discussed here, broader support to trade policy and border reforms would further help complement transport infrastructure.⁴² While such reforms would normally include a look at tariffs, non-tariff barriers, and regional trade agreements, this is not feasible given ECOWAS restrictions. However, implementation of trade policy reforms that support better competition policy, especially in the logistics and services sectors, could help to address the constraints and skills gaps that apply across sectors. For example, improving transport services would contribute to cost reductions for production of tradeable goods, including high potential sectors such as agriculture, livestock, and fishing. The logistics sector in Guinea is currently dominated by transport unions, which generally control the transport of both goods and passengers.⁴³ Measures to improve investment protection and retention, discussed at a more detailed level in the enterprise support and finance section, also fall under broader trade policy reforms that would complement transport infrastructure.

As indicated in the quantitative analysis, border reforms would support the development of secondary cities in Guinea. These reforms could include better collaboration among border agencies for more integrated border management, along with the reengineering of customs processes and procedures to simplify border crossing. Prior to any such actions, however, a detailed assessment of the current border processes would be required to identify the most important interventions and how these could be put in place.

42. Mattoo, Aaditya; Rocha, Nadia; Ruta, Michele. 2020. The Evolution of Deep Trade Agreements. Policy Research Working Paper; No. 9283. World Bank, Washington, DC. [Link](#)

43. Based on interviews conducted with the Syndicat des Transporteurs in Mamou, Guinea.

4.2

Infrastructure and Land.

Cities in Guinea can capitalize on opportunities from connectivity improvements with better spatial planning, including coordinated land use and connective infrastructure. This entails improving the inventory of public land, buildings, and infrastructure, with later improvements to the legal cadaster. Such an inventory would allow for better provisioning of public services and a more seamless urban expansion, two important requisites for a city to absorb economic growth. Urban planning and coordinated land use management play an important role in identifying and executing the most needed investments in basic public services and infrastructure, along with proper operations and maintenance practices. Urban development plans also present a vision and strategy for a city's investments, along with potential interventions to reach that vision, and help to foster community engagement and decision making processes—all of which support better public service planning and delivery, especially within the context of urban population growth. As such, this is a highly desirable action to address constraints to investment.

Most secondary cities in Guinea have outdated or unenforced urban master plans, with local governments generally not making use of such documents. This has important financial repercussions as providing infrastructure and public services is far more expensive if implemented as part of upgrading informal settlements as opposed to planned infrastructure and land use. For example, an upgrade program in Tunisia to reduce slum housing required massive investments in water and sewage infrastructure, which could have been reduced with better prior urban planning development.⁴⁴ A major factor contributing to the poor current state of public services across secondary cities in Guinea is that the current allocation of public services was either unplanned or planned for much smaller populations, and this planning has not kept up with the cities' growth. For example, the electricity network in Sangaredi was built for a population of 10-15 thousand; Sangaredi's population now exceeds 65 thousand. Similarly, the water infrastructure in Nzérékoré was constructed in 1972; since then the population has tripled, leaving the installed capacity inadequate for the growth of the city.

Updates to relevant land codes, including within rural areas, is also crucial for local economic development. Local government officials across the case study cities highlighted the need to update the Code Foncier, which currently only deals with urban areas. In addition to updating the code itself, better communication campaigns and education is required for the local population and potential / current investors to meet its requirements. Rural populations lack awareness of the regulatory, security, and other requirements associated with land ownership. This informational asymmetry also contributes to land-related conflict, particularly between individuals operating in the agriculture, livestock, and mining sectors. Rationalization and updating of the Code Pastoral, which has not been updated since 1989, would also help to improve this situation.

44. Avner, P. and Mukim, M. 2019. "Guinea Urban Sector Review: Planning, Connecting, Financing in Conakry", World Bank Group. [Link](#)

Investments aimed at upgrading road quality and better maintenance will also be needed. Better transport connectivity to cities would improve links between local producers and markets at the center of the city. This is particularly relevant for strategic bets in the agriculture and livestock sectors since producers in rural areas must be able to access urban markets to sell their goods. Road improvements will also be required to allow for the transport of high value-added perishable goods, especially those that can be exported through Conakry's port and need efficient cold chain logistics. Such investments are part of a suite of necessary improvements to local public services, making them high priority actions.

Investments to improve the road network would also allow for easier access to markets. This applies both to improving access roads to rural areas, particularly agricultural production zones, along with investments in construction of larger connecting roads. Given Guinea's wide geographic spread, decisions around how and where to invest in the road network should be strategically planned. This especially applies to planning for access road improvements. Such investments can be chosen strategically to support specific high potential value chains by connecting production zones to points of sale. Alternatively, decisions on access road investments could also be driven by the local population, to increase connectivity to rural areas with the largest population, greatest need, etc.

Additionally, the seasonal rains across different regions make Guinean cities more vulnerable to economic losses associated with flooding. A study on the impact of flooding in Kinshasa demonstrates that flood disruptions have substantial economic costs due to channels such as transit re-routing, decreases in travel speeds, and the reduced accessibility to jobs. This study estimates the daily cost of flood disruption to commuter travel in Kinshasa at US\$1.2 million.⁴⁵ Guinean cities face similar issues, and likely similar costs; during the rainy system, traversing a distance of 2km can take over an hour due to flooding and congestion on roads in the city of Nzérékoré.⁴⁶ Addressing this issue will require both investments to upgrade road quality and improved maintenance practices.

To accommodate growth opportunities, cities in Guinea need to increase the availability of serviced land as a necessary action to alleviate critical investment constraints. First, this entails reducing and improving regulations around land use, including streamlining the purchase and use of private land for potential investors. This could involve improving tenure security and the overall cadaster, along with reducing the number of steps and the costs associated with acquiring land. Improved tenure security in Senegal implemented under the 2011 Land Tenure Act has allowed for conversion of temporary occupancy permits in urban areas into permanent title deeds at no cost, thus helping to increase activity in the formal land market, increase housing investments, and improve access to housing finance; these improvements in the land market also apply to businesses.⁴⁷ This streamlining applies across sectors and will help to incentivize investments. Such provisions also provide support to investment protection and retention, thus supporting better competition policy as part of a broader set of trade reforms.

45. He, Yiyi, Stephan Thies, Paolo Avner, and Jun Rentschler, The Impact of Flooding on Urban Transit and Accessibility – A Case Study of Kinshasa. World Bank Global Facility for Disaster Reduction and Recovery, December 2020.

46. Interview conducted with local government officials in Nzérékoré.

47. Republic of Guinea: Urbanization Review, World Bank, June 2018.

Special economic zones have the potential to help tackle these challenges in a geographically condensed format. These however require large upfront investments to build the basic infrastructure (e.g., electricity and water networks, access roads, etc.) and can remain vacant for long time periods until they reach full occupancy.⁴⁸ Despite the challenges of developing and operating industrial zones, a number of projects in Guinea are using this method to address constraints around serviced land. The African Development Bank is financing an industrial zone for agro-processing, near Boké, with potential expansion near Kankan. This project will finance the basic infrastructure, complemented with technical assistance to support the regulatory environment in attracting potential investors. However, its success is yet to be determined.⁴⁹

The simplification of land tenure system and better enforcement of existing rules would allow a more efficient use of land. By simplifying and ensuring the enforcement of those rules, the national and local governments would benefit through a more efficient land market, more efficient land use and easier tax collection. Those measures could entail: (1) the establishment of a consensual, equitable, sustainable land and property management system based on a non-conflictual coexistence of modern law and traditional practices; (2) the establishment of an appropriate consultation framework for the different actors concerned by the land and property issue in urban and rural areas; (3) providing appropriate solutions to institutional, regulatory and operational problems to minimize the risk of conflicts; (4) and finally strengthening the capacities of the services in charge of land at the central, deconcentrated,⁵⁰ and decentralized levels. For example, Guinea's legal framework devolves authority over many land issues to Land Commissions and other local entities. The effort to devolve and decentralize land administration has not been successful to date, in large measure due to the lack of capacity within the institutions. There is a need to build further local administrative capacity. All these measures are essential if city governments want to encourage higher efficiency of land markets, which will result in higher density and higher revenues from local taxes.

Another way to reduce and improve regulations around land use is to improve the national framework for allocating public land toward large investments. Several different structures could be used to allocate land under terms that incentivize these investments. For example, a Build-Operate-Transfer (BOT) model (amongst others) could be used such that the land title is turned over to a private operator at a free or concessional rate provided that all investments in the site itself are taken on by the operator. Similarly, a "bail emphytéotique" (emphyteutic lease) structure could extend the same provisions under terms for a long-term lease. The BOT structure can however be better suited for attracting investors since the land title can be used as collateral for accessing credit.

Several actions could help improve local provisions for public services, considered to be necessary and high priority actions. In the short term, local governments could provide small-scale subsidies to incentivize local provision for electricity and running water, such as private companies that have invested in generators or solar panels to provide additional power to specific communities. Many such companies are already established throughout our case study cities, but in most cases, consumers are required to pay expensive rates for the power provided.

48. For example, the Tema Zone in Ghana, located two hours outside of Accra, now operates at about 98 percent of capacity; reaching this occupancy rate, however, took several years and considerable investment by the government. Ghana Economic Transformation Project, Project Appraisal Document, World Bank.

49. Interview with African Development Bank specialist.

50. Local representatives of national agencies.

In Nzérékoré, however, as a stop gap ahead of the launch of the Interconnectivity Project,⁵¹ Électricité de Guinée (EdG) has provided subsidies to local groups with generators to improve the provisioning of electricity. While this action provides far less power than is expected from the Interconnectivity Project, which is expected to provide an additional 15-20 MW for the city on top of the 6.9 MW of current actual capacity, it still enables a critical improvement to local power provisions.⁵² Such an action could be used in the short term to supplement power provisions across other Guinean cities. For the communities on the outskirts of the cities that are not connected to the grid or the cities' water pipelines, one way to address this issue rather than extending transmission lines is to allow and incentivize the use of off-grid energy and micro-well solutions. Since most local communities are willing to pay for such services, at least in part, these investments could also be funded by community payments.

To incentivize longer term improvements, the government could fast-track feasibility studies for public sites that have been identified for key infrastructure.

This would help speed up the vetting process associated with site selection and reduce the upfront requirements on the part of the investor. The existence of such studies can play a major role in attracting investors given the high investment values and/or timelines that are often required. For example, construction of a hydropower plant can take about three years, with additional time required for permitting, environmental and social impact studies, etc. The use of pre-identified sites with associated pre-feasibility studies has helped to incentivize mining investments but could be mirrored for provision of public services. For example, the Canadian mining company SRG Mining identified a graphite mining site near Nzérékoré using the national mining cadaster, which has an inventory of mining sites with completed concept and/or pre-feasibility studies. This has since led to the establishment of the SRG Mining subsidiary, the Société Sama Ressources Guinée and an estimated US\$110 million investment.⁵³

Better coordination among the different actors would also help to improve public service provisions. Local governments currently have limited knowledge of and involvement in the planning and implementation of larger public service contracts. For example, the Souapiti power plant will provide additional capacity in the Boké region; however, local government stakeholders in Boké Centre, Sangaredi and Kamsar were not involved in the planning process and have limited knowledge and understanding as to how much additional power capacity the Souapiti plant will provide for both the local population and businesses. As such, local governments within Boké are unable to predict the timeframe of these improvements or prepare for them effectively. Additionally, the power provisions may not end up allocated in the areas with the most need since the LGs were not involved in the planning process. Similarly, LGs have limited awareness of planned transport investments since this planning occurs at the national level, although LGs are responsible for operations and maintenance of local roads. Given that road maintenance provisions are already lacking, this disconnect makes it even more difficult for LGs to plan for these maintenance requirements.

51. The Interconnectivity Project will source power from Côte D'Ivoire and build power lines which pass through Nzérékoré.

52. Interview with EdG.

53. Interview conducted with mining experts in Nzérékoré

Incentivizing investments into larger scale power provisions will be essential to support potential growth in cities across Guinea. Even in cases where power capacity upgrades are planned, such as the Interconnectivity Project in Nzérékoré, support for industrial development will require further capacity upgrades. A single small to medium sized family can use installed capacity of 1-2 MW, meaning that the additional 15-20 MW to be supplied by the Interconnectivity Project could be easily consumed with greater industrial development in the area. Sector regulatory reform could help to improve attractiveness of energy projects to potential investors; for example, the development of a new Energy Law in Burundi helped to incentivize development of a greenfield privately run solar plant in the province of Gitega.

Putting appropriate incentives in place for potential investors is also critical since EdG does not have a well-established credit rating for issuing contracts with private independent power providers. In the aforementioned Burundi example, a Ministry of Finance guarantee was used to underwrite the local utility's payment risk for the contract with Gigawatt Global, alongside a Central Bank guarantee to mitigate currency risk.⁵⁴ The Scaling Solar program implemented in Zambia makes use of a MIGA guarantee to mitigate the local utility's payment risk. IFC and the World Bank Group also provided technical support in initiating this program in Zambia, resulting in a 6.02 cents per kilowatt hour tariff, a major savings relative to the average diesel cost of 20 cents per kilowatt hour. The Neoen S.A. / First Solar Inc. 54 MW solar plant began operations in 2019, supplying over 25,000 homes with power.⁵⁵ Similar payment and currency guarantees could play a critical role in incentivizing private investor participation in both Guinea's energy and water sectors.

Targeted outreach from the national government for proactive investment promotion of the energy and water sectors could help address the need to bolster capacity. This includes the use of non-tax incentives such as the afore-mentioned guarantees. Such incentives improve potential returns to attract investors, especially given Guinea's limited track record with larger PPPs outside of the mining sector.

54. Interview with private IPP considering entry into Burundi market.

55. "Power on in Zambia." [Link](#)

4.3

Skills and Innovation.

Developing a stronger skills base will also play an important role in meeting demand that arises from the likely growth in Guinean cities. Technical and vocational training programs are extremely limited, especially outside of the capital, and businesses struggle to find the caliber of personnel that they need, particularly in technical fields. Improvement in this space is highly desirable action that would support all business sectors. One interviewee in agribusiness stated, *"I can find as many lawyers as I need, but when it comes to technicians, availability is poor."* In Boké, mining companies have considerable demand for technical talent, but often must source this from other countries. Vocational training with such ready demand in place could produce immediate benefits for local economies. In places looking to attract large investors (say, Nzérékoré for mining operations), this could preempt and alleviate concerns about the quality of labor.

Integrating the local business community in available training programs will also be crucial. Programs that bring firms together with local educational institutions can play an important role in this respect; many cities such as Gaziantep (Turkey) or Bucaramanga (Colombia) have implemented them. For the agriculture and livestock sectors, this type of support can also be targeted toward professional associations to provide wider support to the overall sectors. Further integration of these associations into public-private dialogue can also ensure that government reforms and interventions (at both the national and local levels) better address private sector needs, especially for high-potential sectors.

Improving local innovation capacity also entails support to existing entrepreneurship centers and incubators. While such organizations are not widely present in Guinea outside of the capital, Boké does have a local entrepreneurship hub (Centre d'entrepreneuriat) which could benefit from both technical and financial support. Empirical cross-country studies demonstrate the importance of productivity improvements, which account for half of GDP growth (Easterly and Levine, 2001). Innovation is a major component of such productivity improvements in the long-term, and providing support to entrepreneurship hubs can help strengthen local innovation systems and support human capital accumulation.

Wider availability of extension services for farmers is an important constraint to address for growth of the agro-processing industry. One agribusiness interviewee stated that their most pressing issue when it comes to sourcing from farmers is difficulties in standardizing farmer production. The company's agronomist provides ongoing support to farmers within the different community from which they source mangoes, pineapples, and cashews, along with support provided through NGOs such as WinRock, but quality and quantity standards, along with the use of chemicals, remains an issue. Supporting extension service provisions is a strategic bet to support the potential development of the agro-processing industry.

Depending on the region, support to other sectors such as livestock, fishing, and small-scale commercial trade should also be considered. Small-scale traders tend to be informal in border regions such as Nzérékoré, and local government officials highlight the importance of supporting capacity in the trade sector, particularly for formalization. The livestock and fishing sectors are also high potential sectors across regions within Guinea and could benefit from sector-specific technical support.

Targeted technical support to specific value chains within agriculture or other sectors could be an important strategic bet for specific cities and regions.

For example, because of the high sale price of cashews, investment in this value chain could yield high returns for Kankan and the Upper Guinea region more broadly. A local business in this sector was able to secure small-scale international funding, although this process took several years and further funding is required.⁵⁶ Such bets on the part of the local and/or national government, however, require careful consideration, taking into account potential subsidy requirements, overall strategic commitment, and the time to breakeven. The cotton industry in Kankan, for example, has been heavily subsidized and has struggled with funding delays from the national government. These delays could, at least in part, be alleviated by stronger strategic commitments and better coordination between the levels of government. As such, certain value chains could benefit from strategic commitments through larger-scale financing for producers and other actors, but such programs should be part of an overall regional strategic planning effort.

56. Interviews conducted during the April 2019 mission to Kankan.

4.4

Enterprise Support and Finance.

Targeted investment promotion can help to play a role in generating foreign investment, especially outside of bauxite and other mining activities, as a desirable second-tier priority. During interviews, businesses mentioned that international investors, especially Anglophone ones, currently perceive Guinea as extremely high risk despite the wealth of high potential products, particularly in the agriculture sector. Changing this perception involves several different actions at the national level, including proactive sourcing of investments through government organizations such as the *Agence de Promotions d'Investissements* (API). Such actions include more visibility at trade shows, but also putting in place provisions to increase investment returns and mitigate risks.

Incentives and/or other concessions for large-scale investors in targeted sectors could increase Guinea's attractiveness for potential investors. Such incentives help to increase potential returns and thus have a major impact on the desirability of an investment. Such concessions can be set up as temporary incentives to reduce upfront investment costs and improve the return profile of a particular investment. In the case of National Highway No. 5 in Vietnam, the local authorities proactively sought brand name investors for industrial clusters along the highway through international trade fairs and building long-term relationships with recognizable brand names. Using a combination of these proactive investment promotion efforts and incentive programs, they were able to attract companies such as Canon, Honda, and Panasonic, which each helped to attract further investment.⁵⁷

Payment and ownership guarantee of different types can help mitigate investor risks, especially given Guinea's lack of investment history to international investors outside of the mining sector. These types of provisions were mentioned earlier (part of the Gitega power plant in Burundi and the Scaling Solar program in Zambia) in the context of enticing electricity and water investors and could mitigate risks for investments across other sectors too. Guarantees can also be used by potential investors as collateral to access financing from international and more regional banks, or to reduce the interest rates associated with such financing.

Improving the quality of local content available can help to attract potential investors and ensure that the local population is better positioned to capitalize on current investments. The *Bourse de Sous-Traitance*, which has been implemented in Boké, is a good example of this working in practice. The bourse currently pre-vets and provides both technical and financial support to companies so that they can bid on and properly service contracts with large mining companies in the region. The bourse also provides a platform for mining companies to post all available contracts such that the companies can meet their local content requirements. As such, the bourse structure both improves the quality of the local content available and facilitates the circulation of information as and when such contracts are up for bids.

57. JICA (Japan International Cooperation Agency). 2008. "National Highway No. 5 Improvement Project." Vietnam-Japan Joint Evaluation Team 2007. [Link](#)

Given its independent status, use of the bourse also improves governance in the process of how local content contracts are awarded. A similar scheme could be implemented for Nzérékoré to provide support to local firms so that they may bid and service mining contracts, as the mining industry begins to take hold in the Forested Guinea region. The bourse scope could also be widened beyond mining to service other sectors where larger-scale investment is occurring, and/or provide international firms with high quality local partners in several different industries.

Increasing the support available to small and medium enterprises (SMEs) in Guinean cities would also help to improve local capacity; this will be of particular importance in cities with large scale investment, such as the well-developed mining sector in Boké or the one starting to develop in Nzérékoré.⁵⁸ Access to finance for SMEs who have limited options to access capital required for setting up and/or growth is a binding constraint. Providing support in this area is a strategic bet to support high priority SMEs that can provide goods and services to the mining sectors in Boké and Nzérékoré. The bourse, described above, provides financing to companies that they work with, and a similar provision could be expanded to include a window specifically targeted to SMEs. Development of small-scale accelerators could also be used to address this need, along with requirements for management and basic training and/or technical support for SMEs within local value chains.

Smaller-scale support programs could also be used to provide technical and financial support to micro-enterprises, particularly to better engage local youth and women. The Boké region has been particularly vulnerable to civil unrest because of youth unemployment levels; targeting youth with programs to develop local micro-enterprises could help to alleviate this. Programs specifically targeted at supporting women's capacity needs could also address gender gaps, which are widely present across Guinea. For example, Personal Initiative training has been particularly successful in enabling growth of women led MSMEs in South Africa⁵⁹ and Togo.⁶⁰





58. This point is treated also in Guinea Country Private Sector Diagnostic (CPSD), which further develops how the mining sector could function as a catalyst for SME local content and investments in other sectors, such as energy and transportation.

59. Solomon, G., Frese, M., Friedrich, C., and Glaub, M. (2013). "Can Personal Initiative Training Improve Small Business Success? A Longitudinal South African Evaluation Study." *International Journal of Entrepreneurship and Innovation*, 14(4):255-268.

60. Campos, F., Frese, M., Goldstein, M., Iacovone, L., and Johnson, H. (2017). "Teaching personal initiative beats traditional training in boosting small business in West Africa." *Science*, 22 Sept 2017

TABLE 3

Summary of recommendations

	 Institutions & Regulations	 Infrastructure & Land	 Skills & Innovation	 Enterprise Support & Finance
Central Government	<p>Full implementation of more favorable environment for PPPs: Implementation of law; set-up new PPP unit</p> <p>National standards and certifications: National Standards Bureau, facilitating local processes</p> <p>Business environment reform: Full implementation of single window for trade</p> <p>Trade policy reforms:</p> <ul style="list-style-type: none"> Increased competition in transport / logistics and services sectors Closer integration of border agencies on each side of the border, simplified border procedures 	<p>Land use regulations:</p> <ul style="list-style-type: none"> Streamlining public / private land regulations Coherence in tenure duality Update land use codes <p>Spatial development planning: Better public asset inventory and coordinated land use</p> <p>Improvements to public service infrastructure:</p> <ul style="list-style-type: none"> Preparatory investments (i.e., feasibility studies) Better coordination with local governments Sector reform (e.g., energy law for IPPs) Proactive outreach to independent providers Road investments, including access roads 	<p>Skills development programs:</p> <ul style="list-style-type: none"> Vocational training for the local labor force to support needs within mining value chains Support to local entrepreneurship hubs <p>Industry-targeted support:</p> <ul style="list-style-type: none"> Extension services for farmers Sector support: Livestock, fishing, transport/logistics Formalization of small-scale trade 	<p>Investment promotion:</p> <ul style="list-style-type: none"> Incentives and concessions for investors Payment and ownership guarantees to mitigate risks <p>Access to finance and SME development programs:</p> <ul style="list-style-type: none"> Technical training Management / basic training Financing for SMEs Local content support structures (e.g., expansion of Bourse de sous-traitance in Boké) Support for MSMEs, with programs for women / youth

Local Government	<p>LG capacity building:</p> <ul style="list-style-type: none"> • Reforms and TA to increase own-source fiscal and other revenues • Revenue management • Digitalization • Administration / operation of local assets • Better planning / enforcement for mining contracts • Improved communication on local content 	<p>Improvements to local public services:</p> <ul style="list-style-type: none"> • Support to private energy and water providers • Community-based payments • Performance-based contracts for better maintenance • Road maintenance investments, including access roads 	<p>Skills development programs:</p> <ul style="list-style-type: none"> • Vocational training for the local labor force to support needs within mining value chains • Support to local entrepreneurship hubs <p>Industry-targeted support:</p> <ul style="list-style-type: none"> • Extension services for farmers • Sector support: Livestock, fishing, transport/logistics • Formalization of small-scale trade 	<p>Access to finance and SME development programs:</p> <ul style="list-style-type: none"> • Technical training • Management / basic training • Financing for SMEs • Local content support structures (e.g., expansion of Bourse de sous-traitance in Boké) • Support for MSMEs, with programs for women / youth
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Annexes

Annex 1

Corridors Selected.

The **Trans-West African Coastal Road**, also known as the Trans-African Highway 7 (TAH 7), passing through **Boké** and **Conakry**, is one of the nine major highways that constitute the Trans-African Highway network – developed by the United Nations Commission for Africa, the African Union, and the AfDB. The corridor runs along the Atlantic Ocean coast from Dakar to Lagos. For Guinea, it connects Guinea with Guinea Bissau and Senegal in the north and Sierra Leone and Liberia in the south. Within Guinea, it connects Boké (500,000 inhabitants) and Boffa (a new mining site) to Conakry. The corridor could support exports of coffee, fruits, and fonio to Senegal and groundnuts, potatoes, and fruits to Sierra Leone (Figures A1 and A2).

The **Conakry - Dakar** corridor, going through **Kindia**, **Mamou**, and **Labé** in Guinea and Tambacounda in Senegal. It was (i) designated as a priority corridor by the UEOMA Infrastructure and Transport Action program, (ii) cited by the AfDB as a crucial corridor for the regional integration of Guinea, and (iii) partially highlighted in ECOWAS decision 8/12/88 regarding the second phase of the ECOWAS program to provide port access to inland territories within ECOWAS. As such, it can help connect cities and towns in the interior of Guinea to markets in other parts of Guinea and Senegal, as well as to the ports of Conakry and Dakar. Within Guinea, the corridor links the cities of Kindia (approx. 500,000 inhabitants), Mamou (approx. 250,000 inhabitants), and Labé (approx. 250,000 inhabitants) with Conakry and Dakar. The corridor also runs through the Fouta Djallon region, a major agriculture producing area in Guinea. It could support exports of coffee, fruits, and fonio to Senegal.

The **Conakry - Bamako** corridor, going through **Kindia**, **Mamou** and **Kankan**. It was highlighted by the 8/12/88 ECOWAS decision and the AfDB as an essential corridor for regional integration. This corridor links the port of Conakry with Bamako. As such, it could serve as a viable alternative to the Dakar – Bamako corridor, as the distance between the port of Conakry and Bamako is significantly shorter than the distance between Dakar and Bamako. However, the Dakar – Bamako corridor (part of Trans-African Highway 5) is currently much more developed. Within Guinea, in addition to Kindia and Mamou (cited above with the Conakry – Dakar corridor above) it also connects Kankan (approx. 500,000 inhabitants) with Conakry and Bamako. It could serve as a conduit for Guinean exports of fonio and fruit to Mali.

The **Bamako - Monrovia** corridor, passing through **Kankan** and **Nzérékoré** in Guinea. It is highlighted in the 8/12/88 ECOWAS decision and composed by segments of the corridors highlighted by the AfDB. This corridor provides Bamako with an addition access route to the Atlantic Ocean via Guinea and Liberia. From Kankan, it runs north-south in the interior of Guinea and then east-west in Liberia to the coast. Within Guinea, it connects Nzérékoré (approx. 400,000 inhabitants) in the remote Forested Guinea region to Kankan and Mali in the north and Liberia in the south. It could serve as a conduit for fonio and fruit exports to Mali and rubber, groundnut, potato, and fruit exports to Liberia.

The **Conakry - Abidjan 1** corridor, going through **Kindia, Mamou, Faranah, Kissidougou, Guéckédou, and Nzérékoré** in Guinea and Man, Dékoué and Yamssoukro in Côte d'Ivoire. It is defined as an essential corridor by the AfDB and composed of several segments of the Trans-African Highway and the WAEMU network. It serves several cities in the Forested Guinea region. Within Guinea, in addition to Kindia and Mamou (cited above), it connects Faranah (300,000 inhabitants), Kissidougou (300,000 inhabitants), and Guéckédou (250,000 inhabitants) to Nzérékoré and Côte d'Ivoire in the east and Conakry in the south-west. Based on the It could serve as a conduit for Guinean exports of cashews and cocoa to Côte d'Ivoire.

Moreover, from Mamou, the Conakry – Abidjan corridor runs north-south in the interior of Guinea, at approximately the same distance from the coast (250 kilometers) as the Conakry – Dakar corridor, corridor 2 above. Hence, one could also contemplate a Dakar – Abidjan corridor that passes through the interior of Guinea (a combination of corridors 2 and 5). This inland route is shorter than the Trans-West African Coastal Road (TAH7, corridor 1 below, which crosses into Sierra Leone and passes nearby Freetown). It is also less administratively burdensome, requiring only two international border crossings for a trip from Dakar to Abidjan, instead of the seven border crossings required for the same trip via the Trans-West African Coastal Road. Together corridors 2 and 5 connect the Mid-Guinea and Forested Guinea regions with Côte d'Ivoire in the east, Senegal in the north, and Conakry in the south-west.

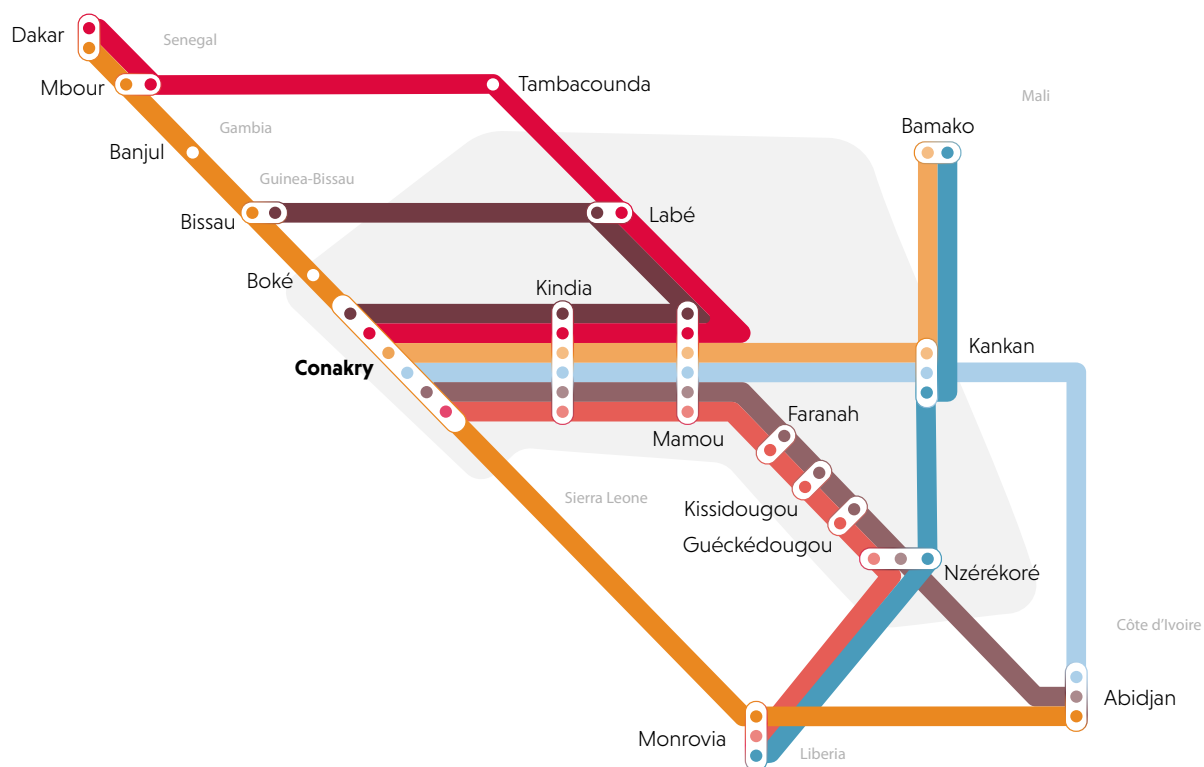
The **Conakry - Abidjan 2** corridor, going through **Kindia, Mamou, and Kankan** in Guinea and Odienne, Man, and Yamssoukro in Côte d'Ivoire. It is highlighted as an essential corridor for the regional integration of Guinea by the AfDB and is composed of several segments of the WAEMU network. It could support exports of cashews and cocoa to Côte d'Ivoire.

The **Conakry - Bissau** corridor, going through **Kindia, Mamou, Labé, and Koundara**. It was highlighted as an essential corridor for regional integration by the AfDB and composed of several segments of the WAEMU network. Within Guinea, it connects Kindia and the cities of the Fouta Djallon region with the ports of Bissau and Conakry. While the shortest route in kilometers between Conakry and Bissau remain the TAH7 (which goes along the coast), frequent delays in crossing some of the rivers along the TAH7 makes this alternative route very popular.

The **Conakry - Monrovia** corridor going through **Kindia, Mamou, Faranah, Kissidougou, Guéckédou, and Nzérékoré**. It is highlighted as an essential corridor for Guinea's regional integration by the AfDB. It could serve as a conduit for rubber, groundnut, potato, and fruit exports to Liberia.

FIGURE A1

Corridors selected

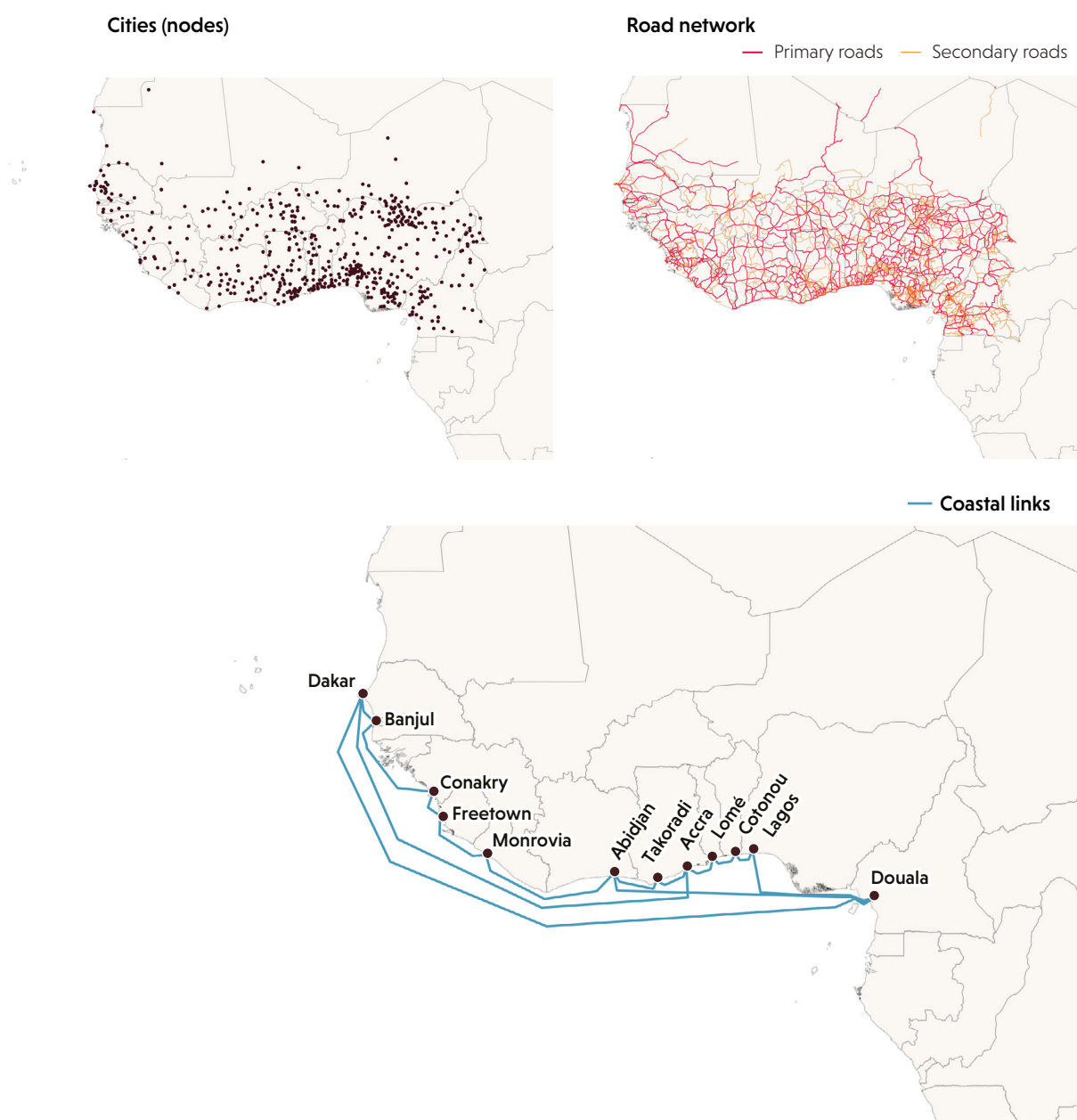


Annex 2

Market Access Analysis Methodology.

FIGURE A2

Inputs of the model (OSM data, CIESIN data and authors' calculations)



Market Access is a measure of the ability of a city to trade with the rest of the economy. Total Market Access is a combination of Firm Market Access (ability to export) and Consumer Market Access (ability to import). Cities have a higher level of Market Access if they are better connected to other cities by roads, railways, and seaports.

Following the iceberg transport cost model (Samuelson 1954), let:

$$\tau_{ij} \equiv 1 + (\text{Shipping cost from } i \text{ to } j / 50,000)$$

where τ_{ij} is a measure of the costs to export from city i to city j . It is defined as how much worth of goods need to be shipped from origin city i to destination city j in order for 1 unit of value (or 50,000 USD, the default value of a twenty-foot equivalent unit (TEU) container) arrives at city j . If shipping costs were 0, τ_{ij} would equal 1. Any value of τ_{ij} greater than 1 represents the shipping costs, which "melt away" in the iceberg model before one unit of the good arrives at destination city j .

The market access that firms in city i have to consumers in city j is estimated by taking the "market size" (measured by GDP) of city j and dividing it by how much it costs to export from city i to city j , τ_{ij} . By summing this measure across all cities besides city i , we get the Firm Market Access (FMA) of city i . Consumer Market Access (CMA) is calculated in a similar manner, except import costs are used instead of export costs. For a city i define the Firm Market Access, FMA_i and Consumer Market Access CMA_i as follows:

$$FMA_i \equiv \sum_{j \neq i} \left(\frac{1}{\tau_{ij}} \right)^\theta Y_j$$

$$CMA_i \equiv \sum_{j \neq i} \left(\frac{1}{\tau_{ji}} \right)^\theta Y_j$$

where j is the city being traded with, Y_j is that city's market size, and θ is a parameter representing the sensitivity to transport costs. As an estimate of θ , we follow Head and Mayer (2014), who survey the literature and find that estimates vary widely between 3 and 13, depending on the estimation method used, with a mean value of $\theta = 6.74$.

Now the market access, MA_i , of a city i is defined as

$$MA_i \equiv FMA_i + e^\beta \times CMA_i$$

or, alternately,

$$\ln MA_i \equiv \ln FMA_i + \beta \times \ln CMA_i$$

where β is the labor share of income. A standard value for the labor share in developing countries is Gollin's (2002) lower bound estimate of $\beta=0.65$.

To analyze changes in Market Access due to infrastructure improvement and trade facilitation measures, two different versions of the model were implemented, each based on different parameters and components for transportation costs. First, for the analysis of the impact of infrastructure improvements, trade costs were evaluated in dollars to ship a twenty-foot equivalent unit (TEU) one kilometer (USD/TEU/km) and calculated as the sum of raw transport cost, tariffs, and customs processing fees. Second, for the analysis of the impact of trade facilitation measures, trade costs were defined in hours and calculated as the sum of transport time and border crossings delays. For a comparison of the two version of the model, see [Table A1](#) below. The implementation of two separated models allows to quantify separately changes in market access due to reductions in monetary cost (i.e. freight costs) and reductions in travel time (i.e. border crossings delays) without having to make very strong assumptions about the monetary value of delays at borders. It is important to point out that, considering that each application of the model uses different components and parameters for transportation costs, the effect magnitudes are not comparable and therefore a comparison of the relative efficiencies of the trade facilitation measures versus infrastructure improvements can be made. However, this method does allow one to compare the distribution of the effects of such measures and investments.

TABLE A1**Parameters of each version of the Market Access model and sources**

	Infrastructure improvement analysis	Trade facilitation analysis
Components of transport costs	<ul style="list-style-type: none"> • Freight costs (ranging from 0.5 to 3.0 USD/TEU/km) • Tariffs (Doing Business 2015) • Customs processing fees (Doing Business 2015) 	<ul style="list-style-type: none"> • Travel time (ranging from 25 to 100 km/h depending on the quality of the road) • Border crossings delays (Doing Business 2015)
Container value	50,000 USD is the notional shipment value provided to survey respondents when asked to estimate the costs of trading across borders in the Doing Business Indicators (DBI).	The 800-hour time-value is taken by dividing the shipment value in USD by a range of estimates for the time value presented by studies reviewed in Shams (2017). A conservative number is taken to account for differences between developed and developing countries.
Unit of estimation	Freight Cost (USD/TEU/km)	Time (Hours)

Annex 3

MA Model: Gains in Market Access Only from Infrastructure Improvements by city and corridor.

	Bamako - Conakry	Bamako - Monrovia	Conakry - Bissau	Conakry - Abidjan 2	Conakry - Monrovia	Conakry - Abidjan 1	Dakar - Conakry	TAH7
Labé	1.8%	0.4%	1.5%	2.0%	1.1%	1.4%	1.7%	0.9%
Sangarédi	0.6%	0.2%	0.2%	0.7%	0.2%	0.5%	0.4%	2.0%
Pita	1.7%	0.3%	1.6%	1.9%	1.3%	1.6%	1.8%	0.8%
Kamsar	0.6%	0.2%	0.2%	0.7%	0.2%	0.5%	0.4%	1.8%
Fria	0.6%	0.2%	0.2%	0.7%	0.2%	0.5%	0.4%	1.1%
Kindia	1.2%	0.2%	0.8%	1.3%	0.8%	1.0%	0.9%	0.8%
Nzérékoré	1.3%	0.9%	0.8%	1.4%	3.4%	4.1%	0.9%	2.4%
Siguiré	3.8%	1.2%	1.1%	3.2%	1.1%	1.4%	1.3%	1.0%
Dinguiraye	2.4%	0.4%	1.2%	2.6%	1.2%	1.6%	1.4%	0.9%
Boké	0.6%	0.2%	0.2%	0.7%	0.2%	0.5%	0.4%	2.0%
Kankan	3.3%	0.6%	1.2%	3.8%	1.5%	1.7%	1.4%	1.0%
Mamou	1.7%	0.3%	1.2%	1.9%	1.3%	1.6%	1.4%	0.8%
Faranah	1.5%	0.3%	1.2%	1.7%	2.3%	2.4%	1.3%	0.9%
Kissidougou	1.5%	0.4%	1.1%	1.6%	2.8%	2.9%	1.3%	1.1%
Guéckédougou	1.4%	0.4%	1.1%	1.5%	3.2%	3.4%	1.3%	1.2%
Macenta	1.4%	0.5%	1.1%	1.3%	3.4%	3.7%	1.3%	1.7%
Conakry	0.6%	0.2%	0.2%	0.7%	0.2%	0.4%	0.3%	0.7%

Annex 4

Spatial Computational General Equilibrium Model Methodology (Lebrand, 2021).

We use the theoretical framework from Redding (2016) that we apply to 662 locations from 16 countries in West Africa: Benin (76 districts), Nigeria (37 provinces), Gambia (6 districts), Senegal (46 districts), Mauritania (44 districts), Guinea-Bissau (9 districts), Mali (50 districts), Togo (21 districts), Ghana (137 districts), Cameroon (58 districts), Niger (36 districts), Burkina Faso (45 districts), Côte d'Ivoire (34 districts), Liberia (15 districts), Sierra Leone (14 districts), and Guinea (34 districts⁶¹). Each location is indexed by i . Locations differ from one another in terms of land supply, productivity, amenities, and their geographical location relative to one another. Bilateral trade costs for goods are assumed to take the iceberg form, such that d_{ni} units of a good must be shipped from location i for one unit to arrive in location n , where $d_{ni} > 1$ for $n \neq i$ and $d_{nn} = 1$. Land and labor are the two factors of production. Workers are mobile across locations within country but not across countries. They have idiosyncratic draws for preferences for each location within their own country.

The detail of equations for consumer preferences, expenditure shares and price indices, residential choices and income can be found in the paper (Lebrand, 2021).

The general equilibrium of the model can be represented by the measure of workers (L_n) in each location $n \in N$, the share of each location's expenditure on goods produced in other locations (p_{ni}) and the wage in each location (w_n).

The information needed to calibrate the model comes from traditional data sources and satellite images.

Four types of data at the state and district level are used: residential land size, labor force, wages, and transport costs. Labor force includes the active population as calculated by the Global Human Settlement Layer (GHSL) for 2015. All wages are monthly and expressed in dollars based on estimates from Tilottama et al. (2010). Land covers urban areas using CIESIN data.

We assume labor mobility within country but not across countries for simplicity.

Following Redding (2016) and a specified residential choice equation, workers can move to a location with higher wages and lower consumption and housing prices depending on their initial preferences across the amenities that are offered across locations. Such assumptions smooth the movement of workers across locations, otherwise all workers will move to the locations with the highest purchasing power.

61. To ensure the homogeneity in the size of administrative units across countries, the level of analysis chosen for Guinea is the prefecture level (districts).

Transport costs are measured as a function of the travel time to reach other locations from the center of each location. The travel time, which is calculated using Geographical Information Systems (GIS) network techniques, is the shortest time given all the possible routes in the road network. Travel times are based on categories of roads from Open Street Map (primary, secondary, tertiary and the rest) with assumptions assigned for each category. For the main roads in the baseline, 35 km per hour is assumed on the primary network and 20 km per hour for the rest of the main network (secondary and tertiary roads). While trucks may move faster on certain segments than others, the overall limited quality of the roads as well as activities alongside the roads slow down land-based freight movement.

In addition, frictions at the border increase travel time between pairs of locations. Delays are added at the border in two ways: a transit time for crossing countries which are neither the origin or the destination, and a final delay when reaching the country of destination. Delays for transiting a country are assumed to be 20 hours for each border crossing. The same time is assumed across all borders, given the lack of consistent data for time delays at borders in West Africa. Delays when reaching the country of destination are assumed to be 50 hours, which represent the time needed to go through the administrative trading processes not included in the transit time. However, given the unreliability of some data across different sources, we assume the same amount of delays across all countries and pairs of countries. No additional delays are assumed for trade within countries.

In the counterfactuals, we increase the driving speed to 80 km per hour on the segments of the roads that are being renovated. While this speed is relatively high, it is the driving speed for trucks observed in richer economies and expected on newly renovated segments. In complementary scenarios, transit delays are reduced to zero and final border delays are halved.

The objectives of this study are to (1) assess the impact of regional and internal connectivity on jobs and access to services and (2) to provide recommendations for policy reforms and investments. This analysis uses quantitative and qualitative approaches to understand the opportunities that better connectivity provides for secondary cities in Guinea, what factors might constrain the potential for growth and, how policy makers at different levels of government should respond to maximize the benefits of economic corridors. This analysis also aims to provide a better understanding of the relative impact of transport improvements and direct trade facilitation reforms. Finally, the study assesses complementary reforms, investments, and overall policies to develop practical and implementable recommendations that could be deployed to enhance the returns to better trade and connectivity to urban areas in Guinea.

