

Electronic Billing to Shape the COVID-19 Recovery

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Common Perceptions

The COVID-19 pandemic has been an unprecedented global crisis with economic consequences that are still unfolding. Understanding how various sectors of the economy have been affected is of particular importance to policy makers as they attempt to address and mitigate the impacts of the crisis. Careful consideration should be given to Sub-Saharan Africa, since most of the region may not have full access to a COVID-19 vaccine until 2023 (Economist Intelligence Unit 2020). Absent a widely administered vaccine, the status quo of COVID-19–related mortality, morbidity, and economic shock is likely to persist.

Although the early months of the COVID-19 crisis were characterized by lockdowns trying to contain the spread of the virus, recent policy responses have focused on easing restrictions and deploying targeted government interventions to support the most affected sectors of the economy (Djankov and Panizza 2020). In the developing world, an eventual recovery is likely to unfold unevenly across economic sectors, echoing the heterogeneity of the pandemic’s impact.

Questions We Should Be Asking

Similar to patterns observed in the developed world (Bartik et al. 2020; Brynjolfsson et al. 2020), several Sub-Saharan countries experienced a “K-shaped” recovery in the months following the initial shock of the pandemic. This characterization describes the fact that some sectors recovered (and at times even surpassed) their

pre-pandemic levels of turnover and employment, while others fared badly. This variance highlights the potential for efficiently allocated government interventions.

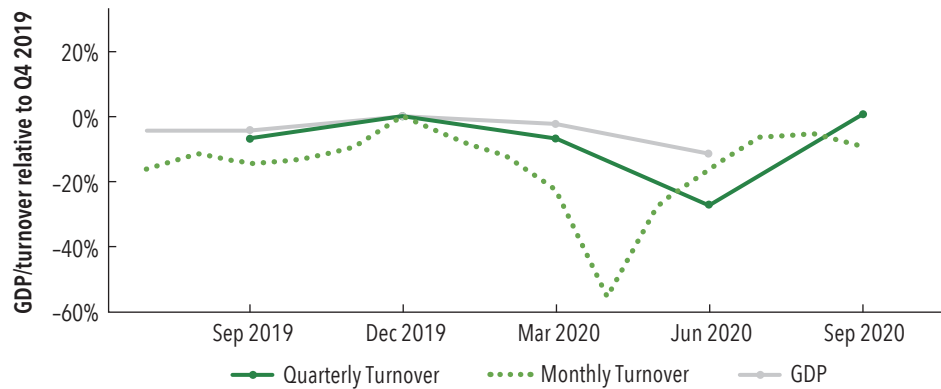
The traditional set of economic indicators available to policy makers (for example, national accounts data) is typically reported with a lag ranging from months to quarters. Reducing this lag allows for the delivery of more precise and targeted economic policies. What tools and resources can policy makers harness for this purpose? One option is to leverage administrative data, for example, high-frequency tax data.

Challenging Perceptions

By maintaining comparatively low case rates, Rwanda is widely considered to have successfully managed the COVID-19 pandemic. As such, the country’s recovery trajectory may offer a best-case scenario for other economies in Sub-Saharan Africa—until vaccines are widely administered. To better understand how individual economic sectors fared, DIME leveraged two sources of high-frequency administrative data submitted monthly to the Rwanda Revenue Authority (RRA): employment and social security tax filings (PAYE) by formal employers and electronic billing machine (EBM) transactions.

EBMs are teller devices that record transactions made by VAT-registered firms. This note uses transactions processed through EBM II, a popular software version of EBM. PAYE comprises the filings of 450,000 workers while EBM transactions

■ ■ Figure 4.3 GDP and Turnover



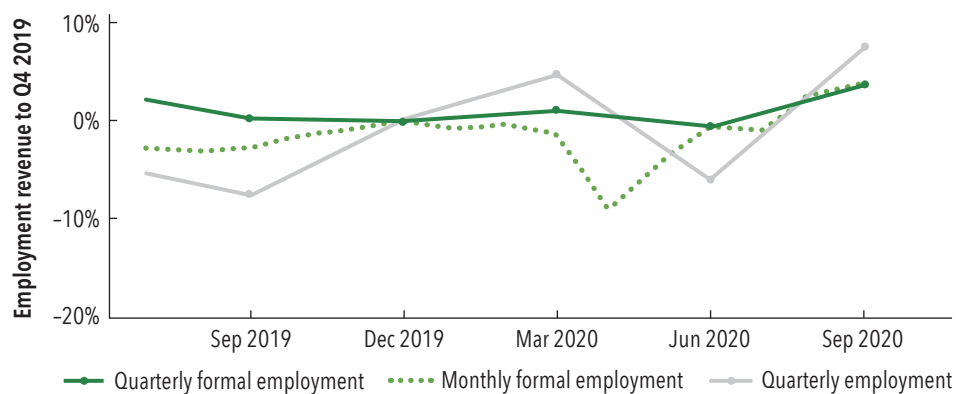
Note: GDP (as measured by the Rwandan government) is plotted on a quarterly basis, while turnover (as measured by DIME using EBM) is plotted on both a monthly and quarterly basis. All three series are plotted relative to their Q4 2019 level.

account for 1.2 trillion Rwandan francs (RwF) of value-added annually, each recording approximately one-tenth of the official national accounts data. The data was aggregated to construct a granular representation of employment (see figures 4.4, 4.6 and 4.7) and turnover at the firm-by-month level (see figures 4.3 and 4.5). Together, this high-frequency administrative data shows that Rwanda experienced a large shock to both employment and turnover, peaking in April 2020 and recovering by September 2020. These results are comparable to national statistics on aggregate employment and GDP compiled by the National Institute of Statistics Rwanda.

The granularity of the data allowed the team to describe recovery in the various sectors of the Rwandan economy. Results indicated that sectors dependent on face-to-face interactions between patrons and employees, such as accommodation and food, remained persistently below pre-COVID-19 levels. This pattern is likely similar in other developing countries (Bartik et al. 2020; Brynjolfsson et al. 2020).

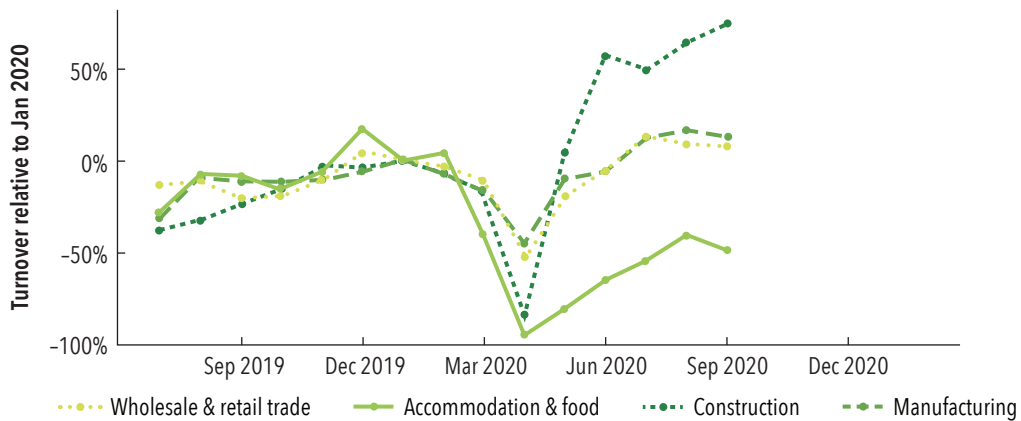
Finally, the team documented the differential impact of the COVID-19 shock on employment across the public and private sectors, with the latter being significantly more affected. This is

■ ■ Figure 4.4 Employment and Formal Employment



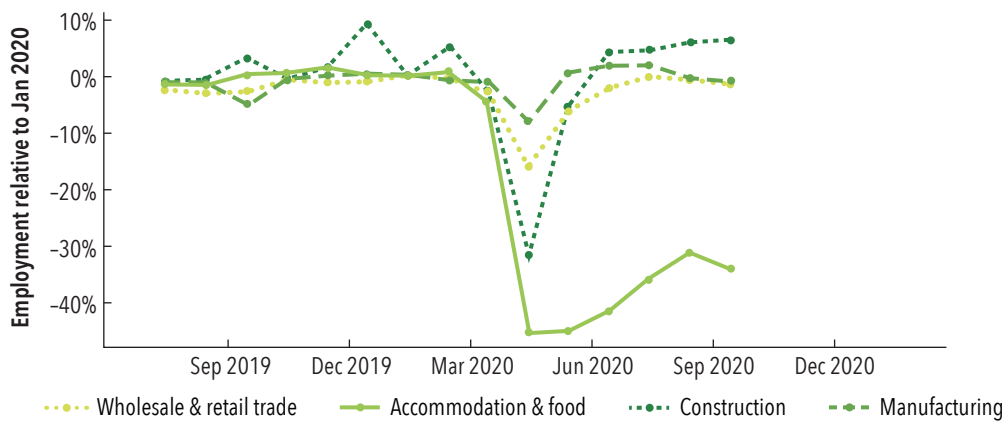
Note: Employment (as measured by the Rwandan government) is plotted on a quarterly basis, while formal employment (as measured by DIME using PAYE) is plotted on both a monthly and quarterly basis. All three series are plotted relative to their Q4 2019 level.

Figure 4.5 Turnover by Industrial Sector



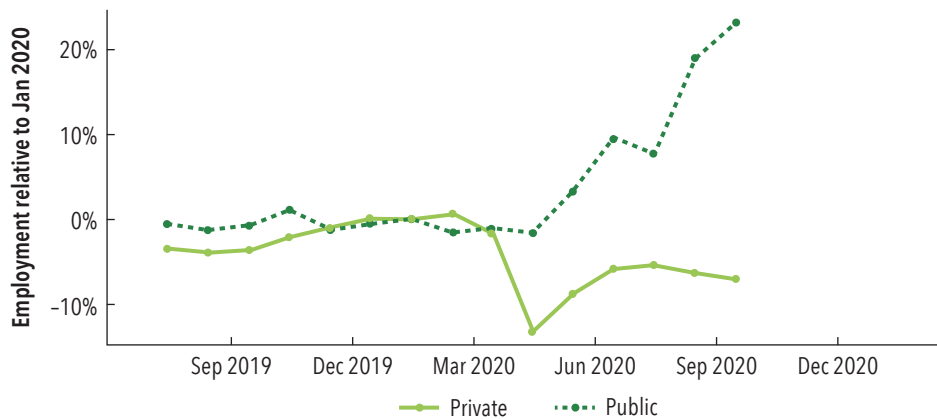
Note: Turnover (as measured by DIME using EBM) is plotted on a monthly basis relative to its January 2020 level. Each sector is defined according to the United Nations' 1-digit International Standard Industrial Classification (ISIC).

Figure 4.6 Employment by Industrial Sector



Note: Employment (as measured by DIME using PAYE) is plotted on a monthly basis relative to its January 2020 level. Each sector is defined according to the United Nations' 1-digit International Standard Industrial Classification (ISIC).

Figure 4.7 Employment by Type of Enterprise



Note: Employment (as measured by DIME using PAYE) is plotted for both public and private firms on a monthly basis relative to their January 2020 level.

consistent with a greater feasibility of remote work in the Rwandan public sector as well as additional employment protections for public sector employees. During the recovery, public and private sector employment continued to diverge, highlighting the effect of the fiscal stimulus on public sector employment.

Policy Implications

Digital technology is transforming governments. The growing use of electronic filing and high-frequency data collection offers opportunities for governments to better understand their economies and deliver targeted policy responses. DIME works alongside government partners to generate actionable knowledge, build their capacity to analyze vast amounts of data, and transform that data into insight. For example, online filings and digital payment systems can generate granular information on taxpayers' revenue in real-time. Likewise, VAT credit systems can decrease the probability of misreporting and improve the enforcement capacity of fiscal authorities.

DIME is committed to helping fiscal authorities use and design data systems to improve policy making, strengthen citizens' trust in institutions, and bolsters national revenue streams. It does so via a "data lab" approach consisting of three pillars:

The first pillar focuses on the rigorous evaluation of digital tools and data infrastructure for tax policy. Such evaluations explore the impact of data systems (for example, digital invoicing schemes and high-frequency data collection) on taxpayer uptake and experience. Evidence-based findings related to the regulation, monitoring, and incentivizing of taxpayers can then be used to design effective policy recommendations.

The second pillar focuses on the development of digital tools for fiscal administrations. Modernizing fiscal data systems can improve the effectiveness and efficiency of tax authorities, for example via the use of machine learning models that predict non-compliance and flag which firms should be audited as a priority.

Compared to national government instances, which collect income tax, subnational governments often rely disproportionately on property tax for revenue generation. As such, the third pillar focuses on deploying digital tools at the subnational level. In addition to behavioral interventions aimed at improving taxpayer engagement, modern tools such as remote sensing imagery (for example, via satellites) can help local governments better register and assess property values. Taken together, these three pillars can help governments across the world leverage the potential of fiscal data systems and deliver policies that are effective, targeted, and evidence-based.



This case study is based on an impact evaluation conducted within DIME's Economic Transformation and Growth research program. Kieran Byrne, Saahil Karpe,* Florence Kondylis,* Megan Lang, and John Loeser.* 2020. Sectoral Heterogeneity in the COVID-19 Recovery: Evidence from Rwanda." Working paper. <http://johnloeser.github.io/assets/bkkl.pdf>.*

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