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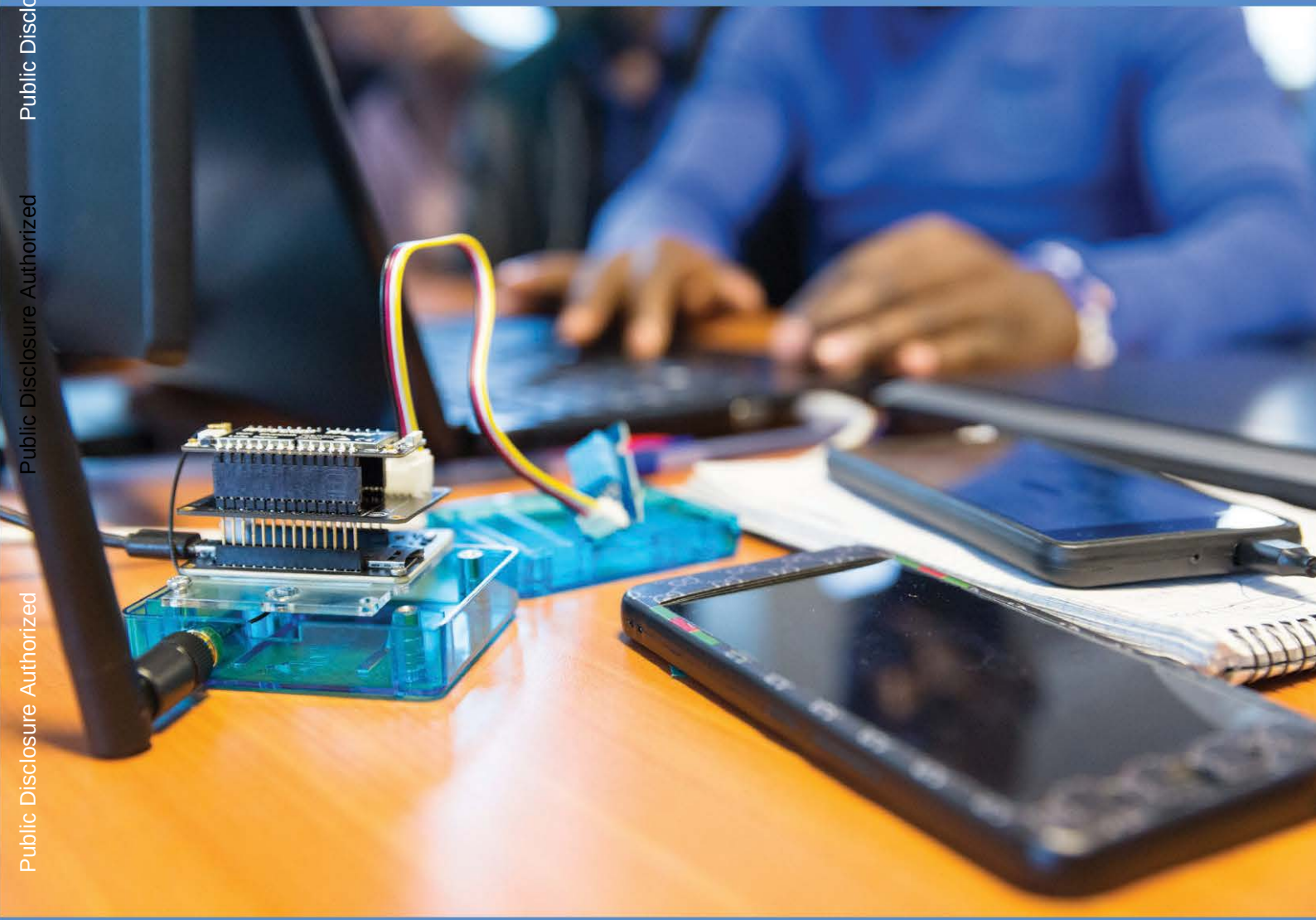
Rwanda Economic Update

September 2022 | Edition No. 19

Boosting Exports Through Technology, Innovation and Trade in Services



WORLD BANK GROUP

Rwanda Economic Update

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September 2022

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF BOXES

ACRONYMS

AfCFTA	African Continental Free Trade Area
ASEAN	Association of Southeast Asian Nations
BNR	Banque Nationale du Rwanda (National Bank of Rwanda)
CAD	Current Account Deficit
CBR	Central Bank Rate
CHOGM	Commonwealth Heads of Government Meeting
CPI	Consumer Price Inflation
DRC	Democratic Republic of Congo
DTRI	Digital Trade Restrictiveness Index
EAC	East African Community
EMDEs	Emerging Market and Developing Economies
EU	European Union
FDI	Foreign Direct Investment
FY	Fiscal Year
GCI	Global Competitiveness Index
GDP	Gross Domestic Product
GDPR	General Data Protection Regulation
GEP	Global Economic Prospects
GoR	Government of Rwanda
ICPAR	Institute of Certified Public Accountants of Rwanda
IMF	International Monetary Fund
IPCOR	Incremental Public Capital Output Ratio
ISIC	International Standard Industrial Classification
ISO	International Organization for Standardization
IT	Information, Communication and Technology
KCC	Kigali Convention Centre
LODA	Local Administrative Entities Development Agency
MBRP	Manufacture and Build to Recover Program
MICE	Meetings, Incentives, Conferences, Exhibitions
MINECOFIN	Ministry of Finance and Economic Planning
MINICOM	Ministry of Trade and Industry
MRA	Mutual Recognition Agreement
NST	National Strategy for Transformation
OECD	Organization for Economic Co-operation and Development
Rwf	Rwanda Franc
SDR	Special Drawing Rights
SSA	Sub-Saharan Africa
US$	United States Dollar
WBES	World Bank Enterprise Surveys
WBG	World Bank Group
WTO	World Trade Organization

ACKNOWLEDGMENTS

The Rwanda Economic Update (REU) analyzes recent economic developments and prospects, as well as Rwanda's policy priorities. The REU is intended for a wide audience of policymakers, business leaders, other market participants, analysts of Rwanda's economy, and civil society. It draws on data reported by the Government of Rwanda and additional information collected by the World Bank Group in its regular economic monitoring and policy dialogue.

Published twice a year, each issue has a special feature spotlighting a particular topic. The 19th edition of REU focuses on the role of technology and innovation to exporting and openness to trade in services. in services. The current edition, led by Calvin Zebaze Djiofack (Senior Economist) and Peace Aimee Niyibizi (Economist), is a collective endeavor and involved staff from several parts of the World Bank. The team includes Esdras Byiringiro (Agriculture Economist), Charles Kunaka (Lead Trade Facilitation), Erwin R. Tiongson (Senior Consultant), Dominique Njinkeu (Lead Trade Facilitation Expert), Bernard Hoekman (Lead Logistic Expert), William Shaw (Senior Consultant), Victor Steenbergen (Economist), Anna Twum (Economist, Internal Growth Center), Samiha Chowdhury (Consultant), Marco Sanfilippo (Consultant), Rohit Ticku (Consultant), Maria Filipa Seara E Pereira (Consultant), Anita Nyajur (Consultant), and Abdoul Akim Wandaogo (Consultant). The team is very grateful to Philip Schuler (Lead Economist) for invaluable inputs on the structure and messaging of the report.

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Views expressed in the REU are those of the authors and do not necessarily reflect the views of the World Bank Group, its Executive Directors, the countries they represent, or the Government of Rwanda.

The report is based on information current as of July 31, 2022

EXECUTIVE SUMMARY

Rwanda's robust economic recovery is facing new headwinds

Rwanda's economy staged a strong recovery in 2021. Real gross domestic product (GDP) rebounded by 10.9 percent in 2021 from its 3.4 percent contraction in 2020. Gradually easing mobility restrictions have supported a broad-based rebound since the second quarter, stimulating domestic demand amid a gradual reopening of economic activities and falling inflation. Although output has recovered to its pre-pandemic levels by the end of 2019, it remains below its long-term potential. However, unemployment continued to be higher relative to the pre-crisis levels as firms were not yet confident about the recovery sustainability and did not hire permanent employees.

Inflationary pressures are mounting, leading the National Bank of Rwanda to tighten monetary policy. After remaining muted in 2021 (averaging 0.8 percent), inflation has accelerated in the first months of 2022, driven mainly by domestic food and utility prices, especially prices of cooking gas. Inflation has reached 13.7 percent in June 2022, a level not seen in the last five years. Underlying price pressures remained strong as core inflation accelerated to 11.2 percent in June 2022. The passthrough of the global oil and fertilizer prices to domestic inflation has partially muted through fiscal subsidies. To curb these inflationary pressures, the National Bank of Rwanda increased its central bank rate (CBR) by 50 percentage points in February 2022, after keeping it at historic low of 4.5 percent—for 22 consecutive months—first to mitigate the impact of COVID-19 on the economy and then to support the economic recovery.

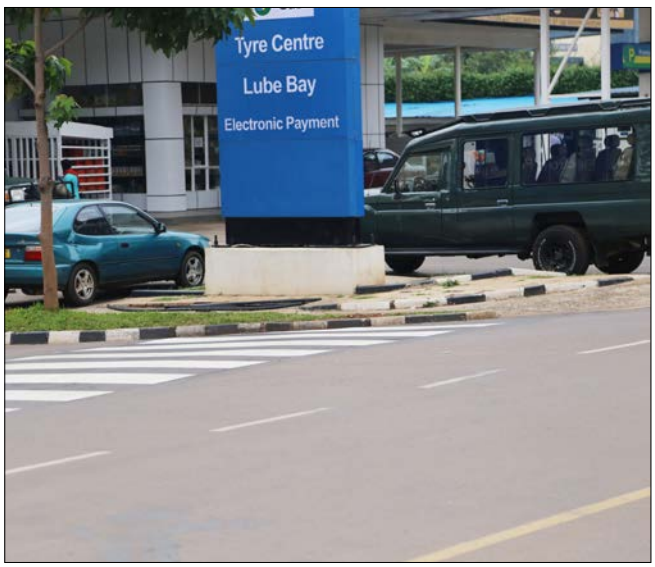
Looking ahead, economic growth is expected to moderate in 2022–24, weighed down by the war in Ukraine. Real GDP growth is projected at 6.0 percent in 2022 and 6.9 percent on average in 2023–2024. The baseline projections assume that the country will receive normal rains that will support agricultural performance and also accounts for the downside effects of the ongoing war in Ukraine through increased global commodity prices. They also assume industrial activities to continue benefiting from government support of the manufacturing and construction sectors and a recovery in tourism activities boosted by the Commonwealth Heads of Government Meeting (CHOGM) meeting as well as other leisure and meeting events planned in 2022. However, softening global growth momentum will negatively affect Rwanda's current account deficit in the near term given higher oil prices and resultant elevated import costs. Risks to this outlook are tilted on the downside, due to the potential for a resurgence of the pandemic, Rwanda's high vulnerability to weather and climate shocks, and the potential for the increasing fiscal deficit to limit the government's fiscal consolidation.

Fiscal consolidation and spending efficiencies will be introduced with the FY22/23 budget to preserve space for growth-enhancing investment. The government plans to carry out a significant rationalization of both recurrent non-wage spending and capital budgets. This will be driven by the phasing-out COVID-related spending, tight recurrent spending control, discontinuing underperforming public investment and avoiding inefficient spending (through digitalizing some delivery of public goods and delivery and strengthening the oversight of state-owned enterprises). On the revenue side, the implementation of the Medium-Term Revenue Strategy through tax policy reforms (personal/corporate income tax and value-added taxes) is expected to raise revenue to 15.9 percent of GDP in FY2023/24 from 15.4 percent of GDP in FY2021/22.

Impact of technology and innovation on firms' export performances

Rwandan firms' participation in international trade has increased dramatically. The share of firms involved in exporting rose from 11 percent in 2006 to 21 percent in 2019, or higher than in any other country in Sub-Saharan Africa (other than Togo--28 percent) and higher than that of most Association of Southeast Asian Nations (ASEAN) countries. The share of firms involved in services exports increased sharply, while the share of exporters among manufacturing firms fell, to levels well below many Sub-Saharan Africa (SSA) and ASEAN countries. Rwanda's share of firms exporting also exceeded the average level in high-income countries (17 percent). The 2019 World Bank Enterprises Survey indicates several constraints on firms' ability to export. Firms that did not participate in exports cited a lack of foreign demand (38 percent) lack of information (12 percent), insufficient production capacity (8 percent); and high trade (5.5 percent) or production (4 percent) costs.

Econometric analysis shows that obtaining International Organization for Standardization (ISO) certification, adoption of e-commerce and access to credit are significantly co-related to a Rwandan firm's participation in exports. Firms with ISO certification are 36 percent more likely to be exporters, but in 2019 only 3 percent of Rwandan firms had obtained ISO certification, placing Rwanda in only the 9th percentile. Thus, support for firms in learning about and applying for ISO certification could facilitate exports. Manufacturers engaged in ecommerce are 27 percent more likely, and firms in other services are 16 percent more likely, to be exporters. However, in 2019, two-thirds of countries had a share of firms engaged in e-commerce that exceeded Rwanda's 43 percent. Investment in internet infrastructure to provide firms low-cost connectivity could improve access to external markets.[1] Finally, access to an additional credit product (i.e., overdraft facility, line of credit or loan, bank financing for working capital, bank financing for investment, and any non-bank financing) is associated with a 10 and 11 percent higher probability of exporting for firms in manufacturing and other services, respectively. Although limited, Rwandan firms' access to finance is greater than that of firms in many other developing countries. Providing sufficient access to finance for firms in times of supply shortages and rising prices, as seen in the post-COVID period, should continue to be a priority for the government.



Innovation is significantly related to exports, although the relationship varies by sector and type of innovation. Firms in services outside of retail that engage in product innovation are 27.5 percent more likely to export than other firms in these sectors. Manufacturing firms that engage in process innovation are 40 percent more likely to export than other manufacturing firms. Thus, providing a new product can be important for services sector

[1] Government has made substantial investments in ICT infrastructure, but continued efforts are needed to upgrade the quality (and uptake) of ICT infrastructure. ICT infrastructure needs to be high-speed, reliable, available, and accessible, and continued investments are required to improve bandwidth and infrastructure reliability. The Networked Readiness Index is a comprehensive composite index that assesses a country's "preparedness to reap the benefits of emerging technologies and to capitalize on the opportunities presented by the digital revolution and beyond" (World Economic Forum, INSEAD, and Cornell University 2016). Rwanda performs least well in readiness (115) and is ranked 106 in infrastructure. In terms of digital infrastructure, Rwanda is lagging because of the lack of investment and inadequate metropolitan and last-mile access networks. The high cost of broadband lines, combined with low computer ownership, put the service beyond the reach of most private users.

firms to succeed in exporting, while manufacturers that export tend to be improving process efficiency or industrial engineering (via ISO certification) to match the productivity of international competitors. Regression results suggest that process efficiency or quality control via ISO certification is a more important correlate of exporting compared to the introduction of new products and services. Thus, the poor performance of Rwandan firms in process innovation (7.2 percent of firms engage in process innovation, placing Rwanda in the 13th percentile of countries, compared to 48 percent of firms in East African Community -EAC- countries) could be a significant constraint on exports.

Rwanda should explore the possibility of creating a dedicated agency under MINICOM with a clear mandate to help addressing the market failures associated with information asymmetry for non-exporters. Like a standard Export Promotion Agency (EPA), the new agency would assist firms with international trade fairs, provide information on foreign markets, and facilitate training and advisory services.

The relationship between training and export participation varies by sector. Service firms outside of retail that provide formal training for permanent, full-time employees are 20 percent more likely to export than other such firms. However, for manufacturing firms the correlation between exporting and offering formal training is not statistically significant. In 2019, 36 percent of firms had formal training programs for permanent, full-time employees, about the same as in other EAC countries (36 percent) and well above the average level in ASEAN countries (18 percent). The government has provided substantial financial support for training: in 2019, 15 percent of firms received training subsidies.

Given the evidence on the strong relationship between ISO certification and exporting and "the lack of demand for product abroad" cited by non-exporters, resources spent on increasing awareness and dissemination of information regarding application and filing procedures may help Rwandan entrepreneurs realize and maximize their exporting potential. Likewise, the positive relationship between e-commerce and exporting in combination with "the lack of information regarding foreign agents, distributors and prospective buyers" cited by non-exporters, suggests investment in Internet infrastructure, combined with a dedicated platform for information provision on foreign markets,, can provide local firms low-cost connectivity to markets and customers aboard.

Rwanda should continue its to foster innovation through tertiary education(WBG-GoR, 2020). Publications and patents in Rwanda have been rising, although from a very low base. Likewise, Rwanda has invested in a range of graduate and postgraduate centers for technical training, including Carnegie Mellon University and the various centers of excellence. Creating incentives for researchers to develop and adapt innovations that benefit industries in Rwanda can help Rwanda to reap the maximum returns to local innovation. A practical way to do this follows the model common in high-income countries, where private firms finance university research to solve production challenges. Given the nascent private sector, the government will have to continue to play a supporting role.

Challenges to trade in services

The government has placed considerable emphasis on expanding services trade. The emphasis on services reflects limits on manufacturing exports due to lack of access to the sea, high transport costs, and small market size. Rwanda has considerable potential to increase incomes and exports by specializing in regional logistics, adding value to agricultural products and investment in consumer and business travel. Services also can support human capital accumulation and innovation, as Rwanda's services sectors tend to employ more highly skilled workers than the manufacturing sector does.

Rwanda has a low level of restrictions on services that should encourage development of a service based economy but there are still important restrictions on data. Sectoral data is not comprehensive, but Rwanda's trade regime for commercial banking, distribution and road freight is similar to that of average levels in many OECD economies. And the ad valorem equivalent of services trade restrictiveness in Rwanda is lower than in a sample of African countries with the requisite data. However, Rwanda imposes restrictions on the cross-border transfer of data and on data processing that could impair firms' ability to participate in services. Regulations require that data must be stored and processed locally, and be accessible to the relevant government authorities. The digital trade restrictiveness index shows that Rwanda is more restrictive in regulating data than the average of other African nations.

Rwanda is facing a skills deficit that, if not remedied, will constrain potential growth for high-skill services exports. A skills assessment estimated that Rwanda needs 5,000 accountants in the public sector and another 2,325 accountants in the financial sector to meet demand, yet it has only 6 percent of that number (ICPAR 2017). Rwanda is lagging behind the rest of the EAC in the number of professionals and is far behind African leaders in services exports such as Mauritius and South Africa.

Rwanda's efforts to achieve international cooperation on services trade policies have been mixed. The number of services sub-sectors where Rwanda has commitments to ensure openness in the EAC agreement (103 out of the 136 identified in the Common Market Protocol) exceeds that of any other member of the Community. However, Rwanda has not participated in discussions initiated by World Trade Organization (WTO) members in e-commerce, domestic regulation of services, investment facilitation and measures to enhance the ability of micro and small and medium enterprises to utilize trading opportunities. Rwanda's lack of engagement in these discussions, all of which are relevant for the country, misses the opportunity to influence their outcomes and to learn about best practice in regulatory policy and areas where coordination can facilitate cross-border services trade. There are other opportunities to pursue further bilateral and multilateral agreements to open services trade, including through the African Continental Free Trade Area (AfCFTA) and reaching mutual recognition agreements concerning the rules governing data privacy and protection.

Rwanda should address its skills shortage by recognizing qualifications of regional professionals and abolishing work-permit regimes for all eligible regional professionals. The EAC mutual recognition agreements (MRAs) should be extended to include professional sectors such as legal, finance, and consulting professionals. To facilitate short-term assignments, the EAC should also consider abolishing work-permit regimes for all eligible professionals.

However, the attraction of regional services providers should be accompanied by aggressive measures to help expand the number of Rwandan professionals. This can be done through a combination of student loan programs, private sponsorships, in-company mentoring, development of a quality tertiary education system focused on high-return activities and strengthening the provision of technical and vocational training by collecting and disseminating information on the quality of skills providers and the returns to different skills (WBG-GoR, 2020**).**

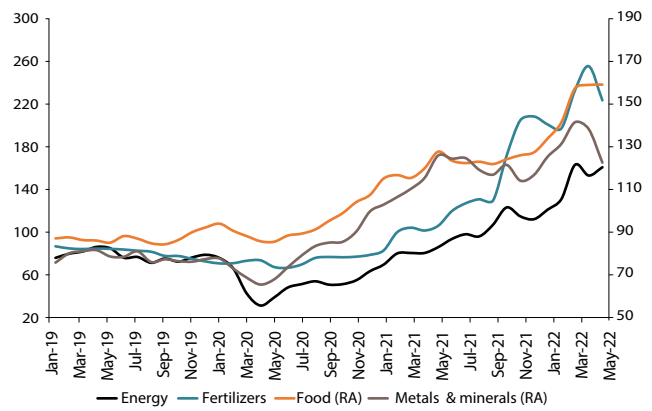
PART ONE

RECENT ECONOMIC DEVELOPMENTS AND OUTLOOK

1.1. Global and regional economic context – from one crisis to another one[2]

The war in Ukraine has set back the global recovery from the COVID-19 pandemic. After contracting by 3.4 percent in 2020 due to the COVID induced economic crisis, the global GDP growth rebounded to 5.7 percent in 2021, the strongest post-recession growth rate in 80 years. The global growth has, however, slowed in first half of 2022, owing to COVID-19 resurgences at the turn of the year, protracted supply disruptions, reduced macroeconomic support and substantial negative spillovers from the war in Ukraine. The war in Ukraine has not only triggered a major humanitarian crisis but also aggravated pre-existing strains in global supply chains, logistics networks, commodity markets, foreign direct investment (FDI), and tourism sectors, weighing on growth across developed as well as emerging market and developing economies (EMDEs). These effects have contributed to tighter financial conditions, magnified financial vulnerability, and heightened policy uncertainty, increasing difficult policy tradeoffs between supporting growth and managing price pressures (Figure 1.1). The World Bank forecasts that global growth is expected to slow to 2.8 percent in 2022 and hover around 3 percent in 2023–24.

Figure 1.1: Developments in global commodity prices
(Price index, 2010=100)



Source: World Bank "Pink Sheet" Datahttps://www.worldbank.org/en/research/commodity-markets

The economic recovery in Sub-Saharan Africa (SSA) has also slowed down as the region faces economic strains from the was in Ukraine. Deceleration of global growth and war-induced disruptions to global food supply are creating headwinds for the region. Although some large exporters of metals and energy are benefiting from elevated commodity prices, surging prices of staple foods and farming inputs are stoking inflation across the region and sharply reducing food affordability.[3] This adds to existing debt vulnerabilities following marked deteriorations in fiscal balances and increased indebtedness caused by COVID-19 relief spending efforts alongside falling tax revenues. The World Bank expects the pace of economic growth in the region to moderate in 2022, expanding by 3.6 percent, down from 4 percent in 2021.

Despite a low exposure to overall trade with Russia and Ukraine, spillovers will weigh on Rwanda. Higher oil prices are expected to boost the import bill of Rwanda, raise international transport costs as well as the cost of all imported items, including food items. This is likely to worsen Rwanda's current account deficit (CAD), which is subjected to further deterioration from weaker global demand of Rwanda' s exports and tourism activities. A spike in global food prices would put pressure on food prices in Rwanda, which account for about 39 percent of the consumer spending in Rwanda (27 percent and 48 percent respectively in urban and rural areas). Higher fertilizer prices are also likely to affect domestic production of food and their prices. So far the impact of increases in global prices of oil and fertilizers have been partially muted as the government has been subsidizing their prices on domestic market. Further increases in these prices on the global market is likely to affect the limited fiscal space for other priorities. This is also expected to make an already delicate fiscal consolation more challenging: preserving development spending under the National Strategy for Transformation (NST1), mobilizing more domestic revenues, and containing debt pressures.

[2] This section draws on World Bank, Global Economic Prospects (GEP) (June 2022), and World Bank, Africa's Pulse (April 2022).

[3] WFP (World Food Programme), 2022).

1.2. Rwanda's economy has broadly recovered in 2021, but labour market is still lagging

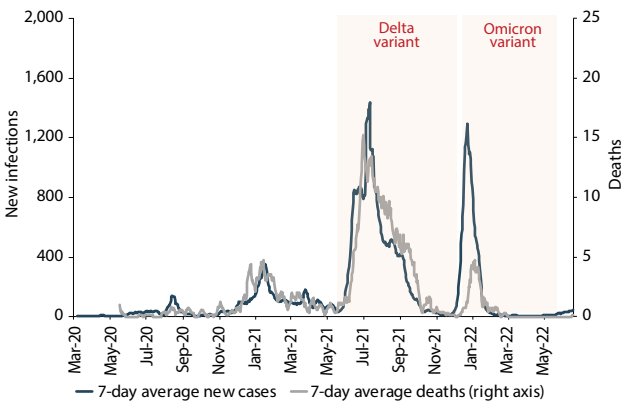
Rwanda has adopted "living with COVID-19" normality. After grappling with the third—and more severe—wave in June–August 2021, Rwanda successfully contained the spread of infections while continuing its vaccination campaign. Thanks to increased immunity conferred by vaccination, COVID-19-related mortalities were less severe with the Omicron-variant wave, despite new spikes in infection (Figure 1.2). The authorities report that 70.6 percent of the total population of about 13 million has been vaccinated with at least two doses as of end-July 2022, while 40.7 percent of total population had received three doses.[4] These vaccination rates place Rwanda among the top ten countries in Africa (Figure 1.3).

Rwanda is now fully open for business. With high vaccination rates and low infection rates, the authorities have re-opened land borders and lifted curfew in early March 2022 while continuing to enforce preventive health measures. The required quarantine period for those who have been fully vaccinated has been lifted toward end January 2022.[5] Currently, testing to attend physical gatherings and social events is not mandatory. Businesses are now operating at full capacity since March 2022. The obligation of wearing masks was also lifted in May 2022.

Rwanda's economy staged a strong recovery in 2021. After contracting by 3.4 percent in 2020, gross domestic product (GDP) is estimated to have grown by about 11 percent in 2021. Gradually easing mobility restrictions have supported a broad-based rebound since the second quarter, stimulating domestic demand amid a gradual reopening of economic activities and falling inflation. On the production side, growth was supported primarily by the buoyed service and industrial sectors, while favorable weather conditions boosted the agriculture sector (Figure 1.5). The level of GDP in 2021 has already exceeded the pre-pandemic levels, but remains 4 percent below the 2009–2019 trend (Figure 1.4).

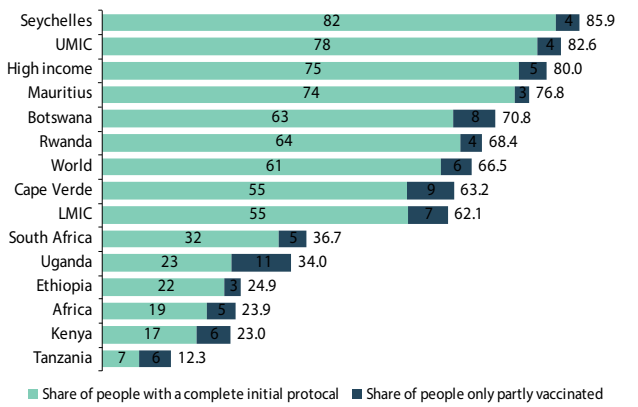
The services sector powered the recovery in 2021 after being hit hard by the COVID-19 pandemic. An easing of mobility restrictions and reopening of economic activities helped the recovery in the services sector. The output in the services sector expanded by 11.9 percent in 2022 and that growth in services output accounts for more than 50 percent of GDP growth (Figure 1.5). This strong performance was mainly driven by four sub-sectors—trade,

Figure 1.2: Rwanda – COVID-19 cases and deaths



Source: WBG staff calculations based on daily Rwanda Biomedical Center (RBC) updates

Figure 1.3: World divergence in COVID-19 vaccination
(share of vaccinated people against COVID, June 30, 2022)

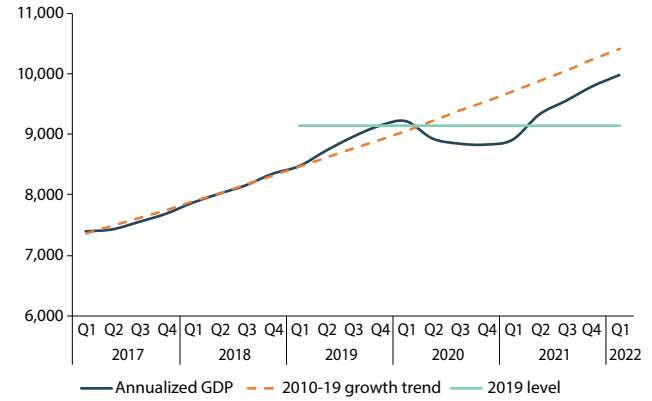


Source: WBG staff calculations based on data by Our World in Data
Note: Alternative definitions of a full vaccination, e.g., having been infected with SARS-CoV-2 and having 1 dose of a 2-dose protocol, are ignored to maximize comparability between countries. UMIC: upper middle-income country, LMIC: lower middle-income country.

[4] RBC. COVID19 updates. https://www.rbc.gov.rw/fileadmin/user_upload/annoucement/Update-on-COVID-19-31-05-2022-eng.jpg.

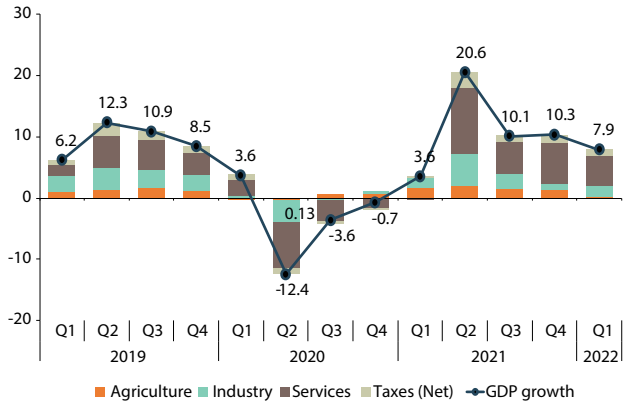
[5] Office of the Prime Minister's Communiqué following the Cabinet Meeting of January 26, 2022.

Figure 1.4: Rwanda GDP: actual vs historical
(RWF million)



Source: World Bank staff calculations based on NISR

Figure 1.5: Rwanda GDP growth and sectoral contributions
(percentage points, year-on-year)



Source: World Bank staff calculations based on NISR

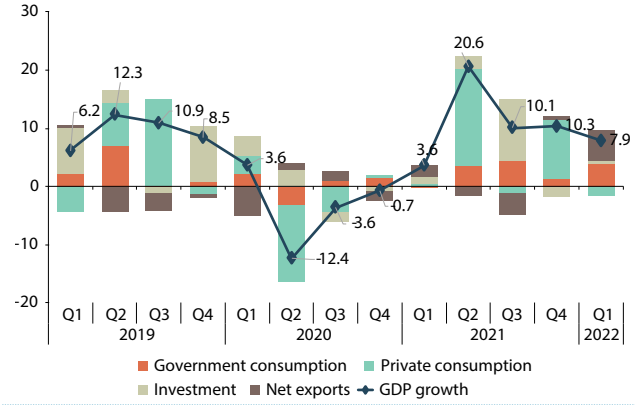
transport, education and financial services—that generated more than 55 percent of the overall services growth. The resumption of conferences and sporting events in Rwanda has fueled the growth in hospitality-related services, however, the overall output in 2021 remained about 28 percent below its pre-pandemic (i.e., 2019) level. The number of tourist arrivals increased by 2.8 percent in 2021 compared to 2020 but remained only 30 percent of their pre-pandemic levels. Output in transport services also remained below their pre-pandemic level, at about 13 percent, as buses did not operate at their full capacity for almost the entire year of 2021.

Construction and mining powered overall industrial growth. The mining sector expanded by 26.5 percent in 2021 (although output remains below pre-pandemic levels), largely driven by high mineral prices on international markets combined with the resumption of mining and quarrying activities following eased COVID-containment measures. Construction production increased by 15.1 percent in 2021 after declining by 5.6 percent in 2020. Rebound in construction went along with the rise in imports of construction materials other than cement and metallic ones. Manufacturing (led by food and beverages production) experienced also double-digit growth of 10.5 percent in 2021. The production of textiles and papers made significant contributions to not only the manufacturing growth but also to exports in 2021.

The agriculture sector also recovered from bad performance. After growing by less than 1 percent in 2020, agricultural output increased by 6.4 percent in 2021, primarily due to a strong performance in food production (6.7 percent), livestock (8.5 percent) as well as fisheries (26.9 percent). Output of Rwanda's export crops remained almost constant relative to their 2020 levels. Despite high prices on international market, the production remains below the pre-crisis levels. On the other hand, tea production increased by 4 percent only in volume terms.

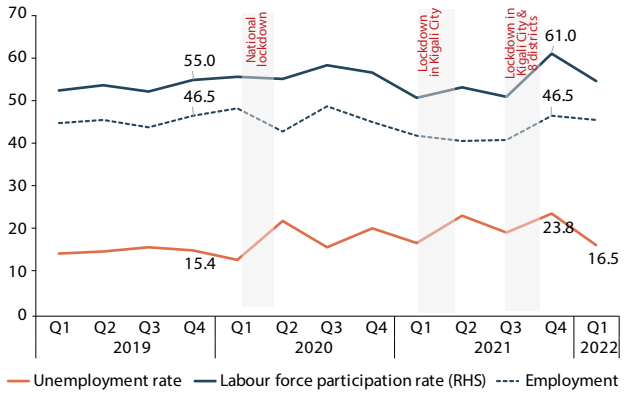
On the demand side, the solid GDP growth in 2021 was due to robust private consumption, stimulated by eased restrictions on mobility and low inflation pressures. Overall, private consumption contributed about 6.3 percentage points to growth in 2021, from -3.6 percentage point contribution in 2020, and almost as the typical 6.2 percentage points it contributed during 2018–2019 (Figure 1.6). Government consumption generated about 2.2 percentage points to growth in 2021, much better than the 0.3 percentage point contribution in 2020, as fiscal support for firms and households affected by the pandemic continued to roll out. Investment also recovered strongly, driven by increased road construction in City of Kigali and other secondary cities as well as the resumption foreign direct investment (FDI).

Figure 1.6: Contribution to GDP growth by expenditure
(percentage points, year-on-year)



Source: WBG staff calculations based on NISR data

Figure 1.7: Quarterly labor market indicators: Rwanda 2019–2021
(percent)



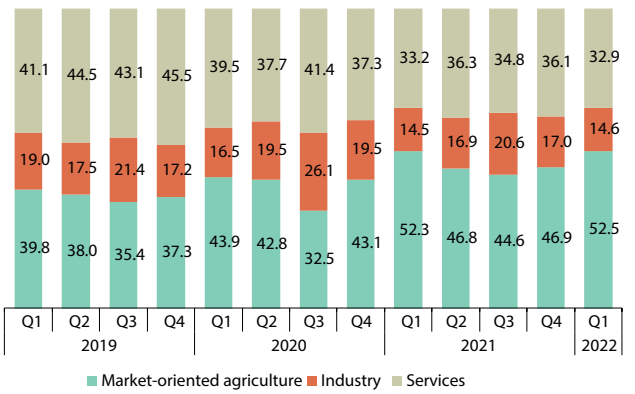
Source: WBG staff calculations based on different NISR's Labour Force Survey reports

The recovery was sustained in Q1-2022, but at a slower pace and with a shift in growth drivers towards government consumption and external demand. The latest data highlight a 7.9 percent GDP expansion in Q1-2022 (year-on-year). Growth was underpinned by a strong boost in external demand thanks to strong commodity prices on the international markets. Growth in Exports of goods and services has reached at 41.4 percent in Q1-2022 compared to a 5.3 percent growth in imports of goods and services. Due to rising inflation in Q1-2022, household consumption declined by 1.6 percent. Overall, the domestic demand contributed 2.6 percentage points to GDP growth in Q1-2022.

The labour market has not fully recovered despite strong economic activity in 2021. Rwanda's labour market showed a mixed picture in 2021 as restrictions on activity imposed during the successive COVID-19-related lockdowns have hampered its prospects. The unemployment rate has reached its highest level, of 23.8 percent, in November 2021 (Figure 1.7), before declining to 16.5 percent in Q1 of 2022, but this level remains above its highest pre-pandemic level (i.e., 16.0 percent in the third half of 2019). On the other hand the employment-to-population rate rose to 46.5 percent in Q4-2021, a same level as its pre-pandemic one. This increase in employment was also reflected in labor force participation rate, which 61 percent, a level not seen before the pandemic. This indicates that some worker re-entered the labor force as the recovery continued.

Rwanda's labour market reported a shift away from employment in contact-intensive services towards agriculture (Figure 1.8). Prior to the pandemic, the labour market was experiencing a shift away from agriculture-related jobs, in line with the government aspirations under the National Strategy for Transformation (NST) in terms of structural changes. This trend has, however, reversed during the pandemic and these proportions fell to 35.1 percent and 17.2 percent, respectively, in 2021.[6] This has to some extend dampened the overall average monthly earnings from employment, which declined by 6.6 percent.

Figure 1.8: Employed population by economic activity
(percent)



Source: WBG staff calculations based on different NISR's Labour Force Survey reports

[6] The increase in the industrial proportion in 2020 was mainly associated with activities related to schools construction that were speed up during the period schools were closed.

1.3. An improved external position amid rebounding oil prices and remittances

Rwanda's current account deficit slightly improved as the trade deficit narrowed and remittance inflows continued to grow (Table 1.1). Buoyed by strong external demand, exports growth outpaced imports, narrowing the trade deficit to 15.0 percent in 2021, 1.2 percentage points lower than in 2020. Driven by higher commodity prices, export earnings from traditional goods—coffee, tea, cassiterite, wolfram, and coltan—increased by 42.8 percent in 2021. A gradual border reopening, especially to the Democratic Republic of Congo (DRC), has also contributed to the strong growth in exports. Merchandise imports on the other hand, were driven by uptick in international oil prices from mid-2021. Oil imports increased by 77 percent in the second half of 2021 after declining for two halves. Oil and non-oil imports increased by 13.9 percent and 5.4 percent in 2021 respectively, leading to an overall import growth of 4.3 percent (compared to 13.1 percent in 2020). Tourism activities resumed gradually in 2021, but remained far below their precrisis levels, generating only 1.4 percent of GDP in receipts. Remittance inflows registered a strong growth of 38.5 percent in 2021, together with public current transfers, partially financing the trade deficit. The current account deficit (CAD) stood at 10.9 percent of GDP in 2021, 1.1 percent lower than in 2020.

Table 1.1: Balance of payments, 2017–2021
(percent of GDP)

	2017	2018	2019	2020	2021
A. Current account balance	**-9.5**	**-10.1**	**-11.9**	**-12.1**	**-10.9**
Goods	***-10.5***	***-12.0***	***-14.2***	***-16.2***	***-15.0***
Exports	*11.2*	*11.7*	*12.0*	*13.8*	*13.8*
o/w gold	11.2	11.7	12.0	13.8	3.3
o/w coffee and tea	1.6	1.7	1.5	1.4	1.6
Import	*21.8*	*23.7*	*26.1*	*30.1*	*28.8*
o/w gold	21.8	23.7	26.1	30.1	3.3
o/w energy products	2.7	5.8	5.0	3.4	3.6
Services	***-2.1***	***-1.5***	***-0.2***	***0.0***	***-0.8***
o/w transport exports	1.5	1.9	2.1	1.1	1.3
o/w tourism exports	4.1	4.1	4.4	1.2	1.4
Primary income	***-3.1***	***-3.6***	***-3.2***	***-2.0***	***-2.0***
Secondary income	***6.3***	***6.9***	***5.6***	***6.1***	***6.8***
o/w general government, net	3.9	3.7	2.6	2.8	3.1
o/w remittances inflows	1.6	2.1	2.0	2.3	3.1
B. Capital account balance	**2.1**	**2.5**	**2.5**	**3.1**	**3.4**
C. Financial account balance (inflows)	**7.4**	**8.4**	**8.9**	**11.0**	**8.7**
Direct investment	2.8	3.6	2.5	1.5	1.9
Portfolio investment	-0.8	-0.2	-0.3	0.3	1.8
Loans and flows	5.4	5.0	6.8	9.2	4.9
o/w SDR allocation	0.0	0.0	0.0	0.0	2.0
D. Net errors and omissions	**1.7**	**0.2**	**1.5**	**1.3**	**0.2**
Overall balance (=A+B+C–D)	**1.7**	**1.0**	**1.1**	**3.2**	**1.4**
Use of reserves (–: accumulation)	**-1.7**	**-1.0**	**-1.1**	**-3.2**	**-1.4**
Memo					
Increase in government net liabilities	4.1	4.8	6.1	9.4	6.2

Source: WBG Staff calculations based on BNR and NISR data
Note: Increases in portfolio investment were due to Eurobond issuance.

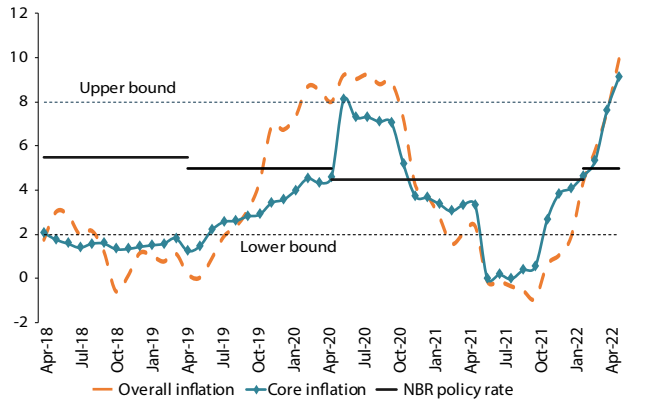
Financial account balance narrowed in 2021 partially due to a base effect emanating from higher borrowing recorded in 2020 to mitigate the pandemic effects on the Rwanda's economy. In 2021, the financial account, excluding reserves, saw net inflows of US$959 million (equivalent to 8.7 percent of GDP down from 11.0 percent in 2020), mainly driven by the International Monetary Fund (IMF) SDR[7] allocation and a Eurobond issuance. In August 2021, Rwanda issued its second Eurobond in August 2021 on US$620 million at a coupon rate of 5.5 percent. The financing raised was used to repay approximately 85 percent of the existing US$400 million Eurobond issued at a coupon rate of 6.25 percent and refinancing an expensive RwandAir debt of about US$112 million. Meanwhile, at US$211.9 million (or 1.9 percent of GDP) in 2021, FDI inflows recovered, but remained significantly below pre-pandemic levels, partly reflecting protracted uncertainty in international markets regarding the global economic outlook (Table 1.1). The overall balance of payments surplus declined from 3.4 percent of GDP in 2020 to 1.4 percent of GDP in 2021.

Moving into 2022, Rwanda's external trade continue to will be subject to rising global commodity prices. According to preliminary BNR trade statistics, export receipts grew by 49.4 percent year-on-year and import payments increasing 27.9 percent year-on-year. Overall, the trade deficit deteriorated by 11.9 percent in dollar terms in the 12-months to June 2022.

1.4. A slight monetary policy tightening amid mounting inflation pressures

Consumer price inflation (CPI), which remained muted in 2021, accelerated in the first half of 2022 (Figure 1.9). Inflation rose by 1.8 percent in October 2021—a reversal of its 14-month declining trend—and has subsequently accelerated through early 2022. Rising prices of services, especially hospitality and education, initially drove increases in the CPI, as the hospitality started gaining some momentum

Figure 1.9: Rwanda's inflation trends



Source: WBG staff calculation based on NISR data

and the school year 2021-22 start. The subsequent acceleration—to 13.7 percent in June 2022—was broadly based among the biggest components of the consumer basket. Accounting for 27 percent of the consumer, inflation of food and non-alcoholic beverages reached 25.1 percent in June 2020, up from -2.1 percent in December 2021. Inflation of utilities—housing, water, electricity, gas & other fuels (20.7 percent of the consumer basket)—increased to 8.8 percent in April 2022 from 1.9 percent in December 2021, reflecting mainly price increases of cooking gas (32 percent) since December 2021. Core inflation, which excludes prices of volatiles items such as fresh foods and energy products, stood at 11.2 percent in June 2022.

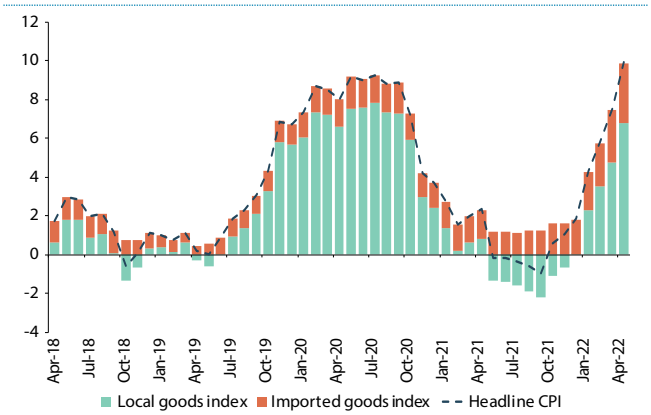
Government subsidies on fuel and fertilizer muted the passthrough of rising world prices. Between February and March 2022, global energy price index surged by 24.1 percent—the highest monthly jump since 2000, driven by crude oil (20.2 percent), coal (49.9 percent) and natural gas (37.2 percent). The increase in oil prices was initially just a rebound from the large drop at the onset of the pandemic (when the world locked down (and some oil prices even went negative). Fertilizer price index increased 18.1 percent between February and March 2022, adding to 171.6 percent increases in 2021. The war in Ukraine has aggravated the situation, by leading to significant disruptions to the production and trade of commodities for which Russia and Ukraine are key exporters. So far, the impact of these price increases on domestic prices has been partially

[7] Special drawing rights.

muted as the government has introduced subsidies on fuel products in May 2021 and increased subsidies on fertilizers in January 2022. This has helped to lessen inflation pressures from higher oil and fertilizer prices but adding some fiscal costs to the budget. According to the July–December 2021 budget execution report, the forgone revenue from the subsidy on fuel levy amounted to Rwf7.8 billion during the July-December 2021 period.[8]

The National Bank of Rwanda (BNR) increased the central bank rate (CBR) in the early 2022 after having maintained it at its historic low for 22 months. BNR reduced the CBR to 4.5 percent in April 2020, to respond to the crisis and has kept it constant in 2021 to support the banking sector's role in financing the economic recovery. Credit growth was consistently higher than economic growth rates (19.9 percent on average in 2021), ensuring ample liquidity during the recovery. At its quarterly meeting held on February 15, 2022, the Monetary Policy Committee raised the CBR by 50 basis points to 5 percent in order to contain rising inflation while continuing to support the economic recovery.[9] BNR raised the CBR to 6 percent in its August 2022 meeting. BNR predicts inflation increases in 2022, threatening to breach the upper bound of the central bank's target range of 5±3 percent in the medium term.

Figure 1.10: Domestic prices are driving up Rwanda's inflation



Source: WBG stall calculation based on data from NISR

The banking sector is reportedly in sound financial condition, but asset quality warrants closer monitoring. The banking sector accounts for 67.2 percent of Rwanda's overall financial sector assets and has remained profitable throughout the pandemic. It and displayed strong solvency, with a capital adequacy ratio (CAR) of 22.1 percent in June 2022—above the minimum requirement of 12.5 percent. The liquidity of the banking sector also remains sufficient to absorb funding shocks, with a liquidity coverage ratio of above 100 percent. Gross non-performing loans (NPLs) subsided to 4.7 percent of total loans in December 2021, and then to 4.3 percent in June 2022, the lowest level ever seen. However, this hides some pandemic scars: sectors that were hard hit by the pandemic have seen their NPLs remain high, such as trade (13.5 percent of total loans) and public works and building (10 percent). These two sectors accounted for 74.8 percent of total NPLs and 47.9 percent of total outstanding credits in December 2021. Consequently, the bank NPL provision coverage ratio has risen to 119.8 percent—the highest in recent history, warding off any immediate stability concerns. In June 2022, the bank NPL provision coverage ratio stood at 114.4 percent.

1.5. The government started unwinding of its fiscal response to COVID-19

Rwanda's fiscal deficit eased in the first half of FY2021/22. Official data for the first half (H1) of FY2021/22 (July to December) indicate an overall deficit of 7.9 percent of GDP, lower than the 9.3 percent recorded in the same period of FY2020/21. However, the overall fiscal deficit remains above their pre-pandemic levels. The decrease in the fiscal deficit was mainly driven by lower level of the government expenditure due to reduction of some related expenditure with the exception of the ones to health expenditure. In overall, COVID-related expenditure declined to 4.5 percent of GDP in July-December 2021 up from 6.5 percent of GDP in the same period of 2020.

[8] MINECOFIN, Budget Execution Report (February 2022). https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=37995&token=f7822f6311c33865b0fee50ae3430c2261d3801f

[9] BNR, Press Release. https://www.bnr.rw/fileadmin/user_upload/PRESS_REALESE__-_MPC__17.02.2022_.PDF

Tax revenue collection fell short of the expectation on account of tax incentives and subsidies on petroleum products, together with confinement measures. In overall, tax revenue in H1 2021/22 performed below the previous year's outrun (15.0 percent of GDP in H1 of FY2021/22 against 15.2 percent if H1 of FY2020/21). Shortfall were mainly recorded in taxes on goods and services as well as on international trade (Table 1.2). Regarding taxes on goods and services were affected through lower taxable base as a result of the decline in household consumption due to COVID-related

Table 1.2: Rwanda's public finances, 2019/20 to 2021/22
(percent of GDP)

	FY2019/20	FY2020/21	FY2021/22		First half of FY2020/21	First half of FY2021/22
			Original budget	Revised budget		
REVENUE	**23.3**	**25.0**	**24.2**	**24.3**	**24.5**	**23.7**
Taxes	**15.7**	**15.8**	**15.8**	**15.3**	**15.2**	**15.0**
Taxes on income, profits, and capital gains	6.8	6.8	6.7	6.8	6.2	6.6
Taxes on goods and services	7.6	7.5	7.6	7.1	7.6	7.2
Taxes on international trade transactions	1.2	1.2	1.3	1.1	1.3	1.1
Other taxes	0.0	0.2	0.2	0.2	0.1	0.1
Other revenues	*3.1*	*3.7*	*2.8*	*3.7*	*4.2*	*3.5*
Grants	*4.6*	*5.5*	*5.5*	*5.4*	*5.1*	*5.3*
EXPENDITURE	**31.2**	**32.5**	**30.3**	**32.3**	**33.7**	**31.6**
Expenses	**20.2**	**20.3**	**19.5**	**20.4**	**20.8**	**20.1**
Compensation of employees	2.8	2.9	3.2	2.7	3.0	2.7
Use of goods and services	6.1	6.1	4.8	5.5	5.7	5.0
Interest	1.5	1.8	2.3	2.1	1.7	1.8
Domestic	0.6	0.7	0.9	0.7	0.7	0.5
Foreign	0.8	1.1	1.5	1.4	1.0	1.3
Subsidies	2.7	2.5	2.3	3.2	3.0	3.6
Grants	5.3	5.3	5.5	5.5	5.8	5.3
Social benefits	0.3	0.4	0.4	0.5	0.2	0.5
Other expense	1.5	1.3	1.0	1.0	1.3	1.3
Net acquisition of nonfinancial assets	***11.0***	***12.2***	***10.8***	***11.9***	***13.0***	***11.5***
Foreign financed	5.8	6.6	5.2	5.6	7.7	5.2
Domestically financed	5.2	5.5	5.6	6.2	5.3	6.3
BALANCE						
Including grants	-7.9	-7.5	-6.1	-8.0	-9.3	-7.9
Excluding grants	-12.4	-13.0	-11.6	-13.4	-14.4	-13.1
Primary balance	-6.4	-5.8	-3.8	-5.8	-7.6	-6.1
Financing (net)	**7.9**	**7.5**	**6.1**	**8.0**	**9.3**	**7.9**
Foreign financing	11.5	6.4	5.0	8.7	9.0	9.2
Domestic financing	-3.6	1.1	1.1	-0.7	0.3	-1.3
Memorandum item:						
Covid related spending	..	..	..	..	6.5	4.5
o/w Health	..	..	..	..	0.6	2.7
o/w Social protection/Agriculture	..	..	..	..	1.3	0.8
o/w Education	..	..	..	..	1.0	1.0

Source: WBG staff calculation based on MINECOFIN budget execution reports & IMF country reports

lockdown measures of July 2021. The introduction of the "manufacture and build to recover program" (MBRP) was also associated with tax exemptions that also contributed to the lower taxable base. Manufacturing companies benefiting from the MBRP are exempted from value-added tax (VAT) payments. Low household consumption has also triggered low import growth than expected, also affecting the tax base of taxes on international trade.

Box 1.1: Fertilizer subsidies

Rwanda introduced fertilizer subsidies in 2007 as a key initiative to reach the Crop Intensification Programme (CIP)'s goal of increasing food crop productivity and ensuring food security.

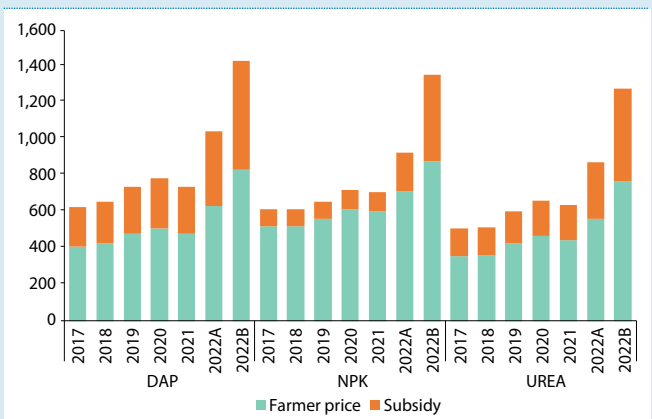
Fertilizer subsidies started with six CIP crops—maize, wheat, rice, Irish potatoes, beans and cassava, and progressively expanded to also include soybeans, banana, fruits and vegetable crops.[i] In FY2020/21, fertilizer subsidies accounted for Rwf16.7 billion, equivalent to about 0.2 percent of GDP.

Urea, Diammonium Phosphate (DAP), and Nitrogen-Phosphorus-Potassium 17-17-17 (NPK) have been the main subsidized fertilizers; initially at the rates of 50 percent for urea and DAP, and 20 percent for NPK. Despite the fertilizer price increases, the subsidy levels remained the same for about six years, before they were reduced to about 35 percent for DAP, 30 percent for urea and 15 percent for NPK and these proportions were kept until in 2021. Between 2017 and 2021, while fertilizer prices in Rwanda had increased by about 26 percent for urea, and about 16 percent for DAP and NPK, they almost doubled in just one year, between 2021 and 2022. To avoid a drop in the fertilizer application, the government shared the cost of the sudden and significant increase in fertilizer prices with farmers, with the government absorbing 50 to 60 percent of the price increases. The subsidy rates increased in January 2022 to 40 percent for urea, 42 percent for DAP and 35 percent for NPK. These changes had an important effect on the share of the subsidy regime relative to the overall MINAGRI's budget, as it increased by about 4 percent, from 7.8 percent in 2020 to about 11.7 percent in 2022.

Import disruptions caused by the war in Ukraine increase further fertilizer prices, which may also affect the production of key food crops. At current prices, national output across all seasons could decrease by up to 3 percent for maize, 2 percent for rice, and 12 percent for Irish potato under assumptions that farmers are highly sensitive to all three fertilizer prices.[ii]

From 2008, the government progressively privatized the importation and distribution of fertilizers and by 2017, private companies selected through a public tendering process had been given license to import fertilizer while a public company, Agro-Processing Trust Corporation Ltd (APTC) was given the responsibility of distributing the fertilizer to agro-dealer shops across the country.[iii] In 2018, to further improve the agriculture inputs subsidy and supply management system, Rwanda Agricultural Board (RAB), through a public-private partnership agreement with BK TEcHouse launched the Smart Nkunganire System (SNS) to digitize the end-to-end value chain of the Agro-Subsidy program.

Figure 1.11: Trends in fertilizers prices



Source: International Food Policy Research Institute (IFPRI)

Note:

i Institute of Research and Dialogue for Peace (IRDP), Crop Intensification Program (CIP), Citizen's Satisfaction Survey – 2018, available at http://www.irdp.rw/wp-content/uploads/2019/02/Final-printed-CIP-report.pdf

ii International Food Policy Research Institute (IFPRI), Expected impacts of increases in international prices of fertilizer in Rwanda, March 2022, available at https://ebrary.ifpri.org/digital/collection/p15738coll2/id/135073

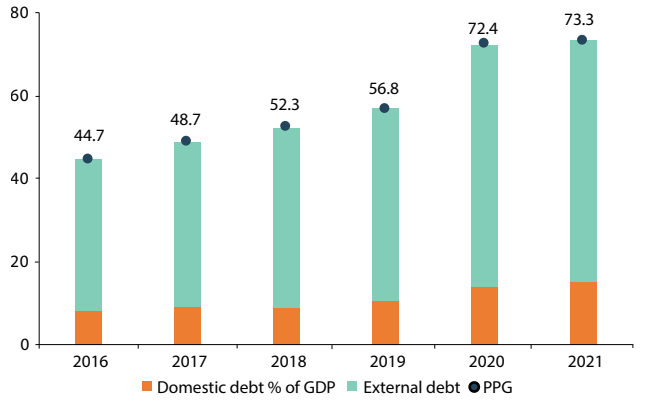
iii Alliance for a Green Revolution in Africa (AGRA), Assessment of Fertilizer Distribution Systems and Opportunities for Developing Fertilizer Blends – Rwanda. 2018, available at https://agra.org/wp-content/uploads/2020/08/Rwanda-Report_Assessment-of-Fertilizer-Distribution-Systems-and-Opportunities-for-Developing-Fertilizer-Blends.pdf

Forgone revenue on petroleum products are generating some fiscal costs, though important in containing the growth in transport fares. In May 2021, the government reduced the fuel excise tax rate by Rwf115/liter to reduce the cost of public transport. This reduction enabled transport fares to remain constant despite capacity limitations for buses. However, these forgone revenues have affected both collections for excise duties and strategic petroleum reserve levy. In July-December 2021, they amounted to Rwf1.3 billion and Rwf7.8 billion respectively on fuel and strategic petroleum reserve levies respectively and both equivalent to 0.2 percent of GDP.

Public spending declined in H1 of FY2020/21 as the government started winding down some COVID-related expenditures. In H1 of FY2021/20, the government's spending focused on accelerating the vaccination campaign while reducing some other COVID-related spending (Table 1.2). The government spent Rwf126.9 billion (or 2.2 percent of GDP) the vaccination program in July-December 2021.Overall public spending declined from 33.7 percent of GDP in H1 of FY2020/21 to 31.6 percent of GDP in H1 of FY2021/22, with both recurrent (i.e., expense) and capital expenditures (i.e., net acquisition of nonfinancial assets) falling. Not only has the government started winding down some COVID-related expenditures, but also some goods and services and capital expenditures were lower-than-expected due to delays in putting in place the legal arrangement for the budget to use the 2021 SDR allocation. Amounting to US201.8 million, the government is using about its 70 percent in FY2021/22 to (i) temporarily increase recurrent spending on social protection and in retrofitting public offices to prevent the spread of the virus as civil servants return to in-person work and (ii) raise capital spending to execute delayed high-quality investment projects in targeted social sectors and to repair infrastructure damages by a recent volcanic eruption near the border with the Democratic Republic of the Congo. The remainder, 30 percent of the allocation (0.6 percent of GDP), will be kept as reserves to be used in retiring the remaining 2013 Eurobond amount at maturity in 2023.[10]

Rwanda's public and publicly guaranteed (PPG) debt further increased in 2021, but at a lesser extend as in the recent past (Figure 1.12). As of December 2021, official data indicate that total public and publicly guaranteed (PPG) debt stood at US$7.9 million, equivalent to 73.3 percent of GDP and marking an 0.9 percentage points compared 2020 levels. About 74 percent was external debt, and the rest was domestic debt. While the concessional loans represent most of the debt stock, the share of non-concessional loans rose from just under 3 percent of GDP in 2011 to more than 16 percent of GDP in 2021.

Figure 1.12: Rwanda's public and publicly guaranteed debt
(percent of GDP)



Source: WBG staff calculation based on MINECOFIN data

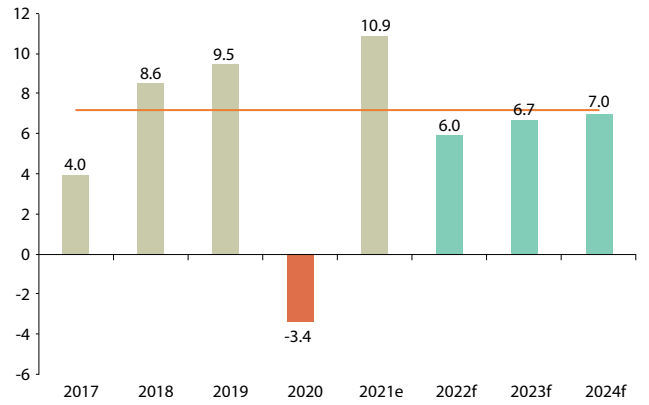
1.6. Growth is expected to moderate in the medium-term

Rwanda's economic growth is expected to moderate in the near and medium-term outlook, weighed down by the war in Ukraine. Real GDP growth is projected at 6.0 percent in 2022 and 6.9 percent on average in 2023–2024, lower than the 10.9 percent growth rate recorded in 2021, a stronger recovery from the COVID-19-induced recession. The near-term growth in expected to be lower than expected in the previous REU.

[10] BNR, Press Release. https://www.bnr.rw/fileadmin/user_upload/PRESS_REALESE__-_MPC__17.02.2022_.PDF

The near-term outlook includes a continued growth in industrial activities as well as a strong recovery in tourism activities. Activities in the industry will continued to benefit from government support of the manufacturing and construction sectors. A recovery in tourism activities is expected to get a booster from the Commonwealth Heads of Government Meeting (CHOGM) meeting as well as other leisure and meeting events planned in 2022. This will support growth in transport and hospitality services. On the demand site, the near-term outlook envisions domestic demand, but not the same level as in 2022 as the growth forecast reflects fiscal consolidation (see section on fiscal policy).

Figure 1.13: Rwanda's economy is expected to grow at a lower in 2022 than in the previous year



Source: WBG staff calculation based on MINECOFFIN and NISR data

Fiscal consolidation and spending efficiencies will be introduced with the FY2022/23 budget to preserve space for growth-enhancing investment. The government plans to begin normalizing its fiscal stance with the FY2022/23 budget to stabilize debt levels while safeguarding fiscal space for development spending in line with the NST-1 objectives. The fiscal deficit is budgeted to narrow to 7.0 percent of GDP by FY2023/24 through a balanced mix of expenditure restraint and revenue enhancement. The government plans to carry out a significant rationalization of both recurrent non-wage spending and capital budgets. This will be through the phasing-off COVID-related spending, tight recurrent spending control and discontinuing underperforming public investment. These measures will be informed by the Public Expenditure Review being conducted by the World Bank and the Public Investment Management Assessment conducted by the IMF, which will help the government to explore the potential for additional cost-savings and efficiency gains through (a) the digitalization in the delivery of public goods and services, (b) strengthening the oversight and governance of state-owned enterprises (SOEs) with a view to gradually reduce subsidies and budget support, and (c) improvements in the selection and prioritization of public investments to achieve greater value-for-money and leverage private sector involvement. On the revenue side, the implementation of the Medium-Term Revenue Strategy through tax policy reforms (personal/corporate income tax and value-added taxes) is expected to raise revenue to 15.9 percent of GDP in FY2023/24 from 15.4 percent of GDP in FY2021/22.

Risks to the outlook are tilted to the downside

Counterweighting the continued recovery from the pandemic is the impact of the war in Ukraine, which has clouded the outlook for the global economic recovery. Although limited direct trade and financial links with Russia and Ukraine, the was in Ukraine is expected to affect Rwanda's economy indirectly. Higher energy prices will increase import costs, while the projected slowdown in global growth will soften the demand for Rwanda's exports.

Despite government subsidies, a sharp rise in global energy prices significantly increases annual imports, adds to inflation. In addition, increased world prices for fertilizers (1.5 percent of total imports in 2021) are likely to have adverse effects on agricultural productivity, food security and inflation. Inflation may further increase due to both demand-pull and cost-push factors, disproportionately affecting the poor.

Rwanda continues to be among the most vulnerable countries to weather and climate shocks, which are a key risk to the continuation of economic recovery. The increasing frequency of weather and climate shocks (e.g., drought and floods) could lower

agricultural output and thereby impact many farms and households in Rwanda. Decreased production could also lead to higher food prices to the detriment of the poor households. The forthcoming World Bank's Country Climate and Development Report (CCDR) includes more on the long-term risks from climate change and the need for the state and the private sector to invest in resilience.

A softening global environment constrain Rwanda's fiscal space, which could undermine fiscal consolidation efforts. Fiscal consolidation faces rising challenges and risks, including from the increased spending pressures from measures to contain the economic impact of the war in Ukraine (such as the current fuel and fertilizer subsidy), and the prospect of more expensive financing costs on the back of tighter global financial conditions. The government has indicated, in the FY2022-23, a temporary elimination of fuel levy and an increase in fertilizers subsidies to support domestic agriculture production and cushion against rising food prices to address any food security concerns. It will make public transport affordable by maintaining the current subsidy to private transport operators and increase some social protection programs. a gradual increase in fuel prices at the current juncture could increase higher operating costs for businesses, at a time when the economy is in its early stage of recovery. A further increase of subsidy payments to the energy and fertilizer sectors would widen the fiscal deficit which could undermine fiscal consolidation efforts.

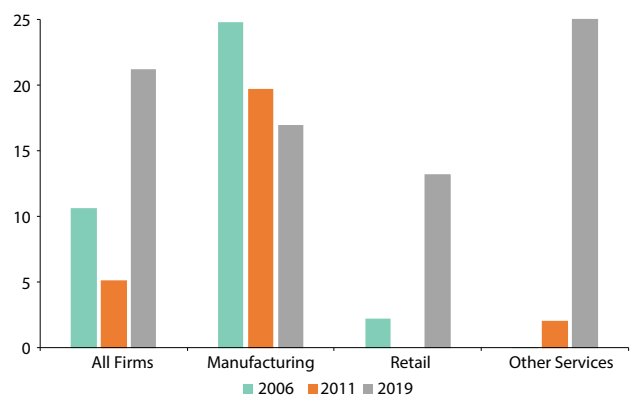
PART TWO

BOOSTING EXPORTS THROUGH INNOVATION AND TRADE IN SERVICES

2.1. Role of technology and innovation on exporting: a firm-level analysis

Analysis of firm data yields several insights into Rwandan export performance. Rwandan firms have increased their participation in international trade (particularly in services) over the last decade, to levels exceeding that of regional and continental peers, as well as member nations of the Association of Southeast Asian Nations (ASEAN). The main reasons given for not exporting in the 2019 World Bank Enterprise Survey related to lack of foreign demand (38 percent), lack of information (12 percent), insufficient production capacity (8 percent), and high trade (5.5 percent) or production (4 percent) costs. Only 3 percent of Rwandan firms in 2019 had obtained ISO certification, placing Rwanda in only the 9th percentile, while econometric analysis shows that firms that have obtained ISO certification are 36 percent more likely to be exporters. The adoption of ecommerce is significantly related to participation in international trade in Rwanda, but its use is still limited among Rwandan firms. Access to credit is significantly related to participation to international trade in Rwanda, and Rwandan firms tend to have greater access to finance than firms in many other developing countries have. In services (excluding retail), firms undertaking product innovations and training are more likely to export, while process innovation appears to be less important for exporting. Manufacturing firms that export are more likely than other firms to engage in process innovation but less likely to engage in product innovation. Thus, improving process efficiency or industrial engineering appears to be a more important determinant of manufactures exports than inventing a new product. However, firms in Rwanda perform quite poorly in the area of process innovation compared to those in other countries.

Figure 2.1: Rwanda exporter share
(percent of all firms)



Source: Rwanda WBES 2006, 2011, and 2019. Median sample weights for subpopulation used

2.1.1. *Firms' participation in exports*[11]

Rwandan firms' participation to international trade increased substantially over the last decade, driven by the services sector. The share of firms involved in exporting rose from 11 percent in 2006 to 21 percent in 2019 (Figure 2.1).[12] The dip in 2011 reflects the sharp fall in exporting following the Global Financial Crisis. The rise in exporting over the period 2006 to 2019 was driven primarily by an increased share of exporting firms in the services sector. In 2019, the sectors with the largest share of firms exporting were food processing and hotels and restaurants. By contrast, the share of exporters among manufacturing firms as whole fell from 25 percent in 2006 to 17 percent in 2019. Note that industrial percentages are not nationally representative because only sector stratification was used in the sample design. Industrial percentages and totals according to ISIC[13] Rev.3.1 for 2006, 2011, 2019 can be seen in Annex Table 1.

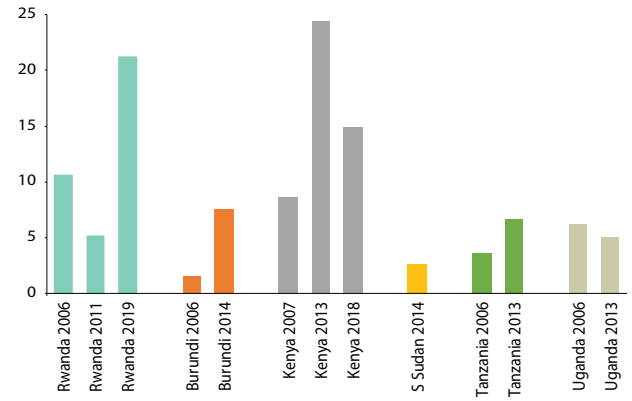
Rwandan firms' participation in trade exceeded that of other regional and continental peers. Twenty-one percent of Rwandan firms exported, according to Rwanda World Bank Enterprise Surveys (WBES) 2019, compared to 15 percent in Kenya

[11] World Bank Enterprise Surveys following the Global methodology are stratified only by business sector, location, and firm size. When computed with sampling weights, sample averages are representative of the aforementioned associated populations at both country and stratification levels. However, since the Global sampling methodology does not stratify by exporter status, the intended level of precision is *not* guaranteed for indicator values by these groups. As a consequence, the estimated shares may not be representative of export activity in Rwanda and other countries analyzed in this section. However, sample weights for subpopulations of firm size, sector, and sub-national administrative division are always employed when computing export shares for all countries.

[12] Exporting firms includes all those where exports equaled at least one percent of total sales.

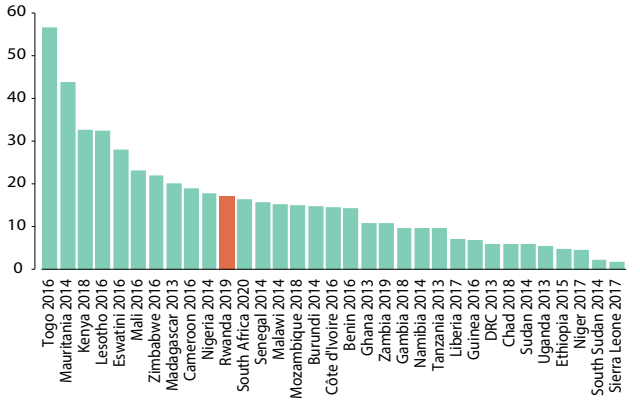
[13] International Standard Industrial Classification.

Figure 2.2: Exporter share across the East African Community
(percent of all firms)



Source: Selection of most recent WBES based on availability. Median sample weights for subpopulation used

Figure 2.3: Ranking manufacturing exporter share in Sub-Saharan Africa
(percent of all firms)

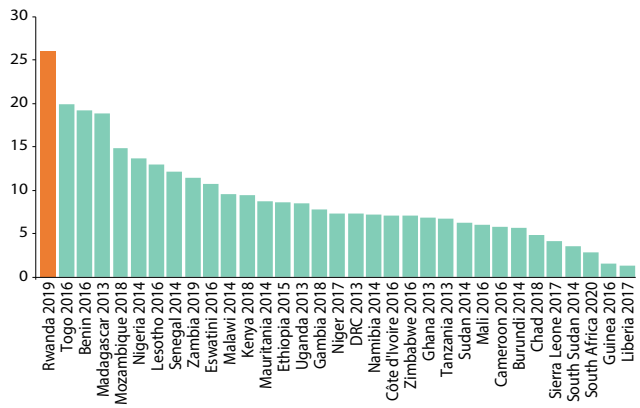


Source: Selection of WBES based on availability. Median sample weights for subpopulation used.

(2018), 8 percent in Burundi (2014), 7 percent in Tanzania (2013), 5 percent in Uganda (2013), and 3 percent in South Sudan (2014) (Figure 2.2). The share of exporting firms in other services was much higher than that of other East African Community (EAC) members, while Rwanda's exporter share in retail (13 percent) far outpaced the activity seen in South Sudan (1) Tanzania (2), and Uganda (1) and was on par with Burundi (9) and Kenya (14) (Figure 2.5). By contrast, Rwanda's share of exporting firms in manufactures in 2019 was little more than half that of Kenya, although above the shares in other EAC members. Rwanda's share of firms that export exceeded that of most other countries in Sub-Saharan Africa, but not in manufacturing. Rwanda's overall exporter share of firms (21 percent) trails only Togo (28 percent in WBES 2016). The share of exporting firms in manufacturing, however, ranks below that of Togo 2016 (56 percent), Mauritania 2014 (44), Kenya 2018 (33), Lesotho 2016 (32), Eswatini 2016 (28), Mali 2016 (23), Zimbabwe 2016 (22) and Madagascar 2013 (20) (Figure 2.3). Rwanda ranks high, although not the highest in Sub-Saharan Africa, in terms of the share of exporters among retail firms, but ranks the highest in other services by at least 5 percentage points (Figure 2.4).

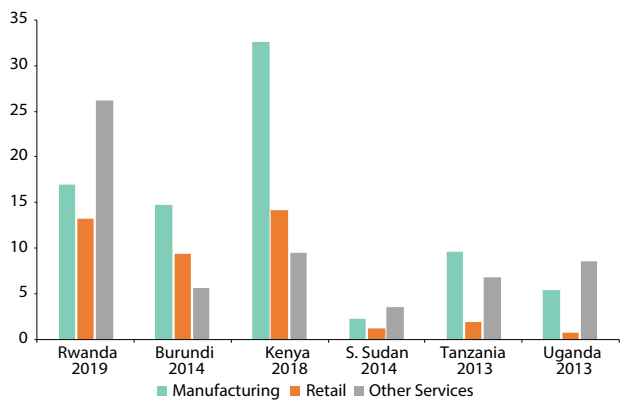
Rwandan firms' participation to international trade also compares favorably to that of exporters in member nations of the Association of Southeast Asian Nations (ASEAN). Rwanda's exporter share of 21 percent exceeded that of Cambodia 2016 (10

Figure 2.4: Ranking other services exporter share in Sub-Saharan Africa
(percent of all firms)



Source: Selection of most recent WBES based on availability. Median sample weights for subpopulation used

Figure 2.5: Exporter share by sector across the East African community
(percent of all firms)

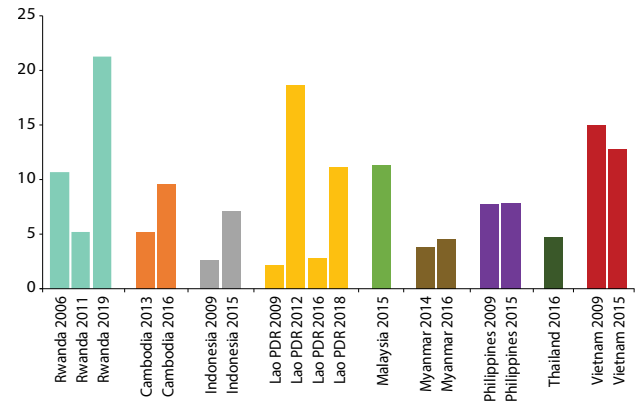


Source: Selection of WBES based on availability. Median sample weights for subpopulation used

percent), Indonesia 2015 (7), Lao PDR 2018 (11), Malaysia 2015 (11), Myanmar 2016 (5), Philippines 2015 (8), Thailand 2016 (5), and Vietnam 2015 (13) (Figure 2.6). The gap between Rwanda and ASEAN countries is particularly wide in other services and retail, although Rwanda remains far behind the share of exporters in manufactures in Malaysia (49 percent), and to a lesser extent, Vietnam (22) and the Philippines (20) (Figure 2.7).[14]

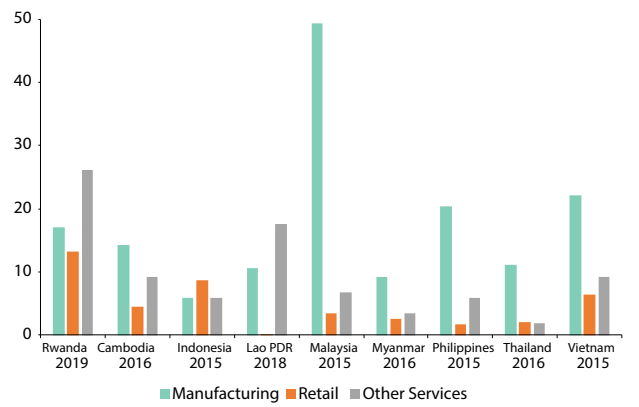
The share of exporters among Rwandan firms is high compared to many other countries covered in the WBES database over the period 2012 to 2021 (Figure 2.8 and Annex Table 3). In 2019, the 21 percent export share places Rwanda in the 77th percentile of countries with a rank of 29 out of 121. Aggregates of WBES countries classified by World Bank income groups are lower: high income (17 percent), upper middle (10 percent), lower middle (9 percent) and low income (8 percent). Annex Table 4 presents descriptive statistics of exporter share for all WBES countries by World Bank income groups.

Figure 2.6: Exporter share versus ASEAN
(percent of all firms)



Source: Selection of WBES based on availability. Median sample weights for subpopulation used

Figure 2.7: Exporter share by sector versus ASEAN
(percent of all firms)



Source: Selection of WBES based on availability. Median sample weights for subpopulation used

[14] Malaysia WBES 2015 likely oversampled exporters with 30 percent share of firms located in the Central Region, where MSC Malaysia (formerly known as the Multimedia Super Corridor) is located. MSC Malaysia is a Special Economic Zone and high-technology business district in central-southern Selangor, Malaysia.

2.1.2. Main reasons why firms did not export

Several reasons were given in Rwanda WBES 2019 for not exporting. Among the 265 non-exporting firms, the most frequent response was "lack of demand for products aboard" (38 percent) as seen in Figure 2.9. Other common replies included "Lack of information regarding foreign agents, distributors and prospective buyers" (12 percent); "insufficient capacity of production" (8 percent); and high trade (5.5 percent) or production (4 percent) costs. The remainder of the non-exporting sample (33 percent) cited other reasons. In all three sectors (manufacturing, retail and other services), a lack of demand was the most commonly cited reason for failure to export, followed by a lack of information on foreign agents, distributors and prospective buyers.

2.1.3. Drivers of firm participation to export: an econometric analysis of the role of technological capabilities and innovation

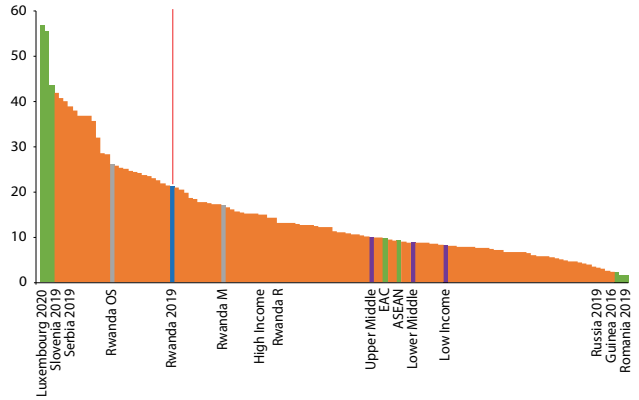
ISO certification, ecommerce, and financial depth are all key determinants of exporting in both manufacturing and other services (Figure 2.10 and Annex Table 3).[15]

▷ ***Certification for international standard***

Securing a certification for an international standard, such as ISO certification, is a major factor in firms' participation to international trade. Estimated coefficients indicate that firms that have

[15] Estimation methodology and variable definitions are detailed in the Annex, and descriptive statistics for variables used in the regression are presented in Annex Table 2. Industrial engineering or quality standardization is proxied by ISO certification, i.e., having obtained an internationally recognized quality certification, such as ISO 9000, ISO 45001, or HACCP, among others. Lastly, ecommerce is defined as using the internet for business purposes for manufacturers, and for service providers, as having a website or social media page.

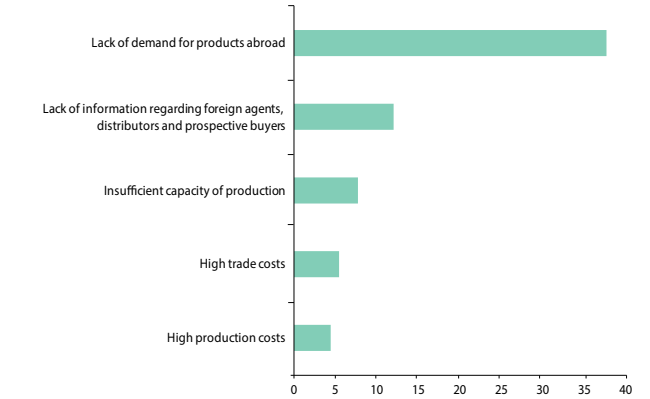
Figure 2.8: Exporter share in global context
(percent of all firms)



Notes: Group averages for EAC and Low Income do not include Rwanda 2019. For Rwanda 2019, M=Manufacturing, R=Retail, and OS=Other Services. World Bank income group classifications are based on the year of survey.

Source: WBES 2012-2021, one round per country with most survey recent selected (121 total). Median sample weights for subpopulation used. Annex Table 4 presents descriptive statistics of exporter share for all WBES countries by World Bank Income Groups.

Figure 2.9: Main reason why firm did not export in 2019
(percent of non-exporters)

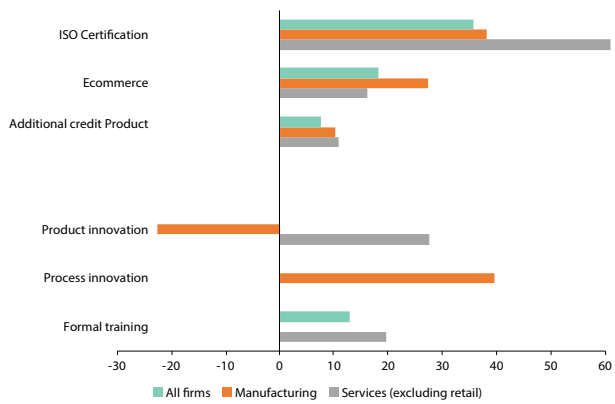


Source: WBES 2019. Median sample weights used.

obtained ISO certification are 36 percent more likely to be exporters. By sectors, manufacturers and service providers (with the exception of retailers) are 38 and 61 percent, respectively, more likely to engage in exporting activity.[16]

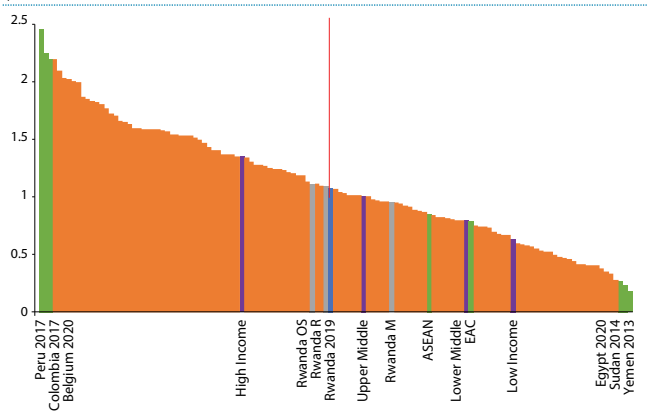
However, firms in Rwanda lag behind those in most other countries in obtaining ISO certification (Figure 2.11). In 2019, only 3 percent of firms had obtained ISO certification, which places Rwanda in the 9th percentile with a rank of 108 out of 119. By sector, manufacturers lead with 7 percent, followed by 3 percent of firms in other services. No retailers have obtained ISO certification in Rwanda. Other EAC countries perform 10 percentage points higher, on average, at 13 percent, while low-income countries and ASEAN average 11 and 8.5 percent, respectively. Given the econometric evidence on the strong relationship between ISO certification and exporting discussed in the previous section and "the lack of demand for product abroad" cited by non-exporters, resources spent on increasing awareness and dissemination of information regarding application and filing procedures may help Rwandan entrepreneurs realize and maximize their exporting potential.

Figure 2.10: Probability of exporting by firm activity in 2019
(percent)



Source: WBES 2019. Median sample weights used.

Figure 2.11: Financial depth (ranges from 0 to 5)
(percent)



Source: Selection of WBES based on availability. Median sample weights for subpopulation used

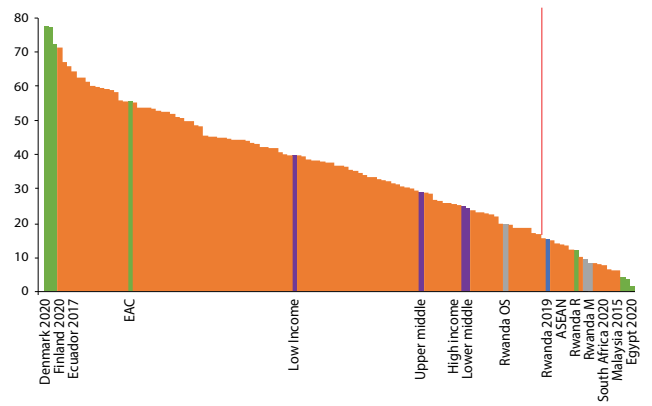
[16] Retailers are excluded from the discussion because the selected independent variables of interest are all insignificant.

▷ *Ecommerce*

While the adoption of ecommerce is a significant determinant of participation to international trade in Rwanda, its use is still limited among Rwandan firms. Manufacturers engaged in ecommerce are 27 percent more likely to be exporters, while such firms in other services are 16 percent more likely to be exporters. However, firms in Rwanda use ecommerce at a much lower rate than the majority of countries (Figure 2.12).[17] In 2019, 43 percent of firms engaged in ecommerce, which places Rwanda in the 33rd percentile of countries with a rank of 82 out of 121. By sector, manufacturers and other services providers lead with 45 percent, followed by 36 percent of firms in retail. ASEAN and other EAC countries perform worse, on average, at 38 and 34 percent, respectively, although this lagging performance is probably due to the survey years used being earlier, when Internet costs were higher. Given the positive relationship between ecommerce and exporting discussed in the previous section and "the lack of information regarding foreign agents, distributors and prospective buyers" cited as a reason for not exporting, investment in internet infrastructure can provide isolated and rural enterprises low-cost connectivity to markets and customers aboard.

Figure 2.12: Product innovation

(percent)



Notes: Group averages for EAC and Low Income do not include Rwanda 2019. For Rwanda 2019, M=Manufacturing, R=Retail, and OS=Other Services. World Bank income group classifications are based on the year of survey.

Source: WBES 2012-2021, one round per country with most recent survey selected (120 total). Median sample weights for subpopulation used. Annex Table 5 presents descriptive statistics of product innovation for all WBES countries by World Bank Income Groups.

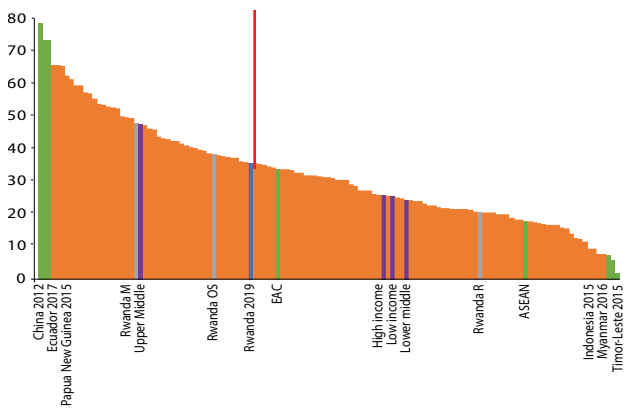
[17] The question in the Rwanda 2019 WBES indicating whether a firm was involved in ecommerce for manufacturers differed somewhat from that used in WBES surveys 2018 and later (except for Chad 2018), which asked whether a firm had a website. To compare with other countries, the calculations in Figure 15 (and Annex Table 3) use the same question for Rwandan manufacturing firms. Note that the shares are higher using this question (45.4 percent) versus the Rwanda-specific new question based on internet use (39.3 percent), which may introduce an upward bias in the Rwandan results.

▷ *Financial depth*

As expected, access to credit positively impacts firms' participation to international trade in Rwanda. Not surprisingly, access to one additional credit product (i.e., overdraft facility, line of credit or loan, bank financing for working capital, bank financing for investment, and any non-bank financing) is associated with a 10 and 11 percent higher probability of exporting for manufacturing and other services, respectively. Although limited, Rwandan firms' access to finance is greater than that of firms in many other developing countries (Figure 2.13). Average financial depth of 1.1 for all firms (Box 2.1) places Rwanda in the 49th percentile of countries with a rank of 62 out of 121, compared to 1.3 for high income countries, 1.0 for upper middle income, 0.8 for ASEAN, EAC and lower middle income, and 0.6 for low income. Financial depth in manufacturing, retail, and other services averages 0.9, 1.1, and 1.1, respectively. Moreover, these scores do not reflect the additional government subsidies available to firms. While high trade and production costs are cited as reasons for not exporting, the availability of credit helps mitigate these obstacles. The percentage of firms citing these two reasons are much lower than those pointing to the lack of demand, and to a lesser

Figure 2.13: Formal training

(percent)



Notes: Group averages for EAC and Low Income do not include Rwanda 2019. For Rwanda 2019, M=Manufacturing, R=Retail, and OS=Other Services. World Bank income group classifications are based on the year of survey.

Source: WBES 2012-2021, one round per country with most recent survey selected (118 total). Median sample weights for subpopulation used. Annex Table 5 presents descriptive statistics of formal training for all WBES countries by World Bank Income Groups.

Box 2.1: Definition of financial depth

For purposes of cross-country comparisons, the definition of financial depth for Rwanda 2019 is slightly different from the measure used for the regression analysis. Financial depth is an interval variable that ranges from 0 to 5, where one point is given for each credit product that the firm has previously used, including: (i) overdraft facility, (ii) line of credit or loan, (iii) bank financing for working capital, (iv) bank financing for investment, and (v) any non-bank financing. Unlike the WBES Global instrument, the questionnaire for Rwanda 2019 included additional questions on government subsidies:

- Over the last three years, has this establishment received any tax breaks or incentives in the form of reduced social security contributions, or VAT exemptions? (3.1 percent of firms responded yes)
- Over the last three years, has this establishment received any access to land at a government-subsidized rate? (1.4 percent)
- Over the last three years, has this establishment received access to subsidized input or energy prices? (1.1 percent)
- Over the last three years, has this establishment received direct subsidies, including wage subsidies, investment subsidies, and others? (0.8 percent)
- Over the last two years, did this establishment receive any support from the government for upskilling its employees. (e.g., subsidies)? (15.4 percent)

Firms answering any one of these questions in the affirmative were defined as having received non-bank financing. In aggregate, 19.7 percent (71 of 360 firms) received at least one of the above government subsidies. However, only 11 of those 71 firms received no other sources of non-bank financing, and only a small percentage of firms lost one point off of their financial depth scores. Therefore, for the cross-country comparison seen in Figure 2.11 (and Annex Table 4), the exclusion of government subsidies in computing financial depth scores reduces the mean slightly from 1.2 to 1.1 for all firms, and by sectors, from 1.1, 1.2, and 1.3 to 0.9, 1.1, and 1.1 for manufacturing, retail, and other services, respectively.

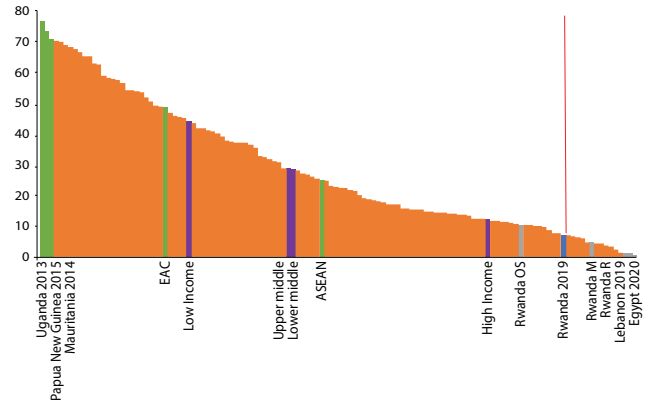
extent, the lack of information. Thus, facilitating sufficient access to finance for firms in times of supply shortages and rising prices, as seen in the post-COVID period, should continue to be a priority for the government.

▷ ***Innovation and training***

Firms that export services tend to undertake product innovations and training. As seen in Figure 2.10 (and Annex Table 3), firms in services outside of retail that engage in product innovation (see Box 2.2 for a definition) are 27.5 percent more likely to export than firms in this sector that do not engage in product innovation. And services firms outside of retail that provide formal training programs for permanent, full-time employees are 20 percent more likely to export. For services (outside of retail), producing a differentiated product or offering a unique service via production innovation is vital for exporting. For example, wholesalers can enter niche commodity markets, while hotels and restaurants can provide a one-of-kind experience for foreign customers. ISO certification and formal training of employees for these services can ensure quality standardization for services rendered, such as meeting internationally known 5-star rating systems in order to increase demand or establish links with foreign agents, distributors, and prospective international buyers (a common reason cited for not exporting, see above). By contrast, the correlation between exporting and engaging in process innovation for other services is not statistically significant.

Firms in Rwanda lag behind in product innovation compared to those in most other countries (Figure 2.14 and Annex Table 5). In 2019, only 15 percent of firms had introduced a new or significantly improved product or service during the last three years, which places Rwanda in the 14th percentile of countries with a rank of 103 out of 120. By sector, other services lead with 19.5 percent, followed by 9.5 percent of retailers and 8 percent of manufacturers. Product innovation

Figure 2.14: Process innovation
(percent)



Notes: Group averages for EAC and Low Income do not include Rwanda 2019. For Rwanda 2019, M=Manufacturing, R=Retail, and OS=Other Services. World Bank income group classifications are based on the year of survey.

Source: WBES 2012-2021, one round per country with most recent survey selected (120 total). Median sample weights for subpopulation used. Annex Table 5 presents descriptive statistics of process innovation for all WBES countries by World Bank Income Groups.

in other EAC countries is much higher, with 56 percent of firms engaged in product innovation, on average: Burundi 2014 (45 percent), Kenya 2018 (52 percent), South Sudan 2014 (48 percent), Tanzania 2013 (51 percent), Uganda 2013 (67 percent). In contrast, ASEAN countries had fewer product innovators (12 percent). However, regression results suggest that process efficiency or quality control via ISO certification is a more important correlate of exporting compared to the introduction of new products and services.

Firms in Rwanda rank well in terms of offering formal training for their workforce (Figure 2.14 and Annex Table 5). In 2019, 36 percent of firms had formal training programs for permanent, full-time employees with 48, 21, and 39 percent in manufacturing, retail, and other services, respectively. These numbers place Rwanda in the 63rd percentile of countries with a rank of 46 out of 118. The incidence of formal training is slight lower in other EAC countries (34 percent), while only 18 percent of firms in ASEAN countries offer formal training. Thus, the Government of Rwanda has provided substantial financial support to help firms enhance the skills of their workers. Of the government subsidies listed and discussed above, subsidies for training are the most popular with 15 percent of firms in Rwanda 2019 receiving financial support from the government for upskilling its employees. These descriptive results, in combination with the results from the econometric analysis, indicate that government subsidies for training have been effective. Specifically, regression results show that firms in services outside of retail that provide formal training programs for permanent, full-time employees, are 20 percent more likely to export.

Manufacturing firms that export tend to undertake process innovations. Process innovation is positively correlated with exporting for manufacturers (40 percent more likely to export). Manufacturers that export tend not to be selling new products to foreign customers, but rather improving process efficiency or industrial engineering (via ISO certification) to match the productivity of international competitors. Doing so can increase a firm's competitiveness and the demand for its products abroad.

Firms in Rwanda perform quite poorly in the area of process innovation compared to those in other countries. Note that this poor performance is in spite of the less stringent definition used in Rwanda for process innovation (see Box 2.2). The share of process innovation at 7.2 percent for all firms places Rwanda in the 13th percentile of countries with a rank of 105 out of 120. By sector, the share of firms engaged in process innovation among other service providers is 10.5 percent, followed by manufactures (5 percent) and retailers (just 1 percent). Process innovation is much more common among the member countries of EAC (48 percent) and ASEAN (25 percent). Unlike product innovation, process innovation was found to be positively correlated with exporting for manufacturers (40 percent more likely to export). In the wake of COVID-19 policies that placed restrictions on the movement of inputs and factors, leading to distorted markets and skyrocketing prices, firms must constantly be nimble and adapt to fluid business environments. As such, process innovators will have a better chance to exhibit strong resiliency in the face of pandemic-induced disruption.

Box 2.2: Product versus process innovation

For the regression analysis, firms are defined to engage in *product* innovation if an affirmative response is given to the following question: "During the last three years, has this establishment introduced new or improved products or services?"

Firms are defined to engage in *process* innovation if an affirmative response is given to following question:

"During the last three years, has this establishment introduced any new or improved process? These include: methods of manufacturing products or offering services; logistics, delivery, or distribution methods for inputs, products, or services; or supporting activities for processes."

and the firm also responded with answer b or c to the following question:

"Over fiscal, what best describes what happened at this establishment when a problem in the production process arose?"

a. We fixed it but did not take further action
b. We fixed it and took action to make sure it did not happen again
c. We fixed it and took action to make sure that it did not happen again, and had a continuous improvement process to anticipate problems like these in advance
d. No action was taken

For purposes of cross-country comparisons, the definition of process innovation for Rwanda 2019 differs from the one used for regression analysis. While the first question, "During the last three years, has this establishment introduced any new or improved process?" was available in all survey years, the second "Over fiscal, what best describes what happened at this establishment when a problem in the production process arose?" was only introduced in 2018. Consequently, only the first question is used to define process innovation seen in Annex Figure 1 (and Annex Table 5). The percent of firms in Rwanda 2019 engaging in process innovation increases when compared to the definition used for the regression analysis. Specifically, the share of all firms increases from 5.4 to 7.2 percent; by sector, manufacturing rises from 2.5 to 4.6 percent, retail remains at 1.0 percent, and other services expands from 8.1 to 10.5 percent.

2.2. Fostering trade in services

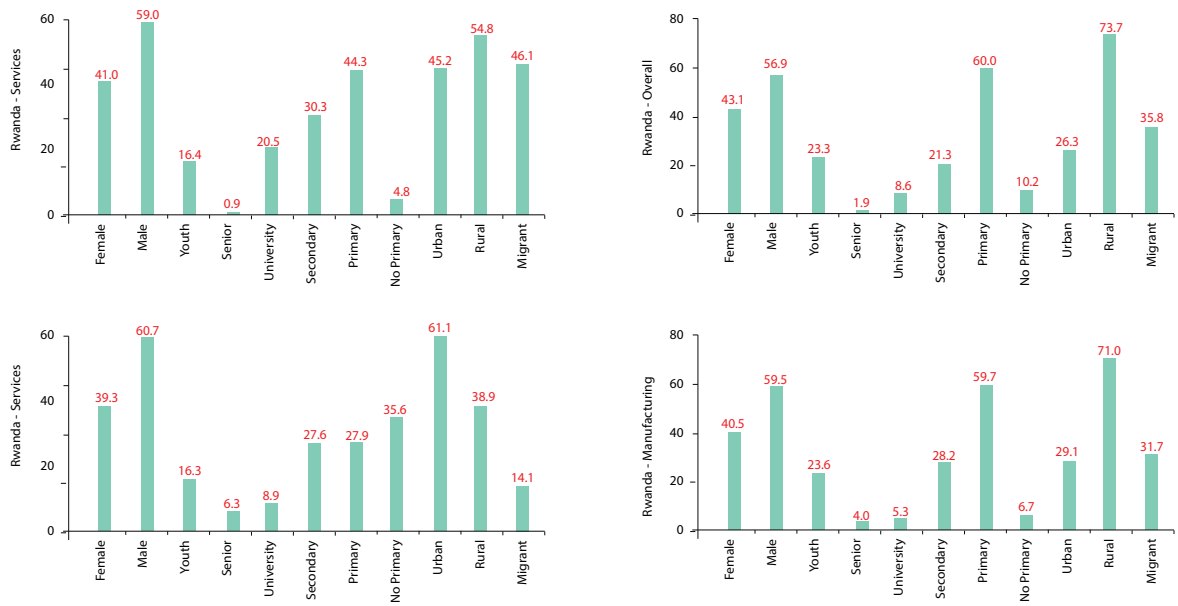
Rwanda has placed great emphasis on services development to raise employment, income and export earnings. In many respects Rwanda's services trade regime is quite open, for example in commercial banking, distribution and road freight, while a measure of overall services trade restrictiveness appears to be lower than for a sample of African countries with adequate data. However, Rwanda imposes restrictions on the cross-border transfer of data and on data processing that could impair firms' ability to participate in services trade. Rwanda has sought international agreements on opening the services sector; the country has committed to open the most sub-sectors of any EAC country. There are considerable opportunities to pursue further bilateral and multilateral agreements to open services trade. Discussions are underway under the AfCFTA to liberalize trade in services, and WTO members have initiated discussions concerning services trade. However, Rwanda has not participated in the latter. There is scope for mutual recognition agreements of regulatory regimes governing data privacy and protection in the context of AfCFTA, and bilateral agreements could be sought with the European Union (EU).

2.2.1. Role of services in Rwandan development strategy

Rwanda aspires to become a knowledge-based, services-led economy through diversification of its export base into distribution and logistics services, tourism, business travel and financial services. These service activities offer significant employment opportunities for both relatively unskilled and more skilled workers. Rwanda's economic development strategy is distinctive among comparators in the emphasis that has been put on services, which in the aggregate account for half of GDP, 30 percent of total employment (up from around 10 percent in the early 2000s), and a rapidly rising share of total foreign exchange earnings. This shift into services was supported by government policy (Behuria and Goodfellow, 2019), as set out in Vision 2020 and the National Strategy of Transformation (NST1). The emphasis on services recognizes the limits on manufacturing exports from lack of access to the sea in a neighborhood with high transport costs and limited market size. A services-based strategy offers significant opportunities to leverage the location and endowments of the country by specializing in (regional) logistics, adding value to agricultural products, and investing in consumer and business travel (e.g., conventions). Among services sectors, ICT, logistics and tourism were highlighted and continue to be prioritized in the country's development strategy and industrial policy (MINICOM, 2011).[18]

In addition to the generation of employment income and export earnings, services also can play an important role as drivers for improving human capital (health and education services). Rwanda's services sectors tend to employ more highly skilled workers than the manufacturing sector does, indicating considerable potential for contributing to development through innovation and human capital accumulation. Over 50 percent of those employed in services in Rwanda had at least a secondary education in 2020 (Figure 2.15, top left panel), or almost 20 percentage points higher than the share of similarly educated in the overall economy (Figure 2.15, top

Figure 2.15: Demographic composition within services and reference groups
(percent)



Source: The demographic data are from the National Labor Force Survey 2020. Data on African countries are drawn from Baccini et al. (2021).

[18] Ggombe and Newfarmer (2018) note that these services employ unskilled and semi-skilled workers, require less physical capital per unit of output, and exhibit high returns from the application of new technology.

right) and about 17 percentage points higher than the share of similarly educated in manufacturing (Figure 2.15, bottom right). The composition of educated workers in services also compares favorably with the services sector in the group of reference African economies (Figure 2.15, bottom left). Moreover, in Rwanda services are more likely to be concentrated in urban areas than manufacturing is, and services are especially attractive for migrant workers.[19] Thus, the descriptive evidence suggests that transition towards a services-led economy is accompanied by a higher human capital accumulation in Rwanda.

Realizing and sustaining high rates of growth of services exports requires openness to trade and investment. This implies low barriers to imports of intermediate products (goods and services) and imports of capital and knowledge through inward foreign direct investment (FDI), as access to a wide variety of inputs, both services and goods, matters for competitiveness. The associated policy agenda includes sustaining a business environment and sector-specific regulatory regimes that support investment. This agenda includes ensuring that Rwandan firms have access to foreign markets and that regulatory frameworks and implementing institutions meet international standards or satisfy the requirements prevailing in export markets.

Fostering greater regional competition among services suppliers would likely lower prices to consumers and producers. Compared to other countries in the region, Rwanda's services economy is faced with relatively high prices and low productivity (WBG-GoR, 2020). While other factors (e.g., small scale, high operating costs, inadequate regulation) contribute to inefficient services, the pay-off to increased competition and efficiency could be large. Hoekman and Shepherd (2015) found that a 10 percent reduction in a country's Services Trade Restrictiveness Index is associated with a 4.4 percent increase in manufactured exports from a country like Rwanda. At present within the EAC, some key services markets are tight oligopolies, with a dominant supplier. Absence of competition is one reason why some industries experience high costs. Telecommunications in Rwanda, for example, despite the advent of quality internet service and the spread of mobile telephony, still suffer from higher-than- average prices to consumers and costly restrictions (WBG-GoR, 2020).

2.2.2. Restrictions on services trade

While indicators of the restrictiveness of Rwandan services trade policy are only available for a few sectors, Rwanda is quite open towards trade in services in sectors that are priorities for the government, including commercial banking, distribution and road freight.[20] Indeed, Rwanda's services trade regime in these sectors is similar in restrictiveness to average levels prevailing in many OECD economies. Rwanda's level of restrictiveness is at the average OECD level in banking and more open in distribution services and road freight. And Rwanda's services trade policies in these sectors are less restrictive than barriers in large emerging economies.

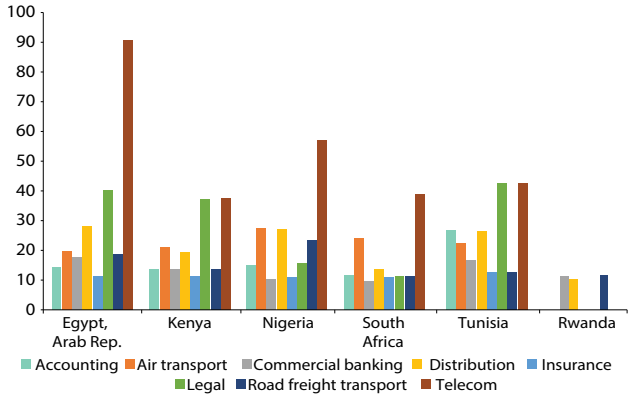
The impact of services trade restrictiveness, as measured by the ad valorem equivalent, also appears lower than in a sample of African countries where data are available, including Egypt, Kenya, Nigeria, South Africa and Tunisia. In the three sectors with data in Rwanda, the ad valorem equivalent of services restrictions in distribution services was the lowest, in road freight transport was lower than in four of the countries, and in commercial banking was lower than levels in three of them (Figure 2.16).

However, considering its significant skills gap in the service sector, concerns exist around Rwanda's recognition of regional professional qualifications. Rwanda is facing a skills deficit that, if not remedied, will constrain potential growth for high-skill services

[19] We define an individual as a migrant if the district of current residence is different from the district of birth in the Labour Force Survey.

[20] These data are based on Shepherd et al. (2018), and reflect services trade restrictiveness indicators (STRIs), based on the methodology used by the OECD.

Figure 2.16: Ad valorem equivalent of services trade policy
(percent)



Source: Hoekman and Shepherd (2019) and author's calculations for Rwanda

exports. A skills assessment estimated that Rwanda needs 5,000 accountants in the public sector and another 2,325 accountants in the financial sector to meet demand, yet it has only 6 percent of that number (ICPAR 2017). Rwanda is lagging behind the rest of the EAC in the number of professionals and is far behind African leaders in services exports such as Mauritius and South Africa. To overcome this skills gap, Rwanda would benefit from recognizing the licenses and standards obtained in other EAC countries and from adopting common qualifications criteria. So far, the EAC has introduced mutual recognition agreements (MRAs) in three professional services: accounting, architectural and engineering services. It would significantly benefit from extending these recognitions in other services with skills shortages, including financial services, but also health and education (WBG-GoR, 2020). In absence of an EAC-wide MRA, Rwanda could also choose to unilaterally recognize these qualifications to address its skills gap.

The current work permit regime also disincentivizes short-term assignments in services. The select few MRAs currently agreed within the EAC still require eligible professionals from EAC partner states to obtain permits prior to being employed, which is a burdensome and slow process (Basnett 2013). It also requires registration for professional bodies in both the "home" and "visiting" country, each requiring an initial certification process and an annual financial contribution. These administrative burdens are a primary reason that prevent professionals from accepting short-term assignments (WBG-GoR, 2020). Liberalizing the work permit regime for EAC professionals could help to alleviate this issue and facilitate services trade.

2.2.3. Restrictions on data

Digital trade policies can help determine countries' access to export opportunities.[21] Firms involved in trade need to meet foreign data protection norms, for example in order to access and process the data required to provide services to clients. Restrictions on cross-border data flows may take the form of screening of inward FDI and data localization requirements – either for storage of data and/or processing of data (Ferracane et al. 2018). Regulatory regimes – at home and abroad – that impede domestic firms from engaging in cross-border data flows and associated digital transactions are particularly important in sectors that have been identified as priorities in Rwanda, including financial services.

Rwanda has adopted regulations pertaining to data transfers and data processing that may impede the ability of Rwandan firms to engage in trade in services insofar as this requires the cross-border flow of data. Data collected by UNECA (2022) reveals that Rwanda has a regime that is relatively restrictive for both cross-border and domestic data management. This results in the data flow-related elements of an overall measure of digital trade restrictiveness for Rwanda being relatively high, offsetting the effects of an open policy towards services trade and inward FDI. Data sovereignty is central to the government's National Data Revolution Policy,[22] which has led the government to impose several regulations requiring that data must be stored and processed locally, and accessible to the relevant

[21] This section has benefitted from information on digital trade policies in Africa provided by Martina Ferracane.

[22] See https://statistics.gov.rw/publication/rwanda-national-data-revolution-and-big-data

government authorities. Ministerial Order N°001/MINICT/2012[23] provides that all critical information data within Government should be hosted in one central national data center (Art. 17). Regulation no. 010/R/CRCSI/RURA/020[24] Governing Cybersecurity prohibits networks, systems and applications of licensees to be managed, hosted, remotely accessed or located outside of the Republic of Rwanda unless explicitly authorized by the Regulatory Authority (Art. 15). This applies to all ICT infrastructure and services (Art. 2).[25] In the case of financial services, the Law no. 02/2018 on Cybersecurity requires all banks licensed by the Central Bank to maintain their primary data in the territory of the Republic of Rwanda (Art. 3).

Emulating the types of provisions that have been adopted in the EU, most recently the General Data Protection Regulation (GDPR), the Law no. 058/2021 relating to Protection of Personal Data and Privacy lists conditions for a data controller or data processor to transfer personal data outside Rwanda. These include: the consent by the data subject; necessity to perform a contract; public interest grounds; protection of vital interests of data subject; legitimate interests by the data controller; and performance on international instruments ratified by Rwanda, and the authorization from the Supervisory Authority. In contrast to the EU approach, however, these conditions do not include bilateral or plurilateral adequacy arrangements with partner countries (discussed below), standard contractual clauses or binding corporate rules for intra-corporate transfers of data. Another difference with the EU approach is that the Law requires data controllers or processors to store a copy of personal data in Rwanda (Article 50). Storage of personal data outside of Rwanda requires a valid registration certificate issued by the supervisory authority (Article 29). In addition, the country requires multimedia companies, including online newspapers, Internet radio services, Internet TV services, VoD services, IPTV, Mobile TV services and other related multimedia services, to retain a copy of all multimedia recordings for 90 days.[26]

The consequence of these various provisions is that Rwanda has a relatively restrictive regime on cross-border data transfers and domestic data processing, which in turn increases Rwanda's digital trade restrictiveness index (DTRI). The different components making up Rwanda's DTRI are reported in Figure 2.17, together with the average level of restrictiveness implied by the pertinent legislation and regulation in 22 other sub-Saharan African nations, which can be regarded as a proxy for other AfCFTA members.[27] This illustrates that on average Rwanda is more liberal (open) on merchandise trade policies pertaining to digital products (e.g., ICT goods) and to foreign investment than other African nations, but is more restrictive in regulating data.

Similarly, Rwanda is more restrictive on cross-border data policies than other ECCAS members for which information is available (Figure 2.18). A similar pattern emerges when the comparator countries are other EAC members (Figure 2.19), although Kenya also has relatively restrictive cross-border data flow regime, and Tanzania has more restrictive domestic data policies.

Thus, restrictive data-related policies in Rwanda could offset the liberal services trade policy stance of the government. The fact that Rwanda has adopted data protection regulations that are in many respects like what has been put in place in the EU creates a potential opportunity to attract data-

[23] https://gazettes.africa/archive/rw/2012/rw-government-gazette-dated-2012-03-12-no-11bis.pdf (Instructions section)

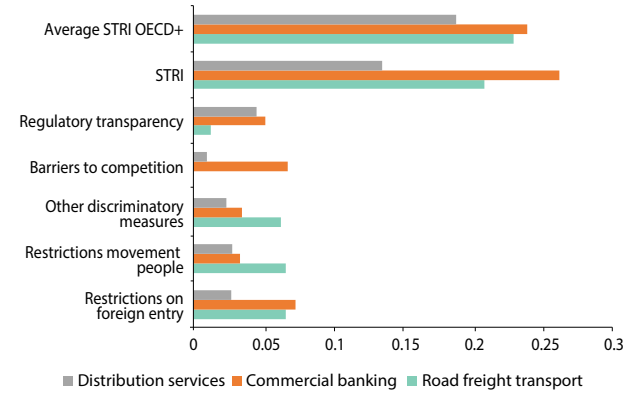
[24] https://rura.rw/fileadmin/Documents/ICT/Laws/Cybersecurity_Regulation_in_Rwanda.pdf

[25] In 2017, Rwanda's telecommunications regulator fined MTN Rwanda (a subsidiary of South Africa's MTN Group) USD 8.5 million (10% of its annual turnover) for failing to process Rwandan customer data in the country by transferring it to Uganda and for running its information technology services outside Rwanda.

[26] Regulation 012/R/MRCER/RURA/020 Governing Licensing of Multimedia Services Provision in Rwanda.

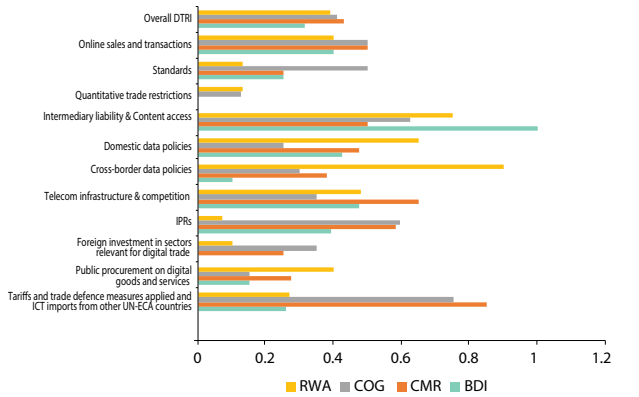
[27] The data on the DTRI is incomplete in terms of country coverage. Work is ongoing to add data on additional African nations. The methodology underlying the DTRI builds on Ferracane, Lee-Makiyama and van der Marel (2018). The basic information on applied regulations is described in UNECA (2022).

Figure 2.17: Composition and level of Rwanda STRI, selected sectors
(percent)



Note: Average OECD+: average across all countries in OECD database.
Source: Shepherd et al. (2018).

Figure 2.18: DTRI and its components, available ECCAS countries
(percent)



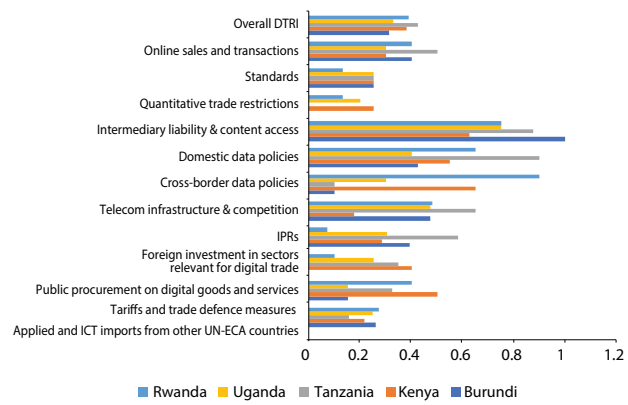
Source: Compiled from UNECA (2022).

intensive services investment. However, several of the measures regulating cross-border data flows are more restrictive than what is found in major markets, which provide for additional mechanisms to govern data flows with the aim of supporting cross-border trade in services while ensuring privacy and data protection.

2.2.4. International cooperation on services trade policies

At sub-regional level, Rwanda is a member of the East African Community (EAC), the only African REC under which members have liberalized trade in services (Olayiwola, 2020). EAC Common Market Scorecards track progress in implementing the common market (EAC and World Bank 2016). The Common Market Protocol identifies seven priority sectors: business, communication, distribution, education, financial, tourism and travel, and transport. Within these sectors, Rwanda has committed to open the most sub-sectors (103 out of a maximum of 136) of any EAC country (Shepherd et al. 2018).

Figure 2.19: DTRI and its components, available EAC countries
(percent)



Source: Compiled from UNECA (2022).

At continental level, several initiatives are being considered or are underway to strengthen international cooperation on services trade policies, but progress remains limited. The AfCFTA Protocol on Trade in Services aims to progressively liberalize trade in services (African Union, 2018), using a similar framework as the GATS. However, AfCFTA signatories have yet to establish schedules of specific commitments for trade in services and associated regulatory frameworks. A work program aimed at liberalization of services trade among members has yet to start in the framework of ECCAS. Partnership between Rwanda and ECCAS on digitization represents an important opportunity to foster trade in services (see Box 2.3).

At multilateral level, Rwanda has participated in none of the talks including subsets of WTO Members, referred to as Joint Statement Initiatives, that have been initiated in e-commerce, domestic regulation of services, investment facilitation, and measures to enhance the ability of micro and small and medium enterprises (MSMEs) to utilize trading opportunities.[28] Few Sub-Saharan countries are involved in these discussions, with the exception of

[28] https://www.wto.org/english/news_e/news17_e/minis_13dec17_e.htm.

Box 2.3: Building on Rwanda competitiveness to deepen regional integration in ECCAS

There is considerable potential for mutual benefits from cooperation between Rwanda and ECCAS countries, given Rwanda's solid business environment, ability to attract foreign investment, relatively efficient air transport services, experience with improvements in the infrastructure and services supporting trade with EAC countries, and experience with cooperation on digital technology. Here we explore business opportunities in two areas: digitization and tourism.

Collaboration between Rwanda and Central Africa on the digitization and data flow agenda could support the development of technological and innovation capacity. The ECCAS community could harness the Rwanda experience to develop the human and institutional capacity for digitization in ICT-enabled services (e.g., in human resource management, payroll, accounting, architectural design, research, editing, education, back-office services, licensing services, and engineering), trade facilitation, and participation in global and regional value chains. Rwanda's Special Economic Zones Programme can provide the appropriate infrastructure and legal/regulatory framework for cooperation on digital technology with ECCAS countries, while ECCAS countries' efforts to establish SEZs could benefit from collaboration with Rwanda's successful SEZs (e.g., the ICT HUB, Kigali International Financial Centre, Kigali Innovation City and the Kigali DP World Dry-Port). Prerequisites include an effective regulatory/legal framework that fosters a vibrant business climate, an adequate digital economy ecosystem, regionally harmonized policies (e.g., on digital infrastructure sharing), and investment in digital skills. Digital regulatory policy frameworks should be combined with measures to eliminate explicit discrimination against foreign suppliers, particularly Rwanda's relatively restrictive regime for cross-border and domestic data management (see main text).

Effective collaboration with Rwanda can help Central Africa better connect with international firms, tourists, tour operators and transport firms. Weak governance in Central African countries underlines the importance of SEZs as a first step towards establishing an appropriate regulatory environment and overcoming market failures (e.g., poor infrastructure, malfunctioning land markets). SEZs could be used to promote tourism, supported by investments in, for example, conference facilities, the film industry, or water sports. Such tourism zones, given their confined and homogenous nature, can offer a better framework for integrated resort and leisure community development.

the talks on investment facilitation, which includes 21 sub-Saharan African states. However, all four of these initiatives are relevant to Rwanda, as they aim to establish what constitutes good regulatory practice in a range of policy areas that matter for trade in services and digital products. The non-engagement of Rwanda in these efforts means that the discussion and eventual agreements will largely be determined by other countries. Non-participation also implies a missed opportunity to learn from the experience and views of groups of countries on what constitutes good regulatory practices and areas of policy where coordination is feasible and beneficial in facilitating cross-border trade in services. One important area of focus for joint action could be to fill knowledge gaps. Better and more timely information on the value and origin/destination of services/digital trade flows would assist in formulating policies. Another possibility is to improve the understanding of how prevailing digital/data policies in Rwanda and African partner markets affect firms based in Rwanda. As noted earlier, the STRI data for Rwanda is incomplete and the DTRI information for AfCFTA, EAC and ECCAS countries reveals significant differences in the content of policies that affect trade in services, digital products, and cross-border data flows.

The pursuit of bilateral and regional regulatory cooperation would support both intra-Africa integration and trade in services. Mutual recognition agreements of regulatory regimes pertaining to data privacy and protection could be considered both in the framework of the AfCFTA – which foresees the possibility of mutual recognition agreements in Art. 10 of the Services Protocol – and pursued bilaterally with major trade partners. In the case of the EU, for example, there is a possibility of seeking so-called data adequacy decisions that provide a governance framework enabling the free flow of data. EU regulation (the GDPR) – as is the case in many jurisdictions – requires that companies processing or with access to personal data originating

in the EU comply with EU regulation. To date the EU has concluded such arrangements with only a small number of countries and has yet to grant an adequacy decision to an African country. While there are clear differences in the approach to cross-border data flows, the premise (goal) of regulation in Rwanda and the EU are similar: protection of data. Initiation of dialogue with the EU could benefit Rwanda by clarifying the extent of such similarity as well as gaps between the GDPR and Rwanda's regulatory regime and providing a basis for deliberation on whether and how Rwanda's regulatory goals relating to data protection might be relaxed on a bilateral basis, in the process supporting plurilateral cooperation in the EAC and AfCFTA contexts and the WTO.

2.3. Conclusions and recommendations

This section presents measures to strengthen technology and innovation to boost firms participation to international trade and to accelerate openness to trade in services.

Strengthening technology capacities and innovation to foster firms' participation to international trade

Measures to encourage economic dynamism via export entrepreneurship to aid in recovery post-pandemic, could include the following:

Rwanda should explore the possibility of creating a dedicated agency under MINICOM with a clear mandate to help addressing the market failures associated with information asymmetry for non-exporters. Like a standard Export Promotion Agency (EPA), the new agency would assist firms with international trade fairs, provide information on foreign markets, and facilitate training and advisory services. The mandate for exports promotion in Rwanda is currently assumed by various institutions under both the MINICOM and RDB, remain poorly coordinated, and are not always well known by SMES. The MINICOM developed the Rwanda Trade Portal, available online to traders for foreign market information, and produced an exporters' guide which was disseminated to private sector firms. The RDB has a Foreign Market information portal charged with providing basic market information to increase the efficiency of exporters' cultural markets in specific areas, including: coffee market analysis; coffee market research in the USA; avocado in the EU; the tea market in the UK; handcraft market information in the USA; mineral market analysis; and global clothing and textile market information. Embassies generally provide some foreign market information as well.

The government should provide incentives to facilitate the obtention of international standard certification and adoption of e-commerce. Given the evidence on the strong relationship between ISO certification and exporting and "the lack of demand for product abroad" cited by non-exporters, resources spent on increasing awareness and dissemination of information regarding application and filing procedures may help Rwandan entrepreneurs realize and maximize their exporting potential. Likewise, the positive relationship between ecommerce and exporting in combination with "the lack of information regarding foreign agents, distributors and prospective buyers" cited by non-exporters, suggests investment in internet infrastructure can provide isolated enterprises, such as those in rural and underdeveloped urban areas, low-cost connectivity to markets and customers aboard. Government has made substantial investments in ICT infrastructure, but continued efforts are needed to upgrade the quality (and uptake) of ICT infrastructure. ICT infrastructure needs to be high-speed, reliable, available, and accessible, and continued investments are required to improve bandwidth and infrastructure reliability. The Networked Readiness Index is a comprehensive composite index that assesses a country's "preparedness to reap the benefits of emerging technologies and to capitalize on the opportunities presented by the digital revolution and beyond" (World Economic Forum, INSEAD, and Cornell University 2016). Rwanda performs least well in readiness (115) and is ranked 106 in infrastructure. In terms of digital infrastructure, Rwanda is lagging because of the lack of investment and inadequate

metropolitan and last-mile access networks. The high cost of broadband lines, combined with low computer ownership, put the service beyond the reach of most private users.

Rwanda should continue its to foster innovation through tertiary education(WBG-GoR, 2020). Publications and patents in Rwanda have been rising, although from a very low base. Likewise, Rwanda has invested in a range of graduate and postgraduate centers for technical training, including Carnegie Mellon University and the various centers of excellence. Creating incentives for researchers to develop and adapt innovations that benefit industries in Rwanda can help Rwanda to reap the maximum returns to local innovation. A practical way to do this follows the model common in high-income countries, where private firms finance university research to solve production challenges. Given the nascent private sector, the government will have to continue to play a supporting role.

In terms of financial depth, facilitating sufficient access to formal credit for firms in times of supply shortages and rampant inflation, as seen in the post-lockdown period, should continue to be a priority for the government in light of the finding that one additional credit product is correlated with 10 and 11 percent higher probability of exporting for manufacturing and other services, respectively.

Lastly, the government should continue to provide incentive to encourage exporters formal training of their workforce. Firms in the services sector that provide formal training programs for its permanent, full-time employees, are 20 percent more likely to export. Of the government subsidies asked about in the survey, subsidies for training were the most popular with 15 percent of firms in Rwanda 2019 receiving financial support from the government for upskilling its employees. A cross-country comparison of the share of firms providing formal training notably shows that Rwanda is ranked 46 out of 118 countries (63rd percentile), with other services ranking even higher at 38 and in the 69th percentile. In combination with regression results that show formal training is an especially important correlate for exporting in other services, policies that support training should continue.

Strengthen Rwanda's services exports by recognizing qualifications and abolishing work-permit regimes for all eligible regional professionals.

Rwanda should address its skills shortage by recognizing qualifications of regional professionals. Between 2013 and 2016, the EAC has introduced mutual recognition agreements (MRAs) in three professional services: accounting, architectural and engineering services. To extend services trade further, MRAs should be drafted for other professional sectors, including legal, finance, and consulting professionals. Similar benefits could occur for extending these recognitions in other areas with skills shortages such as health and education. In absence of an EAC-wide MRA, Rwanda should unilaterally recognize qualifications for regional professionals to address its skills gap (WBG-GoR, 2020).

To facilitate short-term assignments, the EAC should further abolish work-permit regimes for all eligible professionals. The MRAs in the EAC still requires eligible professionals in the EAC to obtain permits and register for professional bodies in both "home" and "visiting" country. These administrative burdens prevent professionals from accepting short-term assignments. Instead, any eligible professional certified from any EAC professional body should be automatically exempt from work-permit regimes (WBG-GoR, 2020).

The attraction of regional services providers should be accompanied by aggressive measures to help expand the number of Rwandan professionals. Regional professionals and services provide a key means to fill high-paying vacancies in the private sector using regional experts. Yet, if this is seen to be a one-sided movement (for example, from Kenya to Rwanda), the use of regional experts may

lead to resentment and result in a backlash to EAC regional integration. For that reason, it is important to increase the number of professionals in Rwanda through the following measures(WBG-GoR, 2020).

- Develop a quality tertiary education system focused on high-return activities. Rwanda has taken dramatic steps to improve the quality of tertiary education in recent years, consolidating public universities into the University of Rwanda for better governance. Increasing access to financing, including loosening restrictions on private financing, would help to expand enrollment. The share of total budget allocated to education increased substantially from 10 percent in 2019 to 14 percent in 2020 and 2021. Rwanda also needs to focus its tertiary education system on key areas of investment: more science and engineering. Strategies used in high-income countries to encourage university students to enter high return fields—including financing incentives (as in Argentina and Australia) and improving the quality of science and engineering instruction in earlier grades (as in Norway and Poland)—could be considered.
- Strengthen the provision of technical and vocational training. Collection and dissemination of information on the quality of skills providers and the returns to different skills would encourage youth to participate in sectors with high returns and help to improve the quality of skills training programs. Many high-growth countries, including Korea, Malaysia, and Singapore, used an activist approach to skills development by setting a strategic direction, tone, and culture for efforts to improve workforce skills; creating an organizational infrastructure with the appropriate governance design; and fostering efficient and effective management of service delivery by providers.

Collaboration with ECCAS countries for enhanced export of goods and services

Collaboration between Rwanda and Central Africa on the digitization and data flow agenda could support the development of technological and innovation capacity. At the regional level the ECCAS community could harness the Rwandan experience to develop the human and institutional capacity for digitization, technology development and innovation. ICT-enabled services for export could be developed in human resource management, payroll, accounting, architectural design, research, editing, education, back-office services, licensing services, and engineering. Enhanced digitization could also foster digitally-enabled services to facilitate cross-border trade; support backward and forward linkages to agriculture, mining, and manufacturing; and increase insertion in regional and global value chains. Technological innovation and science parks and technology development zones (TDZs) can provide the required institutional, legal and regulatory framework to attract investment in infrastructure and high-tech fields.

Looking beyond ECCAS, Rwanda could participate in other bilateral and multilateral efforts to improve the regulatory framework for digital services. Rwanda could participate in talks initiated by WTO members on issues of importance to the country's services trade, to grasp the opportunity to influence the agreements reached and to learn about best practice in services regulation. Mutual recognition agreements of regulatory regimes pertaining to data privacy and protection could be considered both in the framework of the AfCFTA and pursued bilaterally with major trade partners. For example, Rwanda could seek data adequacy decisions that provide a governance framework enabling the free flow of data. A key issue will be Rwandan restrictions on the cross-border transfer of data and on data processing that could impair firms' ability to participate in services trade.

Digital regulatory policy frameworks should be combined with measures to eliminate explicit discrimination against foreign suppliers. For example, Rwanda's overall level of restrictiveness is marginally better than that of Cameroon, and a partnership to lower the restrictiveness of policy

measures in the two countries' SEZ programs holds promise. Through a variable geometry this partnership can be generalized. A regional directive to that effect from ECCAS could smooth out the process.

Specific cooperation between Rwanda and ECCAS countries could be undertaken in Special Economic Zones. The 2018 Rwanda SEZ policy[29] provides the relevant framework for the Rwandan Special Economic Zones Programme. The Special Economic Zone Authority of Rwanda (SEZAR)[30] has been successful in attracting FDI especially from inside Africa (South Africa, Morocco, and Kenya). While most ECCAS countries have put together SEZs, these could benefit through collaboration undertaken through successful various programs in Rwanda. The Fintech innovation programme, Kigali Innovation City, Rwanda Innovation Fund and the ICT Hub offer considerable opportunities for learning.

[29] Ministry of Trade and Industry (2018) "Revised SEZ Policy Addressing the infrastructure constraint to industrialization in Rwanda" https://www.minicom.gov.rw/fileadmin/user_upload/Minicom/Publications/Policies/SEZ_Policy_-_January_2018_v2.pdf

[30] https://fortuneofafrica.com/rwanda/rwanda-special-economic-zones/

REFERENCES

African Union. 2018. Agreement establishing the African Continental Free Trade Area: Protocol on Trade in Services.

Baccini, et al. (2021). Services and economic development in Africa. https://www.theigc.org/wp-content/uploads/2021/09/Baccini-et-al-August-2021-Working-paper.pdf

Behuria, P. and T. Goodfellow. 2019. "Leapfrogging manufacturing? Rwanda's attempt to build a services-led 'developmental state'." The European Journal of Development Research 581--603.

BNR (2022). External Sector Statistics. https://www.bnr.rw/browse-in/statistics/external-sector-statistics/

BNR (2022). Financial Sector Statistics. https://www.bnr.rw/browse-in/statistics/financial-sector-statistics/

EAC and World Bank. 2016. EAC Common Market Scorecard 2016: Tracking EAC Compliance in Movement of Capital, Services and Goods. World Bank / East African Community Secretariat.

Ferracane, M., H. Lee-Makiyama and E. van der Marel. 2018. Digital Trade Restrictiveness Index. Brussels: European Centre for International Political Economy (ECIPE). At: https://ecipe.org/dte/dte-report/

Ggombe, K. and R. Newfarmer. 2018. "Rwanda: From devastation to services – first transformation," in R. Newfarmer, J. Page and F. Tarp (eds.), Industries without Smokestacks: African Industrialization Revisited. Oxford University Press, 316.

Government of Rwanda. 2019-2020 Revised Finance Law. https://www.minecofin.gov.rw/1/publications/reports?tx_filelist_filelist%5Baction%5D=list&tx_filelist_filelist%5Bcontroller%5D=File&tx_filelist_filelist%5Bpath%5D=%2Fuser_upload%2FMinecofin%2FPublications%2FREPORTS%2FNational_Budget%2FAnnual_State_Finance_Laws%2F2019-2020_Revised_Finance_Law%2F&cHash=47b635ce981802c2236ba03ab404ad4a.

Government of Rwanda. Law N°08/2017 of 20/03/2017 modifying and complementing Law n° 31/2016 of 30/06/2016 determining the State Finances for the 2016/2017 Fiscal Year. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=12666&token=540a135f007d11f8d73215628fcfa28dd7ba1649.

Hoekman, B and B. Shepherd. 2015. Services, Firm Performance, and Exports: The Case of the East African Community, IGC Working Paper.

ICPAR (Institute of Certified Public Accountants of Rwanda). 2017. "ICPAR Five Year Strategy: 2017–2021." ICPAR, Kigali.

IMF (2022). Rwanda: Sixth Review Under the Policy Coordination Instrument and Monetary Policy Consultation Clause-Press Release; Staff Report; and Statement by the Executive Director for Rwanda. https://www.imf.org/en/Publications/CR/Issues/2022/06/29/Rwanda-Sixth-Review-Under-the-Policy-Coordination-Instrument-and-Monetary-Policy-520137

IMF. Rwanda: 2021 Article IV Consultation and Fifth Review Under the Policy Coordination Instrument-Press Release; Staff Report; and Statement by the Executive Director for Rwanda. https://www.imf.org/en/Publications/CR/Issues/2022/01/13/Rwanda-2021-Article-IV-Consultation-and-Fifth-Review-Under-the-Policy-Coordination-511923

MINECOFIN (2015). Introduction and implementation of Imihigo – a performance-based and accountability mechanism implemented since 2006 – and the Result-Based Performance Management (RBM) Policy for Rwanda Public Service, August 2015: https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=12464&token=206d23b5640d50ee08ce4db3a852e5f60f9902ed.

MINECOFIN (2017). National Investment Policy, April 2017: https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=12464&token=206d23b5640d50ee08ce4db3a852e5f60f9902ed.

MINECOFIN (2017). National Investment Policy. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=12499&token=c11bee017a40789b8839c5e99ac833780db7e7a4.

MINECOFIN (2018). Guidelines for Preparation and Assessment of Feasibility Study Reports of Projects at Central Government Level. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=12500&token=48723445047768bc212cba8b253f6469f04f8f55.

MINECOFIN (2021). The National Monitoring, Evaluation and Learning Guidelines, 2021. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=21993&token=02a0407c26ab7c744a58e581881e5110c538837c.

MINECOFIN. (2019). Manual of Public Financial Management (PFM) Policies and Procedures. https://www.minecofin.gov.rw/index.php?eID=dumpFile&t=f&f=15841&token=b712c18f2b34da6b7ffd28321812da000ee4de42

MINECOFIN. Budget Execution Reports. FY2019/2020, FY2020/2021, FY2021/2022.

MINICOM. 2011. National Industrial Policy. Ministry of Trade and Industry, Government of Rwanda.

NISR (2022). GDP National Accounts (First Quarter 2022). https://www.statistics.gov.rw/publication/gdp-national-accounts-first-quarter-2022

NISR (July 2022). Consumer Price Index (CPI) - June 2022. https://www.statistics.gov.rw/publication/consumer-price-index-cpi-june-2022

NISR (March 2022). GDP National Accounts, 2021. https://www.statistics.gov.rw/publication/1789

NISR (May 2022). Labour Force Survey Trends-February 2022(Q1). https://www.statistics.gov.rw/publication/1808

NISR. Formal external trade in Goods report (April 2022). https://www.statistics.gov.rw/publication/1813

Olayiwola, W. 2020. Governing the Interface between the African Continental Free Trade Area and Regional Economic Communities Free Trade Areas: Issues, Opportunities and Challenges. UNECA.

RBC (2022). Situation report on Novel Coronavirus. https://www.rbc.gov.rw/index.php?id=717

Republic of Rwanda, Understand the 2020/2021 National Budget: A citizen guide. https://www.unicef.org/esa/media/7291/file/UNICEF-Rwanda-Understanding-2020-2021-National-Budget.pdf

Shepherd, B., M. Décosterd, A. Markitanova, H. Mukama, A. Nderitu, and D. Stivas. 2018. Barriers to Services Trade in Kenya and Rwanda. Report Prepared for the Commonwealth Secretariat. https://developing-trade.com/wp-content/uploads/2018/06/Working-Paper-DTC-2018-3.pdf.

UNECA. 2022. Regional Digital Trade Integration Database and Indicators, forthcoming.

World Bank (2018) Investor Perceptions and Constraints faced by Exporting Firms in Rwanda's Priority Economic Sectors. World Bank: Washington DC.

World Bank Group; Government of Rwanda. 2020. Future Drivers of Growth in Rwanda : Innovation, Integration, Agglomeration, and Competition. Washington, DC: World Bank. https://openknowledge.worldbank.org/handle/10986/30732

World Bank. 2021. Rwanda Economic Update, June 2021 : The Role of the Private Sector in Closing the Infrastructure Gap. World Bank, Kigali. © World Bank. https://openknowledge.worldbank.org/handle/10986/35970

World Economic Forum (2019). The Global Competitiveness Report 2019. https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf#:~:text=The%202019%20results%20of%20the%20GCI%204.0%20reveal,gap%20globally%20stands%20at%20more%20than%2030%20points.

ANNEX 1. SUPPLY SIDE CHALLENGES

Rwanda faces substantial supply-side challenges that limit productivity and competitiveness, and thus trade potential. The most critical issues concern the enabling environment, investment in tradable sectors, human capital, services productivity, agricultural modernization, and governance. This section summarizes some of the main challenges discussed in *Future Drivers of Growth in Rwanda*, a joint publication by the Government of Rwanda and the World Bank.[31]

The enabling environment for both private firms and state-owned enterprises (SOEs) faces significant challenges. Costs faced by firms are high in Rwanda, particularly in energy, transport, and finance (the average nominal lending rate was about 17 percent in 2017, or 12 percent in real terms), compared to costs in other economies at similar stages of development. Access to finance, broadband internet, and affordable and reliable electricity (31.5 percent of firms participating in the Integrated Business Enterprise Survey (IBES) reported access to reliable electricity as a major challenge) remains a substantial barrier to firm growth. Assistance for industrial development fails to achieve its potential due to the emphasis on general support rather than targeting successful enterprises, the lack of performance-based incentives, poor coordination of incentives across government agencies, and the lack of a credible performance monitoring system. Shortfalls in the coordination, monitoring, and evaluation of funding for programs supporting innovation (for example, only 0.7 percent of public expenditures on agriculture were allocated to research and innovation in fiscal 2014/15–2015/16) impairs the effectiveness of the national innovation system.

Private investment in tradable sectors is low. While private credit nearly tripled from 10 percent of GDP in 2000 to 28 percent of GDP in 2016, most of this finance went into non-tradable sectors, such as construction and real estate, or to households. In 2015 only 12 percent of the stock of private finance was in manufacturing and 18 percent was in tourism. More needs to be done to attract FDI and domestic investment into tradable sectors.

The low level of human capital constrains productivity and trade growth. An inadequately educated workforce is cited by employers as the second most binding constraint (after lack of access to finance) to firms' operations in Rwanda. While enrollment in technical and vocational education and training (TVET) is high compared to most African countries, training is not necessarily focused on the priority subfields. Enrollment in tertiary education is low, although it is rising rapidly. However, relatively few graduates are specializing in key job-creation fields, such as science and engineering. Rwanda has a higher level of stunting, and a lower completion rate for primary and secondary education, than the average for low-income countries. There also are concerns over the quality of basic education, as despite substantial improvement over the past decade only 43 percent of teachers were assessed at the "intermediate level" in English.

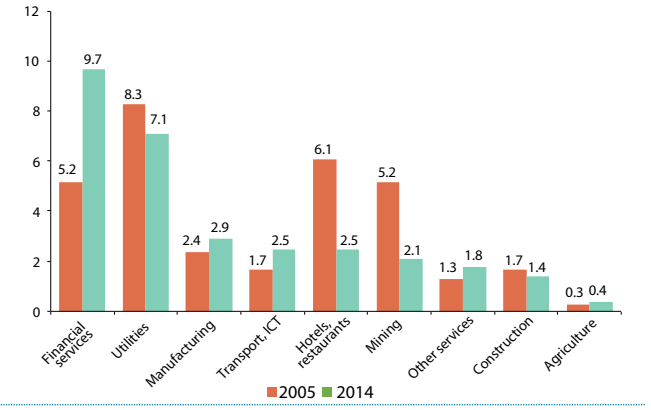
Productivity in services is low and falling. The rapid expansion of the services sector has been at the core of the structural transformation in Rwanda in the past two decades. The high rate of growth the share of services in employment implies Rwanda is converging rapidly to what is observed in a cross-section of thirteen African economies.[32] However, productivity declined from 2005-14 in service sectors such as hotels and restaurants (70 percent decline in output per worker), construction (18 percent decline), and utilities (14 percent decline,

[31] References and supporting material for the points made here can be found in that document.

[32] Benin, Botswana, Egypt, Ghana, Malawi, Mali, Mauritius, Morocco, Mozambique, Rwanda, South Africa, Tanzania and Zambia. This sample group comprises countries for which at least 2 waves of census data is available on employment at the subnational level broken down across sectors. These data are analyzed in a recent IGC study that assesses the link between services and development in these thirteen African economies (Baccini, et al. 2021). See https://www.theigc.org/wp-content/uploads/2021/09/Baccini-et-al-August-2021-Working-paper.pdf.

Annex Figure 1). While productivity in transport and ICT improved, the levels remained low compared with the region. Low productivity in services constrains overall productivity, and in particular that of the higher-quality exporting firms, given firms' reliance on logistics, finance and telecommunications. Hoekman and Shepherd (2015) found that low productivity is driven in part by a policy environment that restricts trade in services. If the EAC were to lower the restrictions on trade in services to the level in Ghana (the African country with the lowest trade barriers for services, with an index of 18), exports of EAC countries could increase substantially: by 13 percent for Rwanda and some 20 percent for Kenya, Tanzania, and Uganda (Hoekman and Shepherd 2015).

Annex Figure 1: Labour productivity in Rwanda, 2005 and 2014s
(constant average 2014 price)



Source: Extracted from World Bank (2020)

Further modernization and policy reforms are necessary to increase the agriculture sector's responsiveness to market signals. Rwanda's rapid growth in agricultural production has been based on the expansion of land devoted to agriculture or increased use of inputs. Since the scope for further land expansion and the productivity gains from applying increased inputs are limited, future agricultural growth will have to rely on productivity-increasing innovations and improved technical and allocative efficiency in resource use. Low investment in irrigation constrains production. Rice yields are insufficient to cover the cost of irrigation investment, underlining the importance of improving rice productivity and shifting towards high-value crops (e.g., horticulture) in irrigated areas. Cooperatives, organized along commodity lines, have been important to state-led collective action. However, less than 20 percent of farmers belonged to cooperatives in 2016, perhaps because some commodities are more suited to cooperative development, or because government resource constraints limit the availability of subsidized seeds and fertilizer inputs distributed through cooperatives. Also, a recent survey indicated dissatisfaction among cooperative members with the level of accountability and transparency in the system.[33] Smallholder farmers often lack access to the benefits of the big data revolution, including the use of sensors to judge the optimal level of inputs and blockchain technology that can lower the cost of small financial transactions and enable secure record keeping. Finally, land degradation remains a critical problem, despite the considerable progress in constructing wide terraces; increasing variability in rainfall patterns particularly impairs the livelihoods of small-scale, rainfed farmers; and accelerated efforts to adapt to climate change are urgent.

Despite Rwanda's remarkable improvements in governance, some rules and institutions continue to hamper country competitiveness. Rwanda has made good progress in improving regulations that support competition and is ranked 34th in the world on the extent of market dominance and 26th on the effectiveness of antimonopoly policy (World Economic Forum, 2016). However, the country is ranked 77th on the intensity of local competition by the *Global Competitiveness Report 2016–2017*. Barriers to entry are high in some sectors. Slow court procedures, limited training and specialization of justice sector employees, and issues with case management techniques impair the effectiveness of the judiciary. Property rights can be threatened due to issues concerning the enforcement of expropriation procedures and protection of intellectual property, coupled with difficulties facing the land management.

[33] MINICOM (Ministry of Trade and Industry) Rwanda. 2018. "National Policy on Cooperatives in Rwanda: Toward Private Cooperative Enterprises and Business Entities for Socio-Economic Transformation." MINICOM, Kigali, January.

ANNEX 2. FIRM LEVEL ANALYSIS

A. Data

This report takes advantage of the granularity of the World Bank Enterprise Surveys (WBES) to explore firm-level perspectives on exporting and female employment. With its detailed questions on firm characteristics and business operations, this database provides a unique opportunity to employ rigorous methods to explore first the role of technology and innovation on exporting and then the role of women-owned and women-managed businesses in creating jobs for women. For Rwanda, three WBES rounds were conducted in 2006, 2011, and 2019. Regression analysis will be based on firm responses provided in the latest round, while data from the earlier two rounds will be used for comparative analysis. In order to provide regional and global context, the analysis in this report will also utilize the larger WBES database covering over 80,000 firms in 118 countries surveyed during the period 2012 to 2021. Annex Tables 4, 5, and 7 list all the countries and years used in this report.

The Rwanda WBES 2019 interviewed business owners and top managers in 360 firms between November 2019 and March 2020.[34] Sector coverage includes manufacturing (120 firms), retail (79), and other services (161), which includes construction, motor vehicles sales and repair, wholesale trade, hotels and restaurants, and transportation. Regionally, 162 firms are located in Kigali, 99 firms in Western Province, and 99 firms in Southern Province. In addition to sector and location, sample design also included stratification by size: 200 small (5 to 19 employees), 110 medium (20 to 99), and 50 large (100 or more).

Two earlier rounds of WBES collected data from (a) 212 firms in November-December 2006 and (b) 241 firms in Rwanda between June 2011 and February 2012. Sample design was identical to 2019 with stratification by sector, location, and size. Sector coverage in 2006 includes manufacturing (59 firms), retail (44), and other services (109), which was similar in 2011, manufacturing (81), retail (36), and other services (124). In 2006 and 2011, respectively, 192 and 232 firms are located in Kigali with only 20 and 9 firms in Butare. The sample in 2006 is comprised of 143 small, 53 medium, and 16 large firms, while the numbers for 2011 were 114, 90, and 37, respectively.

B. Regression Methodology

The increasing collection and availability of microdata on exports—at the industry, firm, and even transaction level—over the last decade has prompted detailed and generalizable research towards developing more accurate trade models and understanding firm behavior. Today a rich body of literature investigates firm dynamics, such as productivity, innovation, and growth in relation to exporting and exporters. One of the primary areas explored concerns exporting in times of crisis and its wake. Upon creating the Exporter Dynamics Database (EDD), Fernandes et al. (2013) finds that "export entrepreneurship," defined as the extensive margin of exports, i.e. new products, firms, and destinations, helped alleviate the negative effects of 2008 financial crisis.[35] Using the EDD, Jaud et al. (2017) shows that financial crisis at both origin and export destination countries have a significant negative impact on firm entry, product introduction, and destination expansion, but this negative impact is less pronounced in countries with more open capital markets and in sectors less dependent on external finance. Similarly, Niemen (2020) uses the EDD to assess financial development and structure on exporters and finds a central importance of access to financial services in export dynamism by increasing the number of small exporters.

[34] Enterprise Surveys, The World Bank, http://www.enterprisesurveys.org. Version: October 21, 2021.

[35] Exporter Dynamics Database 1997-2014: https://microdata.worldbank.org/index.php/catalog/2545/study-description.

The export regressions build upon the industry-level analysis conducted by the aforementioned authors and looks to the WBES to identify the firm-level correlates of exporting, in particular technology and innovation. This research takes advantage of the granularity of the WBES instrument to explore the role of technological activity in explaining exporting behavior. The literature has long stressed the difficult firm-specific processes involved in building technological capabilities and argues that enterprises have to undertake conscious investments to put technology to productive use (Pack and Westphal 1986; Lall 1992; Wignaraja 1998; Wignaraja 2002). Technology transfer necessarily requires learning because many aspects of innovation are tacit; technological knowledge is difficult to embody in hardware or written instructions. The process of getting a new technology into production requires the development of new skills and information. Mastery of new technologies, ultimately, can only be acquired through concerted effort, skill upgrading, investments in training, R&D activities, and extensive managerial experience. Measurement of these variables at the firm level is therefore necessary to identify the sources of low technological capabilities, how external factors such as a global pandemic affects affect scale economies and the probability of exporting.

Export Regressions

Regression analysis of the relationship between exporting and firm activity is based on the OLS estimation of the following model:

$$Exporter_i = \alpha + \beta_1 Product\ Innovation_i + \beta_2 Process\ Innovation_i + \beta_3 ISO\ Certification_i + \beta_4 Ecommerce_i + \beta_5 Formal\ Trainin_i + \beta_6 Financial\ Depth_i + \sum_k \beta_{7k} x_{ki} + \varepsilon_i$$

where *Exporter* is equal to 1 if firm i exports directly any percentage of its sales, and is equal to 0 otherwise. *Production Innovation* is equal to 1 if firm i has introduced new or significantly improved products or services during the last three years, and 0 otherwise. *Process Innovation* is equal to 1 if firm i introduced during the last three years any new or significantly improved process, (i.e., methods of manufacturing products or offering services; logistics, delivery, or distribution methods for inputs, products, or services; or supporting activities for processes) and the firm also takes action whenever problems arise in the production process. *ISO Certification* is equal to 1 if firm i has an internationally recognized quality certification, such as ISO 9000; ISO 45001; HACCP, and 0 otherwise. *Ecommerce* is equal to 1 if firm i uses the internet for business purposes (manufacturing) or has its own website or social media page (services), and 0 otherwise. *Training* is equal to 1 if the firm provides formal training programs for its permanent, full-time employees, and 0 otherwise. *Financial Depth* is an interval variable that ranges from 0 to 5 where one point is given for each credit product that the firm has previously used, specifically, (i) overdraft facility, (ii) line of credit or loan, (iii) bank financing for working capital, (iv) bank financing for investment, and (v) any non-bank financing.

A vector of firm-specific covariates *x* includes controls for the total number of full-time employees (natural logarithm); age; a quadratic in the top manager's years of experience working in firm i's sector; dummy variables indicating positive or negative real sales growth over a last three years (where the reference group are firms with no change or missing value); a dummy variable indicating if firm i has its annual financial statement checked and certified by an external auditor; a dummy variable indicating if firm i imports intermediate materials or supplies; ownership dummy variables, specifically a foreign dummy variable indicating if private sector firm i has at least 10 percent of equity owned by foreign entities (which adheres to the International Monetary Fund threshold that

distinguishes between portfolio and direct investment flows); and a public sector dummy variable indicating if firm i has any equity owned by the government; a dummy variable indicating if firm i is a subsidiary of a larger corporation; an dummy variable equal to 1 if firm i is a sole proprietorship, and equal to 0 if a shareholding company with non-traded shares; a dummy variable indicating if firm i has a waste management system in place; a dummy variable indicating if at least one of the owners is female; a dummy variable indicating if the top manager is a woman; a dummy variable indicating if firm i is located in an industrial park. Lastly, all models include a full set of dummies variables for region (Kigali, Western Province; Southern Province); sector (manufacturing, retail, and other services); and fiscal year.

Annex Table 1: Exporters by industry, WBES 2006, 2011, and 2019

ISIC 3.1	2006		2011		2019	
	Obs	%	Obs	%	Obs	%
Manufacturing						
Food processing (15,16)	21	38.8	24	28.6	66	23.7
Textiles (17)	1	100.0	3	0.0	2	100.0
Garments (18)	5	0.0	1	0.0	..	..
Leather (19)	1	100.0	2	0.0	1	0.0
Wood (20)	1	0.0	4	27.1	3	0.0
Paper (21)	2	50.0	1	0.0	5	33.0
Publishing (22)	7	0.0	15	0.0	2	0.0
Petro & chemicals (2324)	7	14.0	8	23.8	1	0.0
Rubber & plastics (25)	3	0.0	5	60.9	4	10.8
Non-metallic (26)	1	0.0	3	100.0	8	9.4
Basic metals (27)	..	..	2	47.6	2	48.6
Fabricated metal (28)	4	0.0	3	0.0	5	10.4
Electronics (30313233)	..	..	3	0.0	0	0.0
Auto parts (34)	..	..	1	0.0	0	0.0
Furniture, n.e.c. (36)	6	0.0	5	0.0	20	6.0
Retail	44	2.2	36	0.0	79	13.2
Other services	109	4.0				
Construction (45)	..	..	17	0.0	10	2.0
Auto sales & repair (50)	..	..	10	6.3	30	16.5
Wholesale (51)	..	..	24	3.8	19	59.1
Hotels and restaurants (55)	..	..	46	0.0	84	23.8
Land transport (60)	..	..	5	0.0	9	12.2
Air transport (62)	..	..	1	0.0	1	100.0
Travel agencies (63)	..	..	6	6.7	6	37.8
Post & telecom (64)	..	..	3	0.0	2	0.0
ICT (72)	..	..	12	0.0	3	0.0

Notes: Two-digit ISIC Rev.3.1 in parentheses. Median sample weights for subpopulation used.
Source: Rwanda WBES 2006, 2011, and 2019.

Annex Table 2: Descriptive statistics for export regressions, Rwanda WBES 2019 (N = 345)

Variable	All firms	Manufacturing	Other services	Retail
Observations	345	117	151	77
Export	0.264	0.282	0.338	0.091
Product innovation	0.130	0.103	0.185	0.065
Process innovation	0.049	0.034	0.073	0.026
ISO Certification	0.061	0.154	0.020	0.000
Ecommerce	0.472	0.496	0.563	0.260
Formal training	0.371	0.444	0.424	0.156
Financial depth (0-5)	1.339	1.427	1.384	1.117
	[1.252]	[0.499]	[1.205]	[1.112]
ln (Full-time employees)	2.972	3.143	3.215	2.237
	[1.262]	[1.385]	[1.252]	[0.786]
Age (years)	11.762	12.88	11.616	10.351
	[10.425]	[1.350]	[9.483]	[8.341]
Top manager's experience	11.414	11.803	11.053	11.533
	[8.459]	[12.561]	[8.012]	[8.640]
Experience squared	201.635	218.573	185.94	206.675
	[316.799]	[8.941]	[267.875]	[324.952]
Investment (>0)	0.223	0.299	0.219	0.117
Sales growth (>0)	0.684	0.709	0.682	0.649
Employment growth (>0)	0.522	0.521	0.530	0.506
External audit	0.464	0.479	0.556	0.260
Importer	0.270	0.274	0.205	0.390
Domestic ownership	0.858	0.795	0.894	0.883
Foreign ownership (>10%)	0.107	0.154	0.086	0.078
Government ownership (>0%)	0.020	0.043	0.013	0.000
Subsidiary	0.067	0.085	0.073	0.026
Sole proprietorship	0.719	0.641	0.695	0.883
Waste management system	0.617	0.718	0.596	0.506
Female owner	0.261	0.248	0.245	0.312
Female top manager	0.194	0.137	0.212	0.247
Industrial park	0.078	0.231	0.000	0.000
Kigali	0.446	0.376	0.497	0.455
Western province	0.270	0.291	0.298	0.182
Southern province	0.284	0.333	0.205	0.364
Fiscal year 2018	0.380	0.333	0.397	0.416
Fiscal year 2019	0.620	0.667	0.603	0.584
Manufacturing	0.339	..	..	..
Retail	0.223	..	..	..
Other services	0.438	..	..	..

Notes: Standard deviation in square brackets.
Source: Author's calculations based on Rwanda WBES 2019

Annex Table 3: Export regressions (Rwanda WBES 2019)

Export regressions (Rwanda WBES 2019)	All Firms	Manufacturing	Other services	Retail
	(1)	(2)	(3)	(4)
Product innovation	0.058	-0.226***	0.275**	-0.076
	(0.077)	(0.082)	(0.106)	(0.260)
Process innovation	0.011	0.396**	-0.265	0.173
	(0.129)	(0.177)	(0.172)	(0.368)
ISO Certification	0.358***	0.381**	0.610***	
	(0.117)	(0.149)	(0.229)	
Ecommerce	0.182***	0.274**	0.162**	0.049
	(0.057)	(0.130)	(0.080)	(0.098)
Formal training	0.128**	-0.004	0.196**	0.117
	(0.057)	(0.090)	(0.087)	(0.124)
Financial depth (0-6)	0.076***	0.103***	0.109***	-0.038
	(0.022)	(0.036)	(0.037)	(0.038)
ln(Full-time employees)	0.003	-0.048	-0.014	-0.024
	(0.027)	(0.057)	(0.036)	(0.068)
Age (years)	0.000	-0.005	0.008*	-0.010*
	(0.003)	(0.004)	(0.005)	(0.005)
Top manager's experience	0.000	-0.010	0.030**	0.017
	(0.009)	(0.014)	(0.015)	(0.017)
Experience squared	-0.000	0.000	-0.001***	-0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Investment (>0)	0.000	0.045	-0.137	0.128
	(0.065)	(0.120)	(0.112)	(0.117)
Sales growth (>0)	0.000	0.054	-0.064	-0.092
	(0.049)	(0.085)	(0.088)	(0.092)
Employment growth (>0)	0.000	0.016	-0.048	-0.017
	(0.046)	(0.083)	(0.075)	(0.081)
External audit	-0.155***	0.027	-0.189**	-0.092
	(0.055)	(0.110)	(0.083)	(0.116)
Importer materials/supplies	0.049	0.119	-0.001	0.258**
	(0.067)	(0.130)	(0.111)	(0.118)
Equity ownership (Reference: domestic)				
Foreign (>= 10%)	0.136	0.138	0.076	0.108
	(0.101)	(0.194)	(0.157)	(0.187)

*Notes: Robust standard errors in parentheses. ***, **, * indicate statistical significance at the 1, 5, and 10 percent level, respectively. Exporter dummy variable is equal to 1 if firm i exports directly any percentage of its sales, and is equal to 0 otherwise.*

Source: Author's calculations based on Rwanda WBES 2019.

Annex Table 4: Descriptive statistics of exporter share, ISO Certification, Ecommerce, and financial depth

	Exporter share		ISO Certification		Ecommerce		Financial depth	
	Obs	%	Obs	%	Obs	%	Obs	%
Rwanda 2019	**355**	**21.3**	**356**	**2.9**	**360**	**42.6**	**360**	**1.1**
Manufacturing	120	17.0	118	7.1	120	45.4	120	0.9
Retail	79	13.2	78	0.0	79	35.8	79	1.1
Other services	156	26.1	160	3.0	161	44.6	161	1.1
EAC	3,301	9.7	3,330	13.0	3,456	34.4	3,471	0.8
ASEAN	6,927	9.0	6,670	8.5	6,921	37.4	6,963	0.8
Low Income	**8,994**	**8.3**	**8,949**	**11.1**	**9,402**	**35.4**	**9,444**	**0.6**
Afghanistan 2014	371	3.3	396	22.1	410	38.2	410	0.3
Bangladesh 2013	1,442	18.5	1,427	14.3	1,442	35.2	1,442	0.9
Benin 2016	147	21.4	148	14.4	150	46.7	150	1.1
Burundi 2014	157	7.5	152	10.6	157	30.9	157	2.2
Chad 2018	146	8.2	148	2.0	153	14.1	153	0.8
DRC 2013	528	5.9	500	13.3	528	21.3	529	0.5
Ethiopia 2015	842	7.5	832	4.3	842	37.5	848	0.6
Gambia 2018	150	7.1	148	17.7	148	22.4	151	0.7
Guinea 2016	142	1.7	132	0.7	149	21.7	150	0.8
Liberia 2017	151	3.1	150	0.1	151	21.9	151	0.9
Madagascar 2013	394	17.8	387	15.4	525	40.6	532	0.7
Malawi 2014	462	10.4	487	18.8	517	53.8	523	1.0
Mali 2016	185	10.0	157	3.6	185	49.3	185	1.7
Mozambique 2018	597	13.1	590	12.5	601	40.3	601	0.4
Nepal 2013	482	4.3	478	8.2	482	33.5	482	0.9
Niger 2017	143	6.4	146	9.1	150	37.9	151	1.2
Rwanda 2019	355	21.3	356	2.9	360	42.6	360	1.1
Sierra Leone 2017	152	2.2	152	5.8	151	14.1	152	0.5
Tajikistan 2019	340	4.2	329	2.2	349	28.2	352	0.4
Tanzania 2013	681	6.6	776	17.6	806	25.8	813	0.4
Togo 2016	149	28.3	148	8.4	150	43.4	150	1.6
Uganda 2013	733	5.1	697	11.6	758	23.3	762	0.4
Zimbabwe 2016	600	8.4	569	9.7	598	48.7	600	0.5
Lower Middle	**35,051**	**8.8**	**34,657**	**13.9**	**35,628**	**49.3**	**35,777**	**0.8**
Bhutan2015	248	3.4	248	3.7	252	39.8	253	1.6
Bolivia 2017	363	7.7	353	11.6	364	57.3	364	1.3
Cambodia 2016	373	9.6	359	5.2	366	33.1	373	0.5
Cameroon 2016	357	9.2	319	7.7	359	36.1	361	1.0
Côte d'Ivoire 2016	354	8.0	350	5.6	360	25.3	361	0.8
Djibouti 2013	246	15.3	262	17.3	266	48.3	266	1.2

	Exporter share		ISO Certification		Ecommerce		Financial depth	
	Obs	%	Obs	%	Obs	%	Obs	%
Egypt 2020	3,073	6.6	3,054	8.4	3,072	42.4	3,075	0.3
El Salvador 2016	717	12.2	693	5.3	719	50.3	719	1.3
Eswatini 2016	143	10.5	131	15.9	150	65.9	150	0.9
Ghana 2013	717	8.7	698	9.2	720	51.2	720	0.9
Guatemala 2017	344	8.7	332	7.4	345	61.9	345	1.3
Honduras 2016	330	7.4	325	10.8	332	55.2	332	1.4
India 2014	9,281	7.8	9,176	27.5	9,274	66.1	9,281	1.1
Indonesia 2015	1,320	7.1	1,306	5.4	1,319	22.6	1,320	0.7
Kenya 2018	997	14.9	977	12.9	999	47.3	1,001	1.2
Kyrgyz Rep 2019	359	12.6	349	12.5	360	57.2	360	0.7
Lao PDR 2018	331	11.2	330	1.7	332	30.9	332	0.6
Lesotho 2016	148	9.8	128	2.5	149	21.5	150	1.0
Mauritania 2014	148	18.8	147	16.2	150	59.1	150	1.3
Moldova 2019	359	14.2	352	8.6	358	48.1	360	0.7
Mongolia 2019	360	4.6	359	4.3	359	37.5	360	1.0
Morocco 2019	973	21.1	991	3.1	1,073	55.4	1,096	1.0
Myanmar 2016	607	4.6	596	3.5	607	17.9	607	0.3
Nicaragua 2016	333	4.0	321	3.7	332	47.7	333	1.4
Nigeria 2014	2,300	15.7	2,473	7.1	2,640	25.2	2,676	0.4
Pakistan 2013	1,148	13.2	1,157	35.8	1,239	54.8	1,247	0.4
Papua New Guinea 2015	65	6.6	63	23.8	65	80.1	65	1.6
Philippines 2015	1,331	7.9	1,219	8.8	1,327	63.3	1,335	0.5
Senegal 2014	599	10.3	583	9.3	599	39.7	601	0.9
Solomon Is 2015	143	14.3	141	6.4	150	44.0	151	1.6
South Sudan 2014	733	2.6	728	2.6	736	27.0	738	0.3
Sudan 2014	660	6.7	657	7.0	649	65.4	662	0.2
Timor-Leste 2015	126	36.8	124	5.5	126	22.8	126	0.8
Tunisia 2020	605	24.2	580	18.8	615	56.5	615	1.3
Ukraine 2019	1,332	12.4	1,295	11.1	1,332	63.9	1,337	0.8
Uzbekistan 2019	1,231	5.9	1,219	8.3	1,227	26.2	1,239	0.6
Vietnam 2015	990	12.8	978	10.0	991	59.8	996	1.0
West Bank and Gaza 2019	358	17.3	355	2.1	362	30.3	365	0.5
Yemen 2013	350	9.3	348	4.9	352	24.0	353	0.2
Zambia 2019	598	8.6	580	7.9	600	59.0	601	0.5
Upper Middle	**21,002**	**10.0**	**20,646**	**30.9**	**21,274**	**68.0**	**21,317**	**1.0**
Albania 2019	374	19.9	369	13.2	377	59.8	377	1.6
Argentina 2017	662	15.3	646	20.2	663	83.7	663	1.8
Armenia 2020	543	16.1	531	7.8	546	57.5	546	1.0
Azerbaijan 2019	214	11.1	221	17.4	225	66.2	225	0.4

	Exporter share		ISO Certification		Ecommerce		Financial depth	
	Obs	%	Obs	%	Obs	%	Obs	%
Belarus 2018	598	25.3	589	20.7	600	73.5	600	1.1
Bosnia & Herzegovina 2019	360	36.8	351	28.3	362	68.1	362	1.7
Bulgaria 2019	770	23.7	738	24.0	772	45.7	772	1.4
China 2012	2,698	10.8	2,669	53.4	2,700	76.5	2,700	0.8
Colombia 2017	993	12.2	948	20.6	993	85.8	993	2.2
Dominican Rep 2016	357	5.5	334	1.6	358	48.4	359	1.6
Ecuador 2017	361	8.4	340	7.4	361	82.7	361	2.0
Georgia 2019	576	15.4	554	5.6	581	51.2	581	1.0
Jordan 2019	586	24.5	579	26.0	601	77.1	601	0.7
Kazakhstan 2019	1,427	5.3	1,409	6.0	1,438	50.4	1,446	0.5
Kosovo 2019	220	25.2	234	9.1	270	70.6	270	1.6
Lebanon 2019	530	24.6	532	11.7	532	63.5	532	1.5
Malaysia 2015	975	11.3	936	14.0	998	36.0	1,000	1.2
Montenegro 2019	150	6.8	142	20.5	150	41.0	150	1.1
Namibia 2014	527	6.1	537	8.3	576	44.0	580	0.6
No Macedonia 2019	359	22.0	351	17.8	360	63.5	360	1.4
Paraguay 2017	364	5.8	349	10.0	364	77.1	364	2.0
Peru 2017	1,003	16.6	994	17.0	1,002	80.2	1,003	2.4
Romania 2019	794	13.1	781	30.0	793	52.6	795	1.2
Russia 2019	1,309	2.2	1,286	1.8	1,322	58.5	1,323	1.0
Serbia 2019	353	43.5	351	34.5	359	79.1	361	1.8
South Africa 2020	1,074	7.9	1,085	5.6	1,096	79.6	1,097	0.8
Suriname 2018	227	8.1	225	23.5	232	77.1	233	1.5
Thailand 2016	1,000	4.8	946	7.9	981	48.8	1,000	0.7
Turkey 2019	1,598	10.7	1,619	29.5	1,662	64.6	1,663	1.5
High Income	**14,089**	**15.0**	**13,931**	**17.4**	**14,209**	**67.6**	**14,219**	**1.3**
Argentina 2017	328	12.9	323	10.0	327	66.7	328	1.7
Austria 2021	599	38.1	586	27.1	600	90.3	600	1.5
Belgium 2020	609	40.8	601	25.1	614	91.2	614	2.2
Croatia 2019	404	23.6	403	21.0	404	74.9	404	1.2
Cyprus 2019	238	8.7	237	30.0	240	71.5	240	2.0
Czech Rep 2019	501	37.0	498	26.7	502	88.8	502	1.5
Denmark 2020	993	38.9	951	28.6	995	96.7	995	1.6
Estonia 2019	358	40.1	354	16.3	359	78.3	360	1.6
Finland 2020	755	35.8	740	23.7	759	95.2	759	1.8
Greece 2018	600	20.5	579	45.4	600	80.4	600	0.9
Hungary 2019	803	22.5	801	28.3	805	75.1	805	1.5
Ireland 2020	606	17.7	600	41.7	605	93.1	606	1.5
Israel 2013	482	17.2	482	33.0	483	72.5	483	2.0

	Exporter share		ISO Certification		Ecommerce		Financial depth	
	Obs	%	Obs	%	Obs	%	Obs	%
Italy 2019	741	12.7	758	57.9	760	60.2	760	1.3
Latvia 2019	354	32.1	351	22.1	358	69.0	359	0.9
Lithuania 2019	356	25.9	354	7.7	356	24.3	358	0.7
Luxembourg 2020	168	57.1	158	32.0	170	87.9	170	1.6
Malta 2019	242	23.1	229	22.9	242	83.3	242	2.1
Netherlands 2020	805	42.1	792	44.4	808	97.1	808	1.5
Poland 2019	1,297	8.9	1,331	4.8	1,367	62.6	1,369	1.3
Portugal 2019	1,062	12.3	1,054	10.2	1,061	60.1	1,062	1.2
Romania 2019	19	1.6	19	57.0	19	41.5	19	1.2
Slovak Rep 2019	428	17.5	428	31.0	429	83.7	429	1.3
Slovenia 2019	408	55.7	402	25.8	409	86.6	409	1.8
Sweden 2020	587	28.6	576	40.7	591	92.6	591	1.4
Uruguay 2017	346	15.3	324	10.7	346	74.6	347	1.8

Notes: Group averages for EAC and Low Income do not include Rwanda 2019. For Rwanda 2019, M=Manufacturing, R=Retail, and OS=Other Services. World Bank income group classification is based on the year of survey.

Source: WBES 2012-2021, one round per country with most recent survey selected (118 total). Median sample weights for subpopulation used.

Annex Table 4: Descriptive statistics of product innovation, process innovation, formal training

	Product innovation		Process innovation		Formal training		Female employment	
	Obs	%	Obs	%	Obs	%	Obs	%
Rwanda 2019	**359**	**15.2**	**360**	**7.2**	**358**	**35.9**	**357**	**35.2**
Manufacturing	120	8.2	120	4.6	120	48.1	119	28.3
Retail	79	9.5	79	1.0	78	20.8	79	37.8
Other services	160	19.5	161	10.5	160	38.7	159	36.0
EAC	3,460	55.7	3,413	48.4	3,437	34.1	3,126	35.5
ASEAN	6,811	11.8	6,691	24.9	6,893	18.0	4,210	36.8
Low Income	**8,872**	**39.8**	**8,781**	**44.2**	**9,358**	**26.0**	**7,940**	**26.5**
Afghanistan 2014	406	44.8	383	65.3	409	31.7	53	23.2
Bangladesh 2013	1,440	31.4	1,436	54.2	1,442	21.9	1,438	16.0
Benin 2016	149	34.2	149	22.6	150	20.0	146	30.4
Burundi 2014	157	45.1	157	70.3	157	32.0	157	24.5
Chad 2018	153	36.5	152	11.3	152	22.9	145	15.0
DRC 2013	526	37.9	526	42.0	526	17.0	522	18.6
Ethiopia 2015	848	25.6	845	32.6	845	20.8	750	27.7
Gambia 2018	151	45.3	150	17.0	150	25.2	150	20.0
Guinea 2016	147	23.7	143	10.6	144	16.0	141	14.8
Liberia 2017	151	53.5	151	30.8	151	22.8	149	21.1
Madagascar 2013	..	..	..	..	520	12.7		
Malawi 2014	518	53.7	507	65.4	510	32.9	456	26.3
Mali 2016	184	38.3	184	36.4	179	17.7	174	19.1
Mozambique 2018	601	35.4	600	15.6	601	20.7	597	26.5
Nepal 2013	482	50.8	478	68.1	482	31.9	482	18.2
Niger 2017	149	33.4	150	14.0	151	27.5	147	13.5
Rwanda 2019	359	15.2	360	7.2	358	35.9	357	35.2
Sierra Leone 2017	152	26.4	152	14.0	152	21.6	152	23.3
Tajikistan 2019	342	18.6	334	10.2	339	24.3	268	35.5
Tanzania 2013	808	51.0	786	57.6	793	30.7	569	43.9
Togo 2016	150	38.0	150	15.5	150	33.7	148	20.6
Uganda 2013	760	67.1	748	76.8	755	34.7	699	40.1
Zimbabwe 2016	598	29.4	600	13.8	600	26.4	597	32.1
Lower Middle	**35,503**	**24.3**	**35,226**	**28.6**	**35,325**	**24.5**	**32,460**	**25.7**
Bhutan2015	253	44.5	252	54.3	252	26.0	252	25.7
Bolivia 2017	360	60.0	363	37.1	362	49.9	339	30.6
Cambodia 2016	352	32.4	332	35.5	351	22.2	288	46.5
Cameroon 2016	359	39.6	350	12.6	353	37.6	331	32.1
Côte d'Ivoire 2016	359	40.1	351	15.9	355	35.5	331	22.8
Djibouti 2013	259	32.7	256	45.9	265	21.8	227	27.0

	Product innovation		Process innovation		Formal training		Female employment	
	Obs	%	Obs	%	Obs	%	Obs	%
Egypt 2020	3,070	1.6	3,068	0.4	3,072	7.9	3,072	17.8
El Salvador 2016	719	37.8	719	18.1	719	53.8	705	34.8
Eswatini 2016	148	26.9	141	4.8	148	36.1	143	40.5
Ghana 2013	717	52.5	712	69.1	715	40.1	674	24.8
Guatemala 2017	344	53.8	345	37.4	344	55.7	330	36.6
Honduras 2016	332	41.9	331	27.2	331	47.7	326	33.3
India 2014	9,270	41.9	9,256	56.4	9,229	35.9	8,899	15.0
Indonesia 2015	1,312	6.2	1,311	11.4	1,319	7.7	1,315	38.7
Kenya 2018	1,001	51.9	1,001	24.8	998	37.4	981	31.7
Kyrgyz Rep 2019	359	45.3	358	26.2	360	41.4	350	47.1
Lao PDR 2018	330	22.0	331	20.2	332	24.4	331	46.3
Lesotho 2016	147	7.8	148	6.4	150	31.2	141	48.3
Mauritania 2014	150	59.0	149	70.8	149	52.7	145	12.7
Moldova 2019	360	36.8	357	14.8	357	38.1	355	39.2
Mongolia 2019	360	44.5	359	39.2	360	66.2	351	51.4
Morocco 2019	1,053	6.1	1,052	3.3	1,034	35.7	822	32.6
Myanmar 2016	607	15.6	607	14.3	607	5.9	593	31.4
Nicaragua 2016	333	52.9	332	32.9	333	57.3	324	37.5
Nigeria 2014	2,610	52.7	2,588	62.9	2,573	30.7	2,288	24.2
Pakistan 2013	1,212	30.8	1,178	43.5	1,177	32.0	1,088	7.8
Papua New Guinea 2015	65	59.3	65	73.5	65	73.7	44	37.1
Philippines 2015	1,313	32.9	1,274	40.9	1,325	59.8	304	38.3
Senegal 2014	597	49.8	594	51.9	592	17.4	576	20.7
Solomon Is 2015	150	42.3	149	67.7	151	42.0	109	34.0
South Sudan 2014	734	48.3	721	42.0	734	17.1	720	23.5
Sudan 2014	662	55.9	637	45.1	660	9.5	630	13.4
Timor-Leste 2015	126	38.3	126	62.7	74	1.9	90	31.3
Tunisia 2020	612	14.0	610	4.4	614	19.1	601	39.2
Ukraine 2019	1,329	33.4	1,309	13.7	1,333	24.3	1,263	41.1
Uzbekistan 2019	1,233	23.2	1,222	14.4	1,233	16.9	1,145	34.9
Vietnam 2015	988	23.2	956	37.9	985	22.2	705	33.9
West Bank and Gaza 2019	363	13.7	362	14.7	361	9.6	356	16.8
Yemen 2013	353	44.0	352	45.5	351	14.3	342	2.7
Zambia 2019	601	28.7	601	9.9	601	36.6	573	34.8
Upper Middle	**21,101**	**29.1**	**19,994**	**28.8**	**21,149**	**47.8**	**18,897**	**37.0**
Albania 2019	377	42.4	374	17.8	377	46.2	349	53.1
Argentina 2017	660	55.4	654	40.1	655	42.8	628	25.9
Armenia 2020	546	35.5	545	12.6	543	27.5	543	48.2
Azerbaijan 2019	224	22.9	221	8.7	220	33.9	204	32.9
Belarus 2018	600	39.9	599	26.6	599	31.5	594	48.3
Bosnia & Herzegovina 2019	359	48.7	346	29.0	360	37.9	318	39.4
Bulgaria 2019	772	16.6	764	10.5	771	20.0	726	42.3

	Product innovation		Process innovation		Formal training		Female employment	
	Obs	%	Obs	%	Obs	%	Obs	%
China 2012	2,692	43.6	1,681	58.0	2,695	79.2	2,650	37.8
Colombia 2017	992	64.4	992	50.7	987	63.0	925	38.2
Dominican Rep 2016	356	38.6	356	13.5	355	23.4	340	33.6
Ecuador 2017	355	72.4	359	58.2	361	73.7	352	34.2
Georgia 2019	578	43.2	577	17.0	579	32.0	563	38.5
Jordan 2019	591	18.6	593	4.5	591	16.9	563	20.8
Kazakhstan 2019	1,435	18.7	1,423	10.2	1,424	21.8	1,326	42.6
Kosovo 2019	267	26.0	260	9.8	269	20.6	179	60.3
Lebanon 2019	532	7.9	532	1.0	531	20.8	527	24.0
Malaysia 2015	983	3.5	976	37.3	989	18.5	429	33.9
Montenegro 2019	150	18.5	150	3.7	149	15.8	143	44.0
Namibia 2014	573	59.6	558	69.8	571	25.4	550	34.3
No Macedonia 2019	359	45.6	358	18.8	359	39.0	326	47.2
Paraguay 2017	354	53.8	364	28.0	359	46.4	328	28.5
Peru 2017	1,002	61.3	994	47.0	997	65.9	976	32.2
Romania 2019	790	25.3	788	17.0	789	20.1	760	37.4
Russia 2019	1,289	9.9	1,299	11.8	1,309	11.8	1,153	39.3
Serbia 2019	359	39.8	359	25.3	361	38.3	331	44.6
South Africa 2020	1,097	3.9	1,093	1.5	1,089	7.9	1,065	39.8
Suriname 2018	232	30.2	231	21.7	231	34.8	227	40.8
Thailand 2016	926	8.2	904	11.9	985	18.0	245	37.4
Turkey 2019	1,651	6.5	1,644	2.3	1,644	30.7	1,577	19.5
High Income	**14,159**	**25.1**	**14,122**	**12.1**	**14,152**	**26.0**	**13,463**	**43.5**
Argentina 2017	316	34.8	313	22.4	328	33.9	324	29.3
Austria 2021	599	50.0	598	22.3	598	42.6	588	39.3
Belgium 2020	614	58.4	613	31.7	611	57.8	595	29.6
Croatia 2019	404	30.5	404	7.8	404	26.2	403	44.8
Cyprus 2019	238	44.3	237	14.5	240	39.7	234	33.9
Czech Rep 2019	501	31.6	501	15.5	502	43.6	491	36.1
Denmark 2020	995	77.7	987	53.7	992	40.6	983	30.4
Estonia 2019	357	36.8	356	23.1	360	40.7	357	34.1
Finland 2020	759	77.2	756	59.0	753	50.2	695	26.2
Greece 2018	600	22.6	599	15.5	598	21.6	598	35.3
Hungary 2019	802	19.8	804	11.0	805	29.3	798	33.7
Ireland 2020	604	66.0	605	31.0	605	59.8	547	38.8
Israel 2013	481	17.1	482	12.3	482	18.6	472	31.8
Italy 2019	757	12.1	757	7.7	755	12.6	738	33.6
Latvia 2019	356	40.7	356	41.2	359	52.9	354	42.8
Lithuania 2019	357	28.8	354	19.2	356	27.5	353	43.2
Luxembourg 2020	169	55.8	169	37.2	168	66.1	158	25.7
Malta 2019	241	45.1	241	18.4	242	49.9	234	28.1

	Product innovation		Process innovation		Formal training		Female employment	
	Obs	%	Obs	%	Obs	%	Obs	%
Netherlands 2020	808	62.8	806	48.8	806	54.1	768	33.7
Poland 2019	1,361	19.5	1,349	5.9	1,342	21.7	1,042	49.9
Portugal 2019	1,059	14.9	1,060	6.7	1,061	29.0	1,042	41.2
Romania 2019	17	25.8	18	21.3	19	32.9	18	35.9
Slovak Rep 2019	429	13.3	428	7.0	427	43.3	425	37.3
Slovenia 2019	404	60.2	402	49.3	406	44.0	363	33.7
Sweden 2020	590	62.7	590	53.7	590	61.9	580	27.0
Uruguay 2017	341	71.4	337	66.6	343	53.3	303	32.8

Notes: Group average for EAC and Low Income do not include Rwanda 2019. For Rwanda 2019, M=Manufacturing, R=Retail, and OS=Other Services. World Bank income group classification is based on the year of survey.

Source: WBES 2012-2021, one round per country with most recent survey selected (118 total). Median sample weights for subpopulation used.

Annex Table 6: Datasets and their coverage

Database	Time period	Coverage
National labour force surveys	2017-2020	HH level. 42-45 k working-age individuals per survey
Value Added Tax (VAT)	2020	Firm-level. 74 k buyer and 17 k seller firms
Corporate Income Tax (CIT)	2020	Firm-level. 58 k firms
Pay As You Earn (PAYE)	2020	Firm-level. 19 k firms
Import-export database	2020	Firm-level. 13 k importer firms; 1.1 k exporter firms

Annex Table 7: Distribution of establishments in Rwanda, by sector

	2011		2014		2017	
	n of firms	% on total	n of firms	% on total	n of firms	% on total
Agriculture, forestry and fishing	675	0.55%	751	0.49%	563	0.30%
Mining and quarrying	49	0.04%	282	0.18%	307	0.16%
Manufacturing	9,124	7.40%	10742	6.96%	14,195	7.46%
Electricity, gas, steam and air conditioning supply	135	0.11%	25	0.02%	138	0.07%
Water supply, sewage, waste management and remiation activities	225	0.18%	64	0.04%	645	0.34%
Construction	112	0.09%	157	0.10%	159	0.08%
Wholesale and retail trade; repair	64,684	52.48%	78,464	50.87%	96,081	50.49%
Transportation and storage	264	0.21%	288	0.19%	382	0.20%
Accommodation and food service activities	33,305	27.02%	44,626	28.93%	51,868	27.26%
Information and communication	558	0.45%	404	0.26%	1150	0.60%
Financial and insurance activities	970	0.79%	1150	0.75%	1574	0.83%
Real estate activities	17	0.01%	4	0.00%	105	0.06%
Professional, scientific and technical activities	903	0.73%	962	0.62%	1243	0.65%
Administrative and support services activities	749	0.61%	929	0.60%	1408	0.74%
Public administration and defense; compulsory social security		0.00%	104	0.07%	126	0.07%
Education	496	0.40%	3483	2.26%	4,046	2.13%
Human health and social work activities	525	0.43%	1245	0.81%	1497	0.79%
Arts, entertainment and recreation	108	0.09%	156	0.10%	453	0.24%
Other services activities	10,355	8.40%	10,400	6.74%	14,345	7.54%
Total	**123,254**		**154,236**		**190,285**	

Source: Authors' elaboration on Rwanda establishment census

Annex Table 8: Distribution of FDI projects, 2005-2021

Year	Number of projects	Share of total (%)
2005	2	1.18
2007	9	5.33
2008	12	7.1
2009	26	15.38
2010	5	2.96
2011	14	8.28
2012	8	4.73
2013	13	7.69
2014	11	6.51
2015	12	7.1
2016	10	5.92
2017	6	3.55
2018	11	6.51
2019	20	11.83
2020	4	2.37
2021	6	3.55

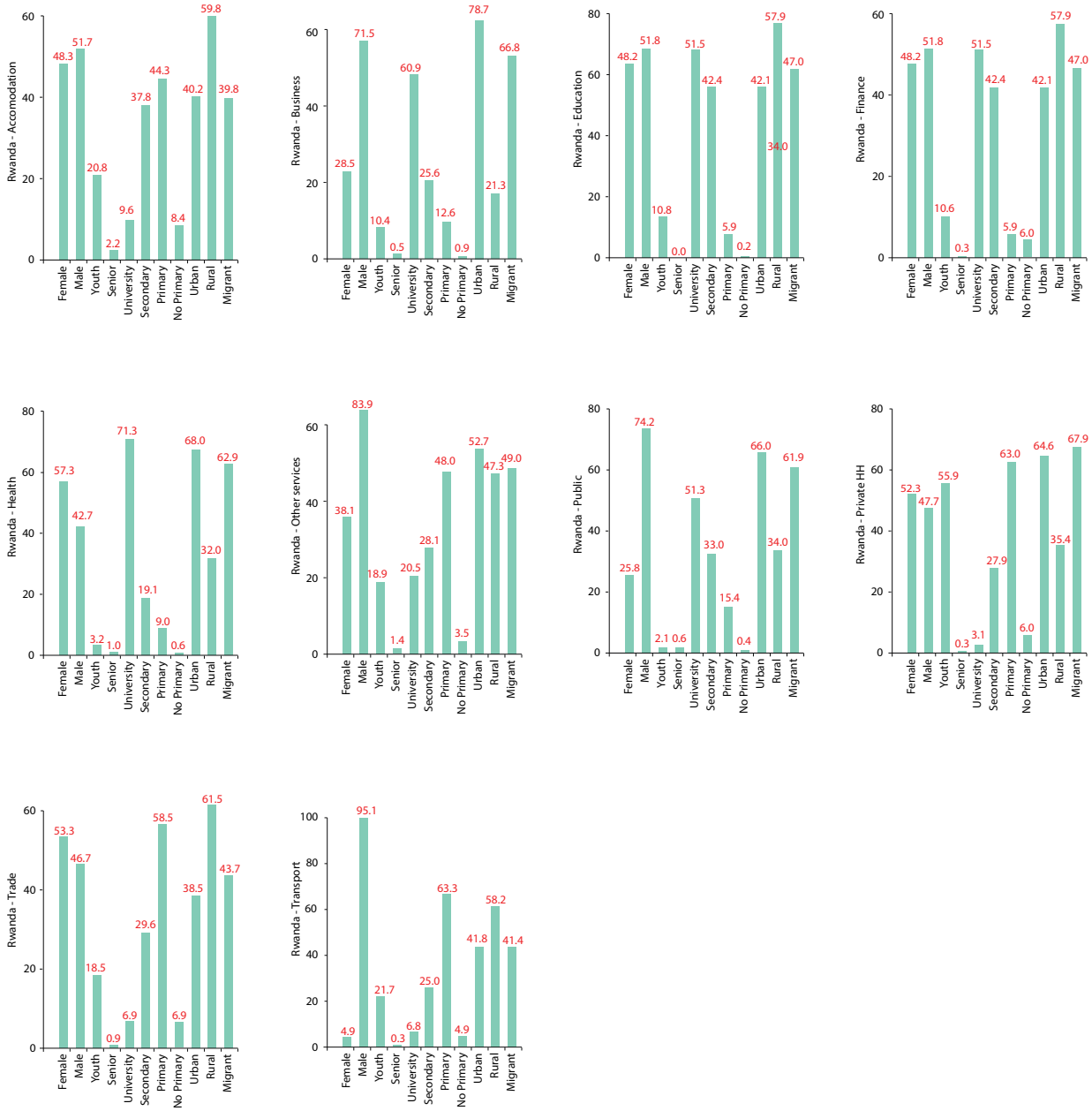
Source: Elaboration on fDi Markets

Annex Table 9: Top sources of FDI projects in Rwanda, 2003-2021 (Aug)

#	Country	Projects	Share of total (%)
1	Kenya	31	18.34
2	United States	15	8.88
3	UAE	12	7.1
4	India	9	5.33
5	Uganda	9	5.33
6	South Africa	8	4.73
7	China	6	3.55
8	Nigeria	6	3.55
9	Switzerland	6	3.55
10	Tanzania	6	3.55
	Others	61	36.07

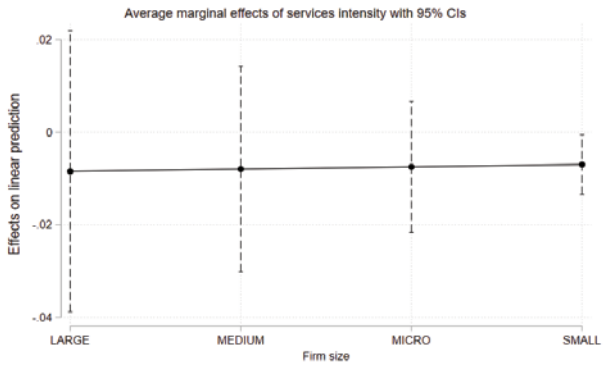
Source: Elaboration on fDi Markets

Annex Figure 2: Demographic composition within different services



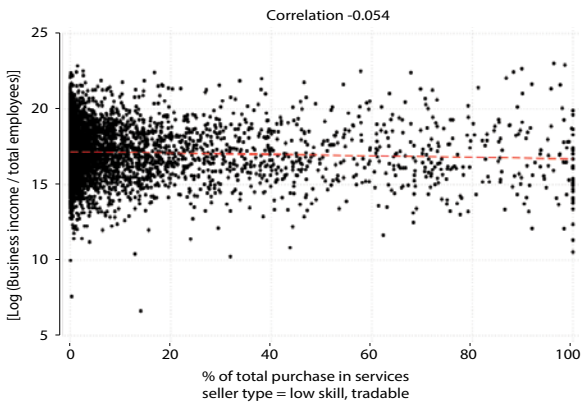
Notes: The demographic data is based on the National Labor Force Survey 2020. The sub-categories are based on the three-digit classification of services that is available in IPUMS.

Annex Figure 3: Firm size, service intensity, and productivity



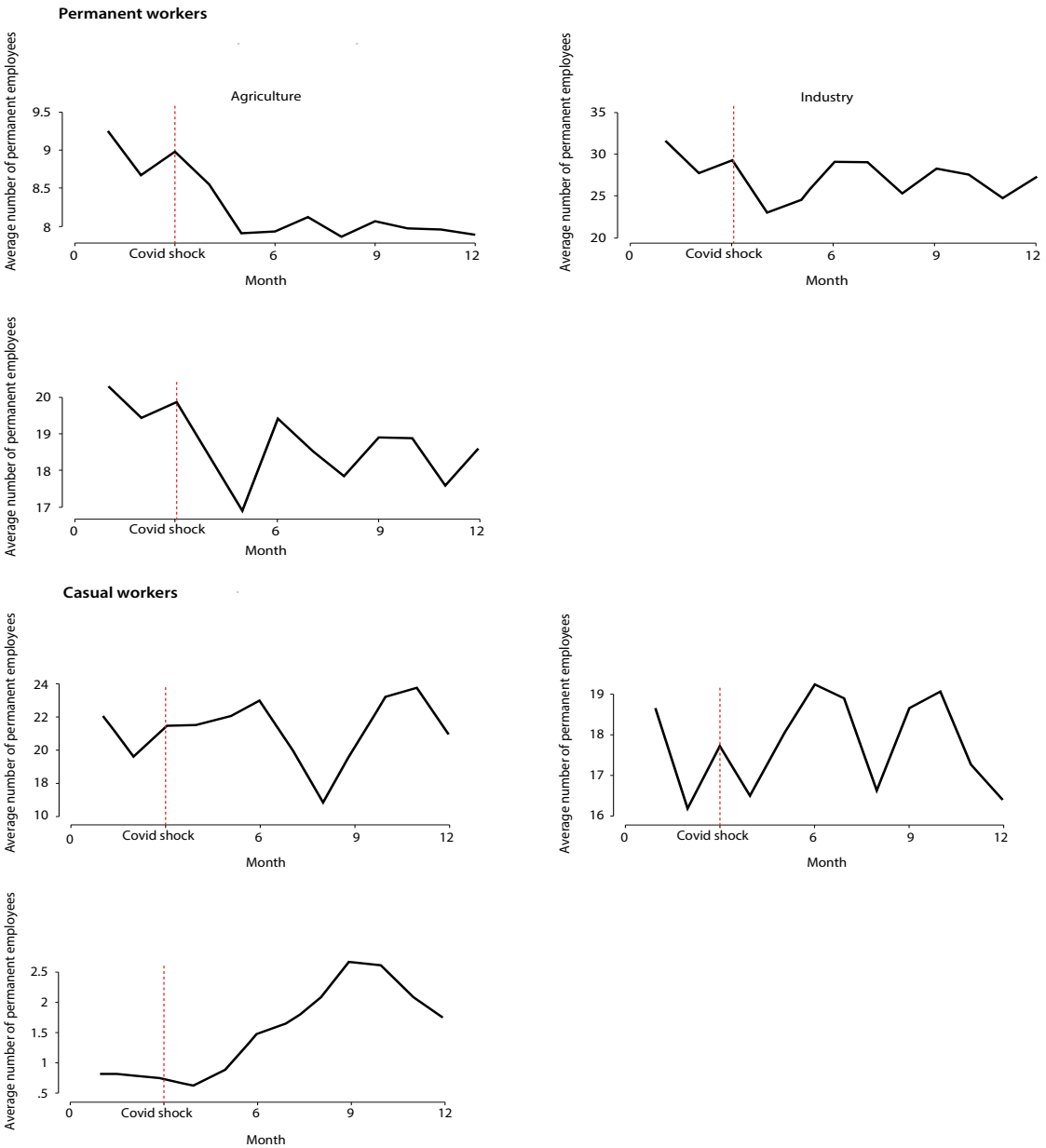
Notes: The marginal effects are obtained from an OLS model where we regress productivity on the interaction between service intensity and buyer firm size, after controlling for sector fixed effects. The standard errors are clustered at the sector level. The black circles display the coefficients and the dashed vertical lines represent the 95% confidence intervals. For large, medium, and micro firms the association between service intensity and firm productivity is statistically not different from zero. Only for small firms we obtain a negative association that is significant at the 5% level.

Annex Figure 4: Seller firm type, service intensity, and productivity (excl. Wholesale and retail services)



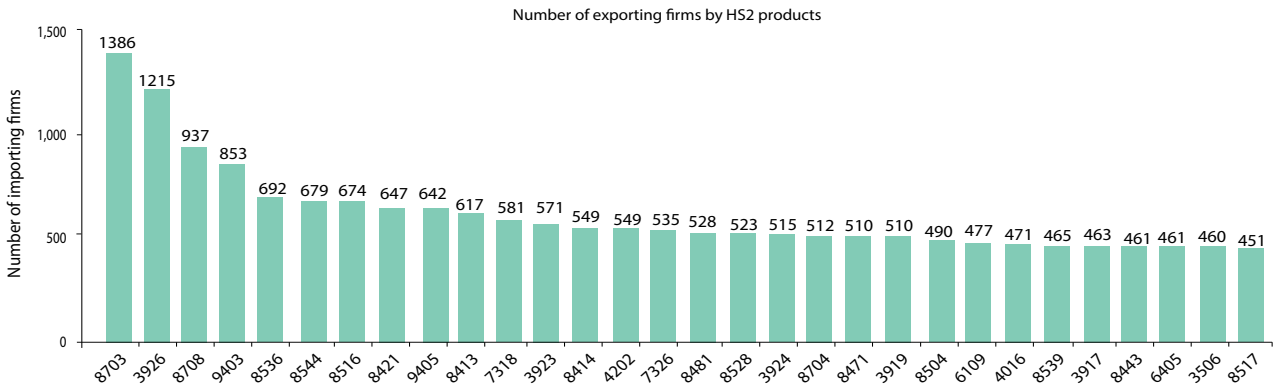
Notes: The analysis is based on bilateral VAT, CIT, and PAYE datasets for 2020. Y-axis measure productivity as the log of business income/total employees. X-axis measures the service intensity of firms. Service intensity is calculated from VAT data. Business income is obtained from CIT data and employment data is obtained from the PAYE database. Seller firm classification is based on Nayyar (2021). We exclude seller firms that are identified as ISIC 3-digit sector "Wholesale and retail trade; repair of motor vehicles and motorcycles" while constructing service intensity when seller type is low skill, tradable.

Annex Figure 5: Covid-19 and employment type across sectors



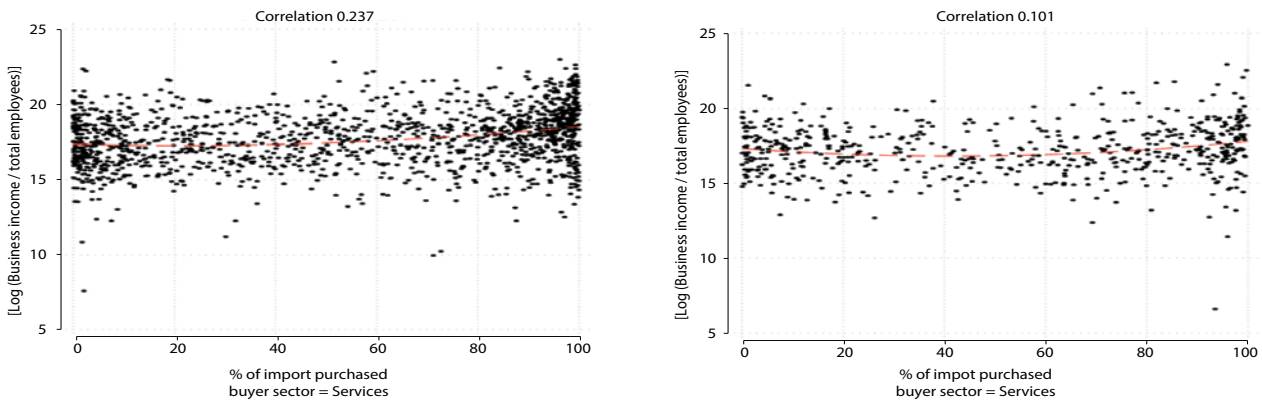
Notes: The analysis is based on PAYE dataset 2020. The top panel shows the average number of permanent employees by month in 2020. The bottom panel shows the average number of casual employees by month in 2020.

Annex Figure 6: Top 30 product categories by the number of importing firms



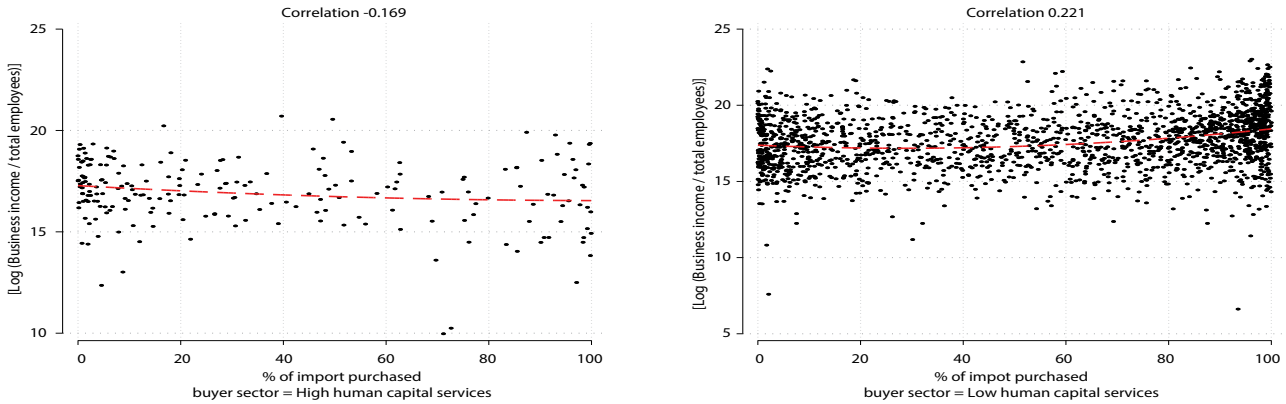
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive imports in the Imports dataset. An importing firm can purchase inputs across different product categories. The Y-axis represents the sum of firms that reported at least one import transaction for a given HS4 product category in 2020.

Annex Figure 7: Productivity and import intensity (services vs non-services)



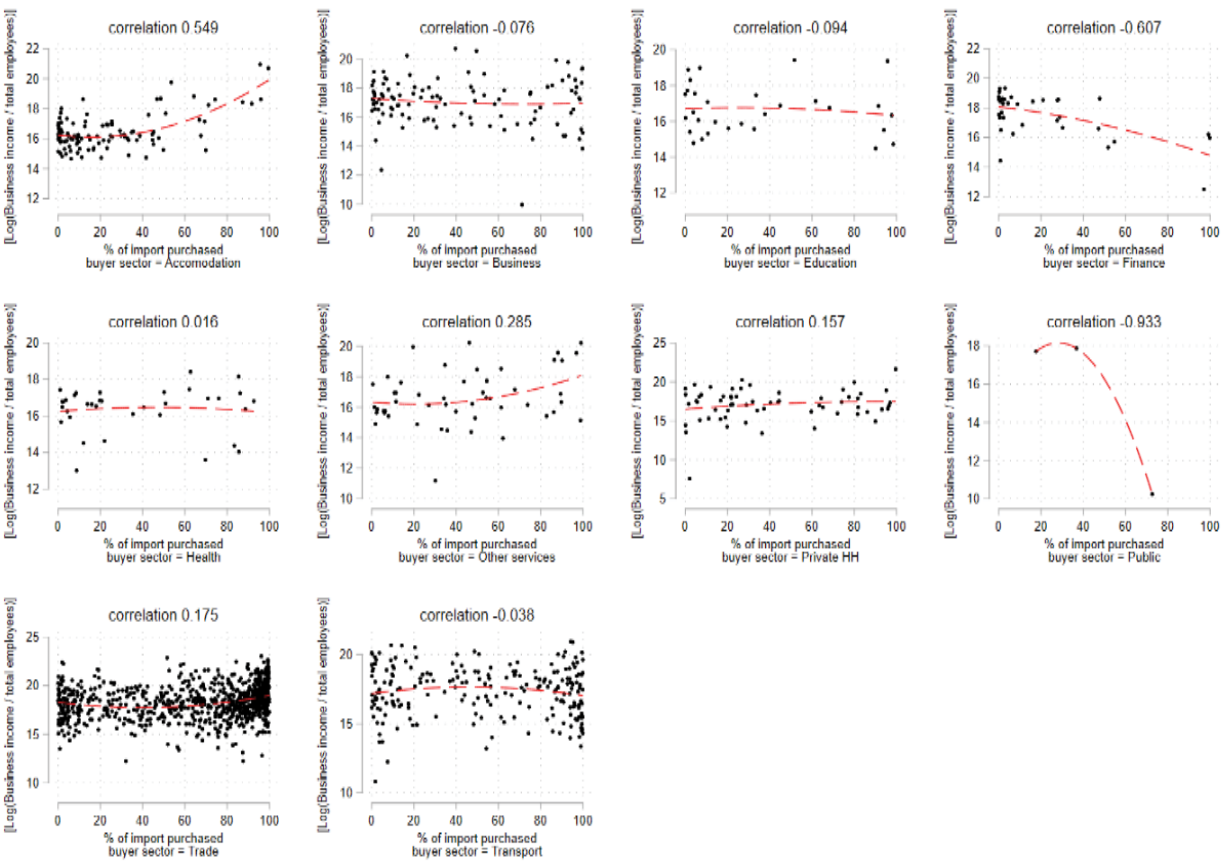
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive imports in the Imports dataset. An importing firm can purchase inputs across different product categories. The Y-axis represents the sum of firms that reported at least one import transaction for a given HS4 product category in 2020.

Annex Figure 8: Productivity and import intensity (high vs low human capital services)



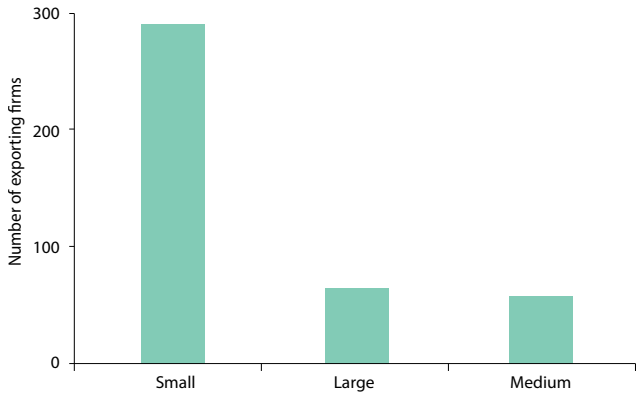
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive imports in the Imports dataset. An importing firm can purchase inputs across different product categories. The Y-axis represents the sum of firms that reported at least one import transaction for a given HS4 product category in 2020. High human capital services are those where over 50% of employed had a university education as per NLFS, 2020.

Annex Figure 9: Productivity and import intensity (across services)



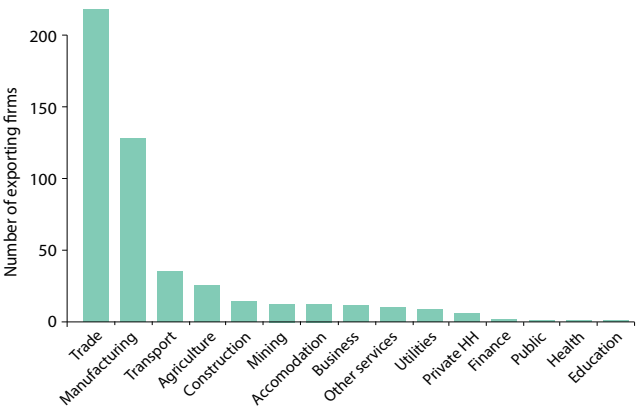
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive imports in the Imports dataset. An importing firm can purchase inputs across different product categories. The Y-axis represents the sum of firms that reported at least one import transaction for a given HS4 product category in 2020. High human capital services are those where over 50% of employed had a university education as per NLFS, 2020. See figure A.1 for demographic breakdown across services in 2020.

Annex Figure 10: Exporting firms by size



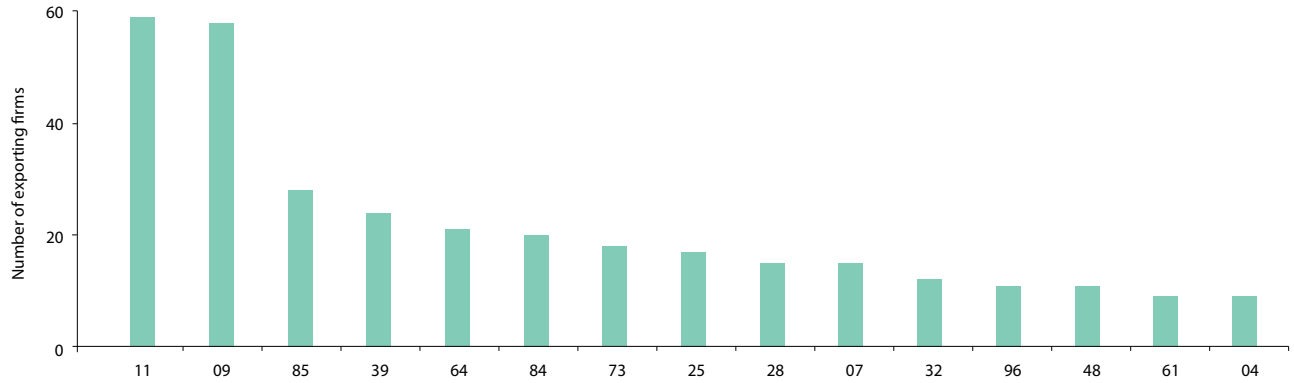
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive exports in the Imports-export dataset.

Annex Figure 11: Exporting firms by sector



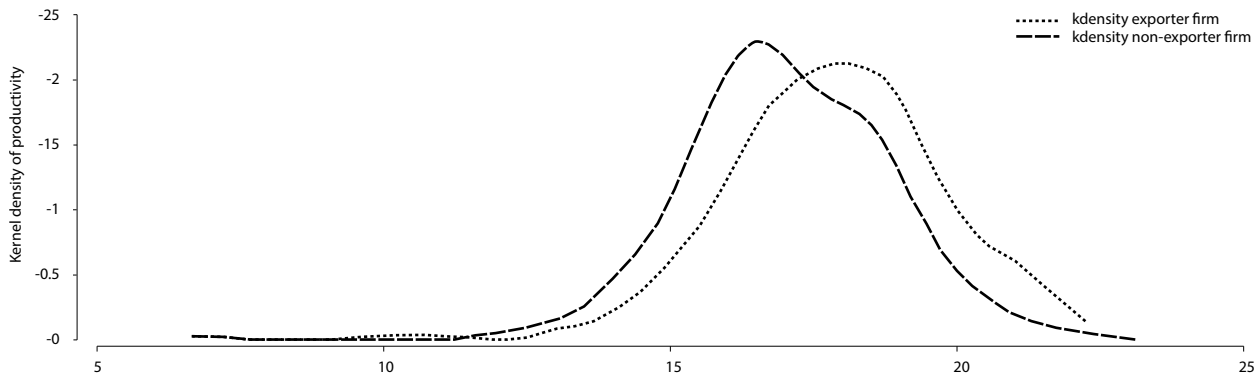
Notes: The analysis is based on VAT and import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive exports in the import-export dataset.

Annex Figure 12: Top 15 HS chapters by number of exporting firms



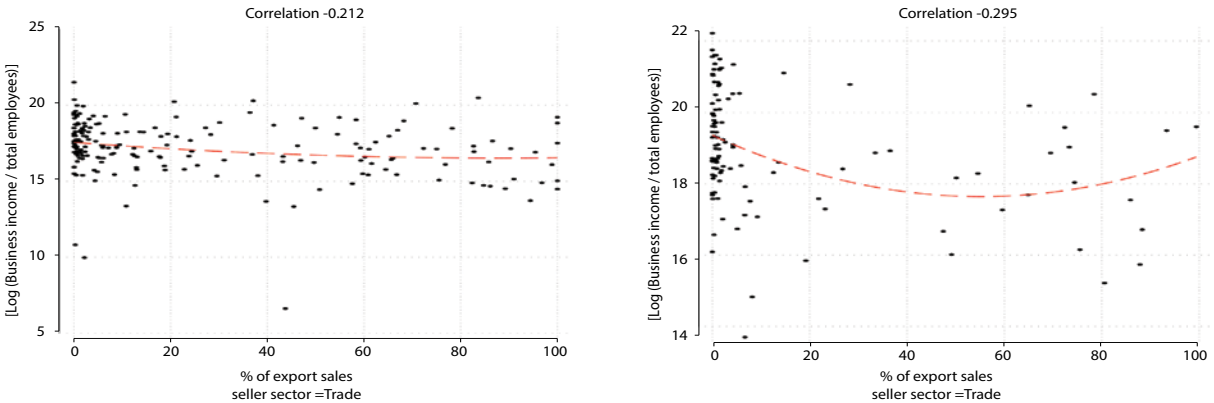
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive exports in the import-export dataset.

Annex Figure 13: Productivity and firm type (exporter vs non-exporter)



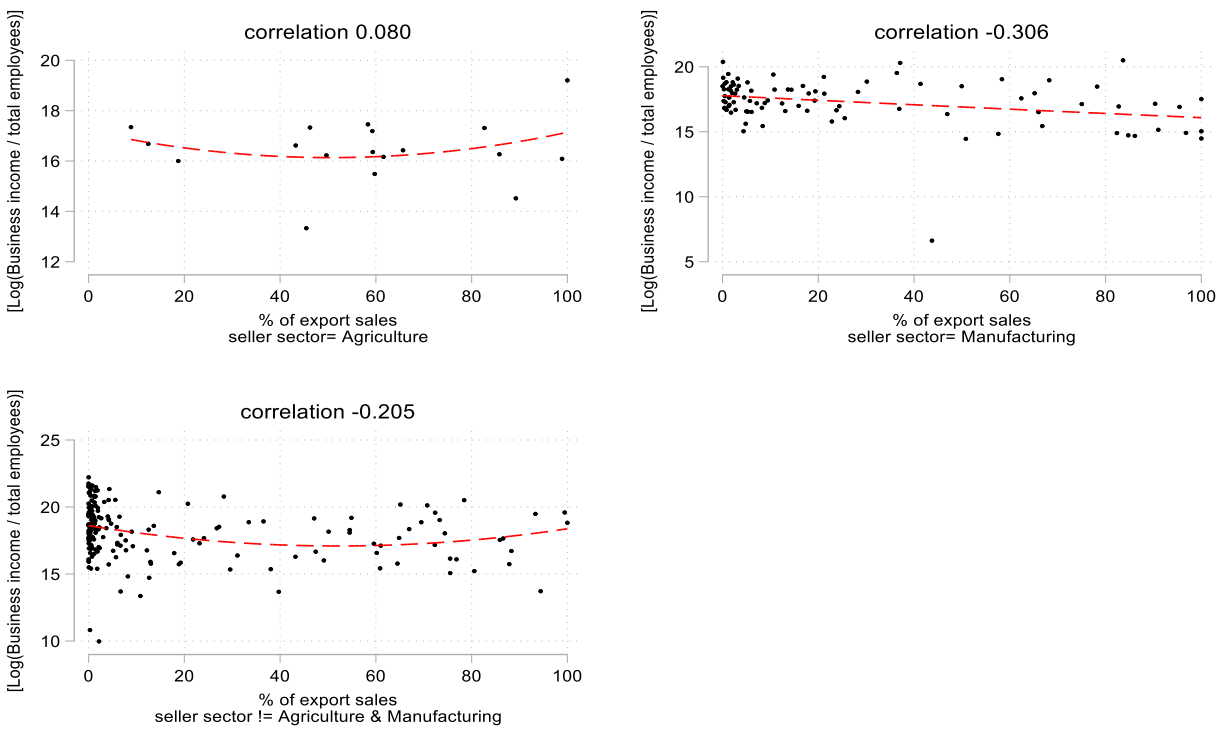
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive exports in the import-export dataset.

Annex Figure 14: Productivity and exporter firms (trade vs non-trade sectors)



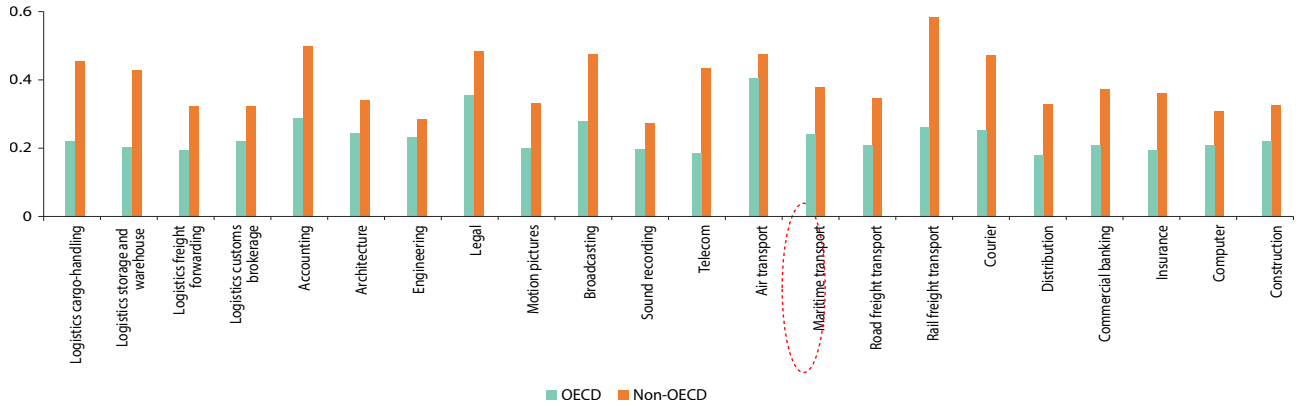
Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive exports in the import-export dataset.

Annex Figure 15: Productivity and exporter firms (manufacturing, agriculture and others



Notes: The analysis is based on VAT and Import-export datasets 2020. The graph represents buyer firms in VAT data which also reported positive exports in the import-export dataset.

Annex Figure 16: STRI, OECD vs. selected Non-OECD, 2020



Note: circled sectors are those for which comparable data is available for Rwanda.
Source: OECD STRI database. Note: Complete openness to trade and investment gives a score of zero, while being completely closed to foreign services providers yields a score of one.

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