



Macroeconomics, Trade & Investment MTI Practice Notes



Simulating the Impact of COVID-19 on Formal Firms in Rwanda

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SUMMARY

This note uses administrative tax data for firms to measure the direct impact of lockdown restrictions on firms' profitability, employment, and exit rates. We separate the economy into three sectors, which face different size shocks, and consider two lockdown scenarios: one lasting three months and one lasting five months. We estimate losses to corporate income tax (CIT) revenue, increases in firms' debt levels, cuts in employment and their mitigation through wage subsidies, and aggregate output losses from firms' exit.

Overall, the impact on the economy is severe, with large falls in tax revenue, increases in loss-making firms, and declines in employment. Under a three-month lockdown scenario, we estimate that only 54.9% of firms remain profitable, while 72.1% of firms were profitable pre-COVID. CIT collections would drop by 25 to 36% depending on the length of the lockdown. In addition, firms accumulate losses equivalent to 0.7% of GDP, suggesting that firms will need to increase borrowing to survive. After adjusting their material costs in proportion to revenue losses, firms would still cut at least 5% of their total yearly wage bill to try to regain profitability. We also estimate an increase in the firm exit rate, relative to the pre-COVID baseline, of 57%, which implies a permanent payroll loss equivalent to 0.1% of GDP and a

permanent turnover loss equivalent to 2.6% of GDP.

This note faces important limitations: (i) it does not include the indirect impacts of the shocks which operate through firms' trade linkages, (ii) it only models a demand shock and as such firms are assumed to have no issues obtaining inputs (materials, labour), (iii) the model is static, so firms do not adapt to the crisis (for example by changing products, selling online etc.), (iv) profits in administrative tax data may be under-reported for tax minimisation purposes, so that firms in our data would exhibit artificially low profitability in the pre-COVID baseline², (v) we do not account for the effect of policies other than wage subsidies which might also be introduced to support firms (for example, deferred tax payments, 100% tax exemptions for highly-impacted sectors, or special tax deductions). Our results thus show the impact of the shock, accounting for wage subsidies, but without the additional measures.

Taking into account caveats (i)-(iii), the numbers in this report could be considered as plausible lower bounds for the direct impact on tax revenues, in partial equilibrium, without taking into account the full set of government support policies. Dynamic general equilibrium models of the economy, with linkages across sectors and firms, are needed to gauge longer term effects.

¹with substantial inputs from Pierre Bachas, Anne Brockmeyer, and Camille Semelet (World Bank). International Centre for Tax and Development: leesadrienne@gmail.com, G.Mascagni@ids.ac.uk, F.Santoro@ids.ac.uk. The findings and conclusions are those of the authors; they do not represent the views of the International Centre for Tax and Development and the World Bank, their member countries or the countries mentioned in this study. We are grateful to the Rwandan Ministry of Finance and Revenue Authority for providing the data used in this study. We thankfully acknowledge funding by the World Bank through the Knowledge of Change Trust Fund and the Fiscal Policy and Sustainable Growth Unit.

²We do not observe potential under-reporting directly, and thus use the administrative tax data as is.

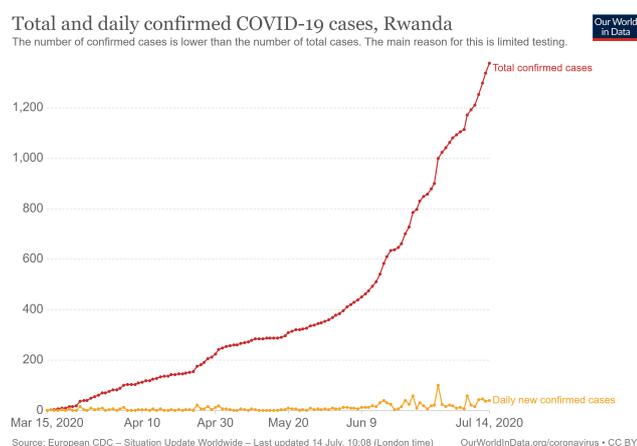
COVID-19 AND RWANDA

Prior to COVID-19, Rwanda was booming, with economic growth exceeding 10% in 2019. Strong growth has been accompanied by significant improvements across various human development indicators, such as poverty reduction and rising life expectancy. The pandemic has placed much of this progress in jeopardy. Exports and tourism have been hurt by border closures and disrupted trade flows, and Rwanda is already experiencing mounting balance of payment and fiscal pressures. The associated economic contraction is likely to result in significant declines in tax revenues. On 21 May, the [Ministry of Finance and Economic Planning](#) announced that it was expecting a total revenue shortfall of RWF 147.6 billion due to COVID-19 (nearly 10% of the projected 2019/20 budget), while the [IMF](#) have predicted that the pandemic will result in a revenue shortfall amounting to 4% of GDP. Given that the pre-crisis tax-to-GDP ratio stood at just above 14%³, this is a significant impact.

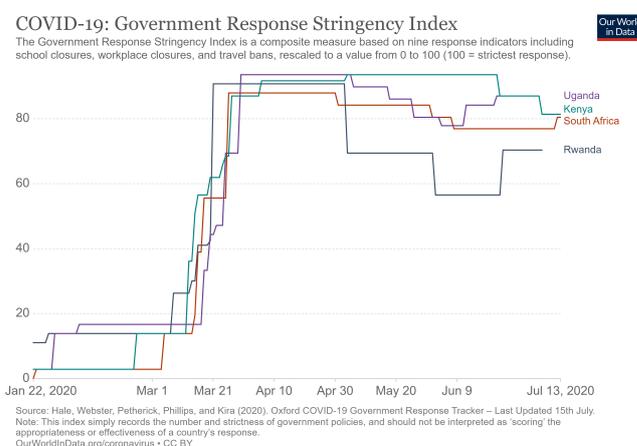
Rwanda confirmed its first case of COVID-19 on 14 March 2020, and lockdown measures were introduced the same day. These included the closure of places of worship and educational institutions and banning public gatherings, while businesses and restaurants were allowed to continue to

operate, as long as they could follow the guidelines on social distancing. A week later, the government enhanced the prevention measures with the suspension of international flights, the restriction of movement outside the home (with the exception of healthcare, food shopping, and banking activities), a request for all employees except those providing essential services to work from home, and the suspension of domestic travel. The Rwandan government prioritised containment, as the healthcare system has limited capacity to handle a large number of serious cases. Remarkably, just five deaths have been recorded and the number of cases, although still rising, has remained relatively low.⁴ Lockdown measures have been gradually eased since 4 May, and selected businesses have been allowed to resume operations. Rwanda has adopted several tax reliefs aimed at supporting businesses. These include: (i) softening the enforcement of tax arrears collection, (ii) extending the deadline for filing and paying income tax (PAYE and CIT), (iii) fast-tracking VAT refunds for small businesses, (iv) a six-month PIT waiver for private school teachers, and tourism and hotel employees earning less than RWF 150,000 (USD 157) per month, (v) exempting locally-made face masks from VAT, and (vi) a waiver of fines, penalties, and interest accrued from late payment of VAT, PAYE, and withholding tax for taxpayers affected by COVID-19.

Figure 1: COVID-19 Spread and Response in Rwanda



(a) COVID-19 Spread



(b) Stringency of Government Response

Note: The yellow line in panel (a) the number of daily new confirmed cases and in red line shows the cumulative sum of confirmed cases. Panel (b) shows how governmental response has changed over time according to the Government Stringency Index – a composite measure of the strictness of policy responses. This includes school and workplace closures, restrictions on public gatherings, transport restrictions, and stay-at-home requirements. A higher score indicates a stricter response (i.e. 100 = strictest response).

LOCKDOWN SIMULATIONS AND CATEGORISATION OF SECTORS BY IMPACT

The COVID-19 pandemic and associated containment measures are expected to cause far-reaching damage to economies around the world. Firms are suffering from reduced demand due to movement restrictions, from reduced labour supply, and from constraints to sourcing material inputs. The breakup of otherwise healthy businesses

in response to a temporary shock implies large social costs. Governments are therefore intent on designing emergency policies to keep businesses afloat.

We present simulations using firm-level tax records from Rwanda, varying the duration of the lockdown and the relative impact across sectors. In these simulated scenarios, demand shocks induce a loss in sales revenue, in turn

³Total taxes in 2018, [UNU-WIDER/ICTD Government Revenue Dataset](#)

⁴As of July 24 2020, [Our World in Data](#)

triggering a cut in profitability, and possible cuts in employment or even firm closure. We compare these simulations to a baseline (pre-COVID) situation, using administrative data from 2018 (the last year of available data). Our analysis relies on a few simple assumptions about the structure of firms' revenue and costs: we assume that firms aim to weather the shock such that they can scale their production capacity back up swiftly at the end of the lockdown. In this stylised world, firms are assumed to reduce their material costs proportionally to the drop in demand, are reluctant to reduce their labour costs as re-contracting is costly, and cannot adjust their fixed costs. Finally, we assume that credit constraints prevent borrowing beyond existing loans used to cover predictable losses (i.e. losses unrelated to the shock).

We classify sectors into three impact categories - high, medium, and low – depending on their expected loss in sales revenue during the lockdown, displayed in Table 1. This classification is based on a subjective assessment by the research team. The high impact category includes sectors which cannot operate at all during the lockdown and so lose 100% of their sales during that period. These include tourism, transportation, non-essential retail and entertain-

ment. The medium impact category includes sectors which are assumed to operate at half capacity during the lockdown period, and thus lose 50% of their sales. These include manufacturing and education. Finally, the low impact sector is assumed to lose just 20% of its monthly sales, which is applied to sectors such as essential retail, health, construction, and agriculture. Naturally there is still a fair degree of heterogeneity of exposure within the categories, with certain sub-sectors experiencing increased revenue. In our simulations, as we use annual data, the five-month lockdown scenario could represent either a continued lockdown lasting five months or a shorter lockdown (e.g. three months) combined with the re-imposition of a lockdown later in the year (e.g. for two months) or a partial continuation of lockdown (e.g. a 50% lockdown for four months). Table 2 shows the number of firms and economic weight of each of the three impact sectors: the high impact sector accounts for 31% of firms and 16% of the wage bill, the medium impact sector accounts for 18% of firms and 33% of the wage bill, and the low impact sector the remaining 50% of the firms and 51% of the wage bill.

Table 1: Sector Categories and Shocks

Categories	Sectors (e.g., detailed list of sectors in Appendix Table 4)	Expected Monthly Sales Revenue Loss
High impact	Accommodation, food service activities, transportation and non-essential retail, and other highly affected sectors	100%
Medium impact	Manufacturing activities, education and other moderately affected sectors	50%
Low impact	Essential retail, human health, social work activities and other mildly affected sectors	20%

Table 2: Statistics for High, Medium and Low Impact Sectors

	Number of firms	Share of firms	Sales revenue share	Wage bill share	Avg. size (RWF, in millions)	Avg. profit margin	Labour costs (% total costs)	Material costs (% total costs)	Other costs (% total costs)
High impact	2593	31%	22%	16%	309	3.2%	3.6%	75.4%	20.8%
Medium impact	1533	18%	15%	33%	367	6.0%	14.7%	35.3%	50.0%
Low impact	4195	50%	63%	51%	544	3.5%	4.7%	69.8%	25.4%
All sectors	8321	100%	100%	100%	438	3.9%	6.2%	65.2%	28.5%

Note: Other costs is a residual category, which we assume largely reflects fixed costs, however other variable costs may be included.

EFFECT ON FIRMS' PROFITABILITY

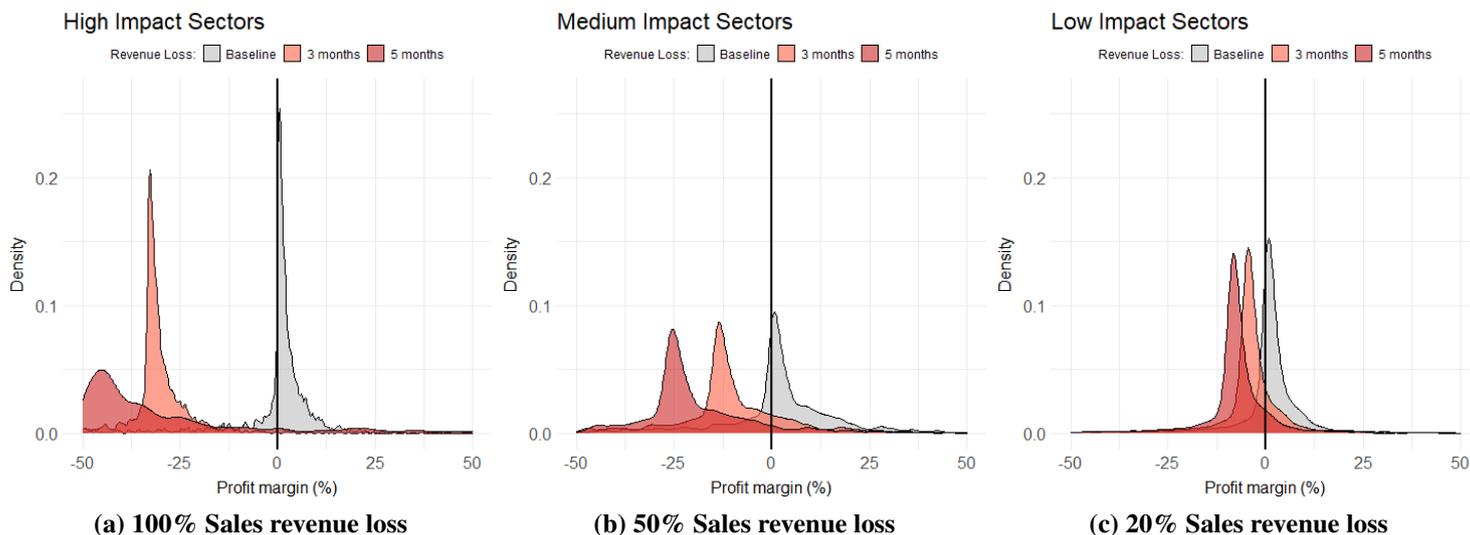
In this section, we examine the share of firms that would need government support to “stay afloat” under a three-month and a five-month lockdown scenario. Assuming credit constraints, a rough indication for firms' abil-

ity to stay afloat is a non-negative profit rate. We start by simulating scenarios where firms lose a share of their sales revenue, while all costs remain constant. The results are displayed in Figure 2, and show that in all sectors the vast majority of firms become unprofitable even under the three-

month lockdown scenario. On aggregate, 72% of all firms are profitable at the baseline, which declines to just 13% after a three-month lockdown, and 7% after five months. Unsurprisingly, these effects are most pronounced for high impact sectors - while 73% of firms are profitable at the baseline, just 1.5% (0.8%) remain profitable after three (five) months of no sales. Across all sectors, there is a high degree of bunch-

ing around near-zero profit margins at the baseline (Table 2 also indicates small average profit margins across all three impact sectors). Narrow profit margins pre-COVID suggest that many Rwandan firms are highly vulnerable to demand shocks, and so even small reductions in sales revenue push many firms into a loss-making position.

Figure 2: Firm Profitability After a Shock to Sales Revenue, No Adjustment to Costs

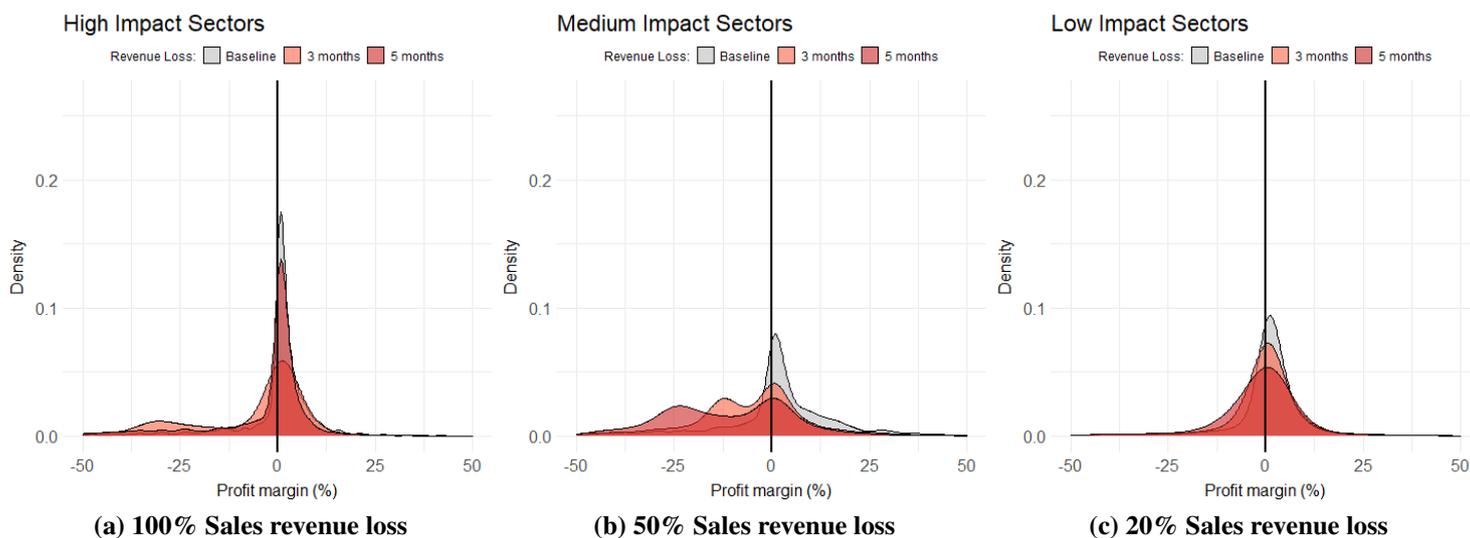


Note: These figures show the distribution of profitability, at the baseline, and assuming that firms face a loss in revenue corresponding to either three or five months of loss in yearly revenue. All costs constant are held constant.

In addition to a pure demand shock, we simulate a more realistic scenario under which firms adjust their material costs proportionally to their sales revenue loss. The results are displayed in Figure 3: relative to the baseline share of 72% of profitable firms, once firms adjust material costs, 55% of firms are profitable under the three-month lockdown scenario and 51% under the five-month scenario. The impact on profitability is most severe for firms in medium impact sectors, which display a higher proportion of other costs at the baseline (where other costs are assumed to reflect largely fixed costs, see Table 2). Before the shock, 65% of

firms in medium impact sectors are profitable, but after three (five) months of lockdown, this drops to just 38% (30%), after accounting for proportional material cost adjustments. The high and low impact sectors are more reliant on material costs, and thus have more space to adjust these to remain profitable. For both sectors, just under three-quarters of firms are profitable at the baseline, which declines to 55% and 62% after the three-month lockdown, for the high impact and low impact sectors respectively.

Figure 3: Firm Profitability After a Shock to Sales Revenue, Material Costs Adjust in Proportion



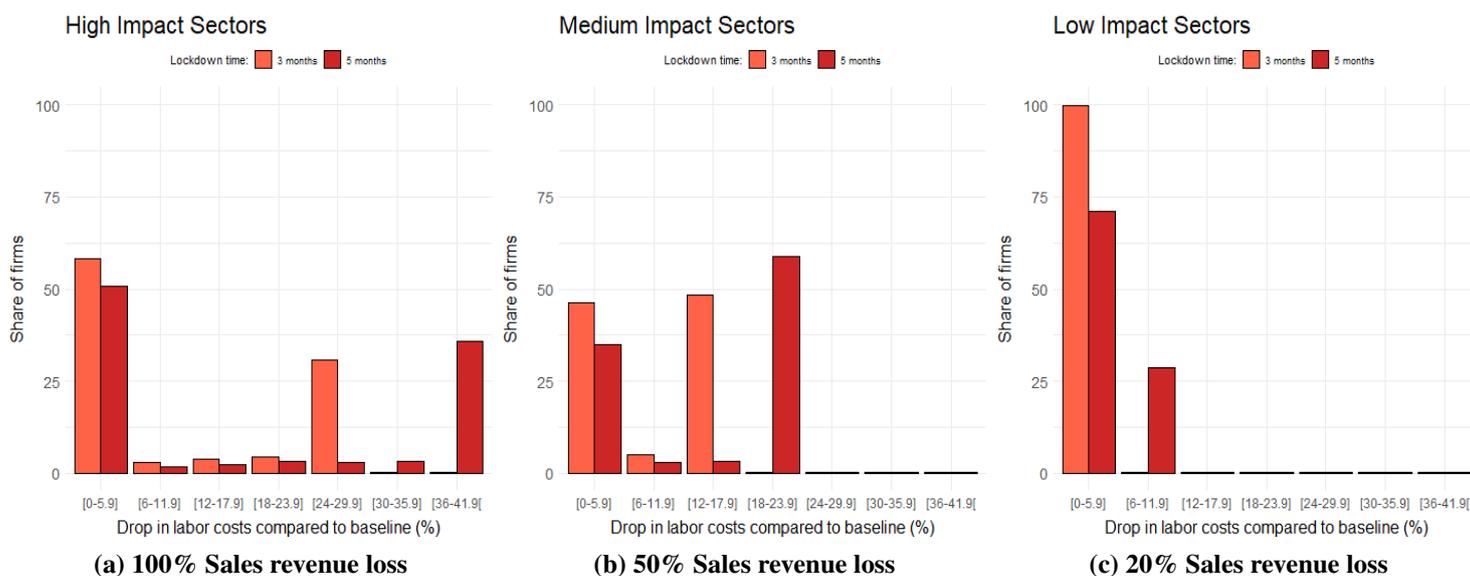
Note: We allow firms to adjust their material costs in proportion to the shock, but hold labour and other costs constant.

EFFECT ON EMPLOYMENT AND WAGE SUBSIDIES SIMULATIONS

In this section, we study by how much employers would need to slash their yearly wage bill in the absence of government support. We continue to assume that material inputs adjust first, and that firms only cut employment if they are still unprofitable after adjusting their material inputs. Figure 4 shows the resulting distributions of the annual wage bill reductions, for both lockdown scenarios. Across all sectors, weighting by firms' yearly wage bill, firms would need to cut 5.2% (9.6%) of their total yearly wage bill to remain profitable after a three-month (five-month) lockdown. The effect is most dramatic for high impact sectors, where

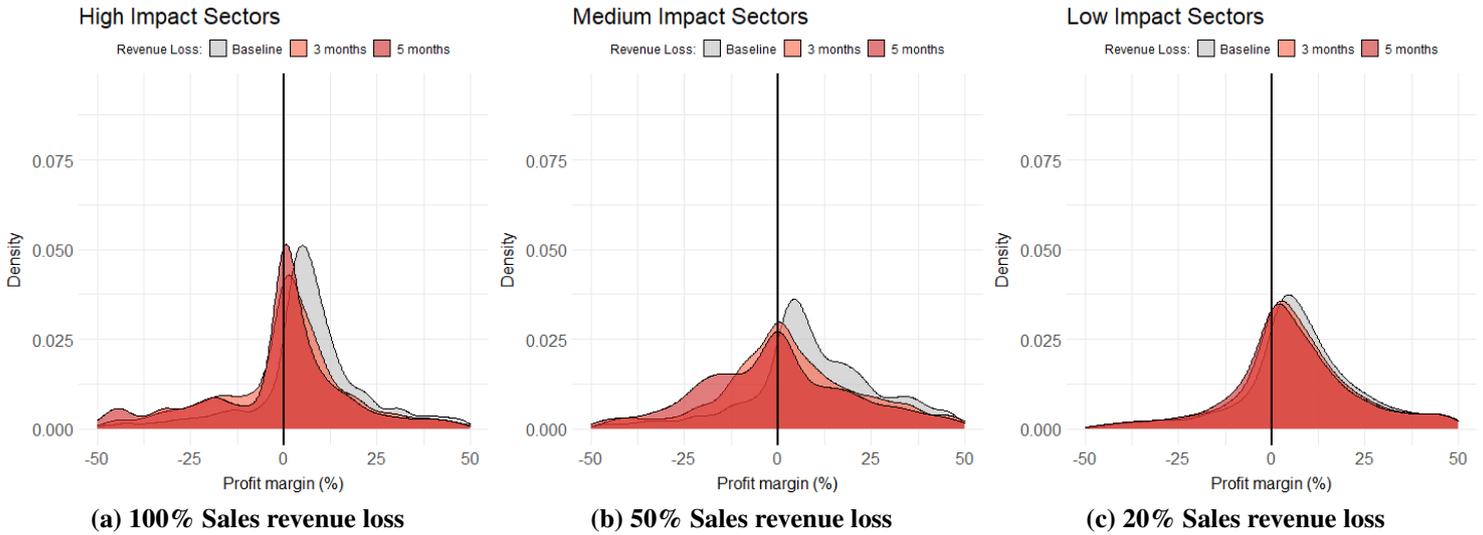
firms would need to substantially reduce their wage bills to stay afloat - the average payroll cut required is 14% (25%) under the three-month (five-month) lockdown scenario. In contrast, low impact sectors can absorb the shock by reducing their wage bill by just 1.3% (2.5%) on average for a three (five) month lockdown. Figure 5 shows the distributions of firm profitability once these labour cost adjustments have been made. On average, across all sectors, 57% (53%) of firms are still profitable under the three (five) month lockdown scenario. This is an improvement of 2 (3) percentage points against the scenario where only material costs are adjusted.

Figure 4: Wage Bill Reduction Needed in Absence of Government Support to Absorb Shock (Material Costs Adjust Proportionally)



Note: These figures show the extent to which firms would reduce their wage bill to stay afloat, after already adjusting their material costs proportionally to the shock. It is assumed that the drop in wage bill cannot be more than proportional to the sales revenue fall and that due to re-contracting costs, firms keep paying wages as long as they remain profitable.

Figure 5: Firm Profitability After a Shock to Sales Revenue, Material and Labour Costs Adjust



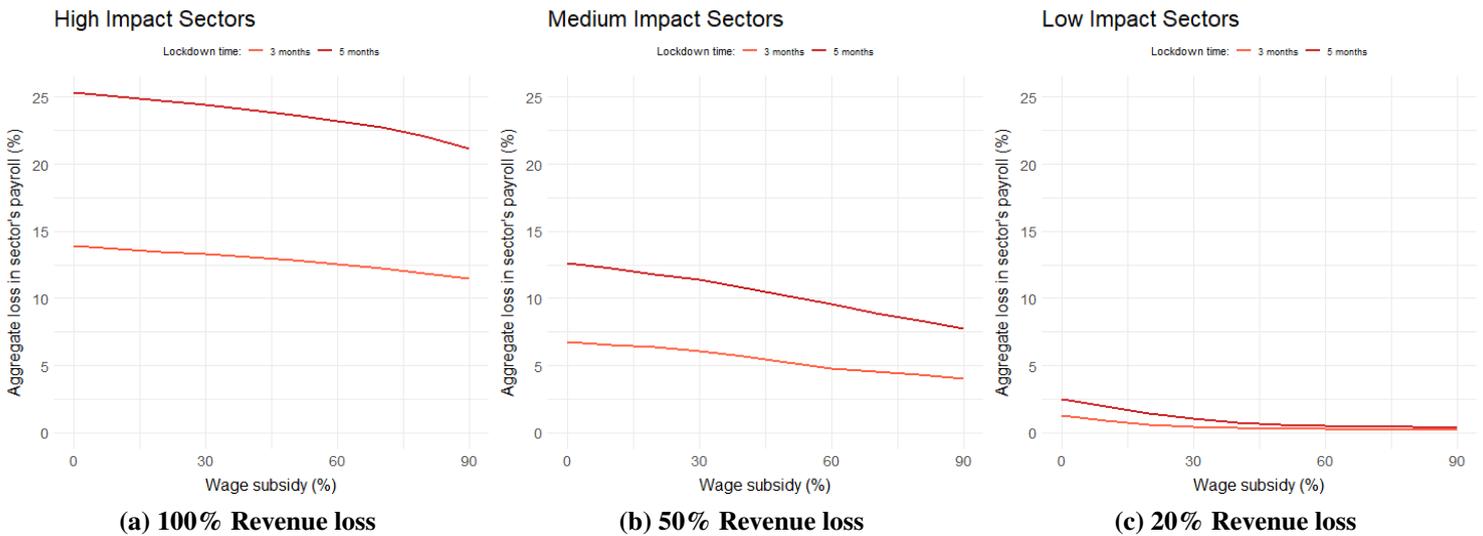
Note: We allow firms to adjust their material and labour costs to compensate for the shock, but hold other costs constant.

WAGE SUBSIDY SIZE AND EMPLOYMENT EFFECTS

To counteract payroll losses and job destruction, we model the effect of a government-sponsored wage subsidy to protect formal employment. As a function of the subsidy size, how much of each sector’s aggregate payroll can be saved? Figure 6 shows each sector’s aggregate payroll losses while varying the size of the wage subsidy, measured as the share of a firm’s payroll paid by the government over the lockdown period. In the case of no wage subsidy (extreme left of the graphs), the loss in payroll corresponds to the numbers previously mentioned. As the wage subsidy increases, the loss in payroll decreases, as some firms now return to zero profits (or to their baseline losses). For the worst-affected, high impact sectors, a 50% wage subsidy

for three (five) months reduces payroll losses by roughly 1 (1.6) percentage point(s) relative to payroll reductions in the absence of a subsidy. A 90% wage subsidy performs slightly better, reducing payroll losses by 2.4 (or 4.1) percentage points. The muted effect of even substantial wage subsidies is explained by the fact that we assume that firms must still pay their other costs (e.g. rent), and so the loss in revenue is too severe to be compensated by reduced labour costs. Across all sectors, even a 90% wage subsidy for three (five) months only reduces payroll losses from 5.2% to 3.3% (9.6% to 6.3%). This limited impact reflects the relatively small contribution that (declared) labour costs makes to total costs for (formal) Rwandan firms. On average, the share of labour costs in total costs is just 6.2% (see Table 2).

Figure 6: Aggregate Sector Loss in Payroll as a function of the Size of the Wage Subsidy



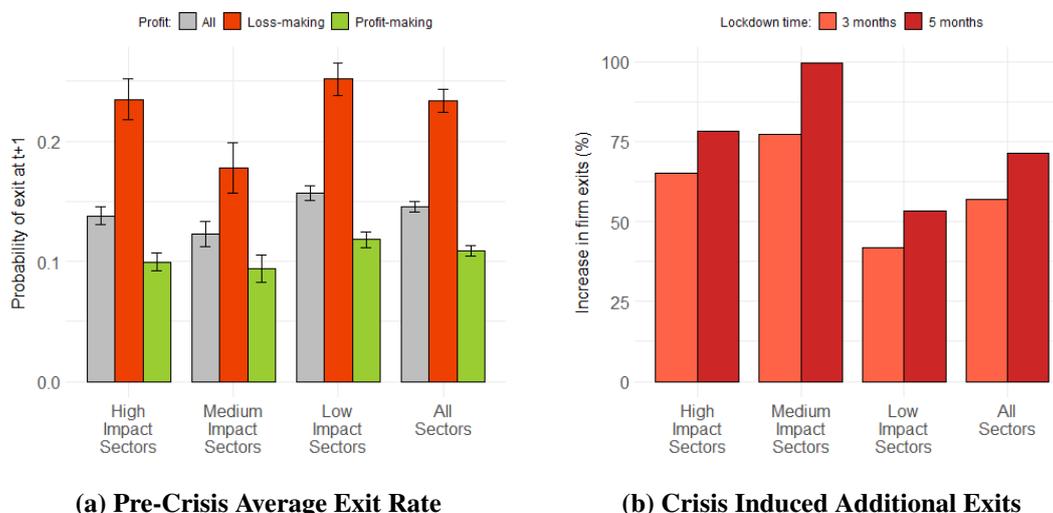
Note: These figures show to what extent a government wage subsidy for the retained labour force can absorb the aggregate loss in payroll, if the lockdown lasts three or five months. Firms readjust their decision after receiving a wage subsidy: they first adjust their material costs, and then their wage bill. It is still assumed that the drop in wage bill cannot be more than proportional to the revenue fall and that due to re-contracting costs, firms keep paying wages as long as they remain profitable.

FIRMS' EXIT RATES INDUCED BY THE REVENUE SHOCK

Here we predict the excess firm exit rates for the different lockdown scenarios. We use the panel dimension of the data to measure the exit rate in pre-crisis years separately for negative and positive profit firms (and in each of the three impact categories). Figure 7 (a) shows the probability of a firm exiting before the coronavirus-induced shock: across all sectors, the average probability of a firm exiting is 14.5%.⁵ However firms which recorded losses in the previous year have a 13 percentage point higher probability of exiting than firms which recorded positive profits. In our previous anal-

ysis, we estimated the share of firms which have negative profits due to the crisis, for each impact sector. We now combine these results to measure the percentage increase in exits induced by the crisis, by multiplying the share of newly loss-making firms with their excess exit rate. We show the results for the three and five months lockdown scenarios in 5 (b): under a three (five) month lockdown scenario, firm exits from the formal economy increase by 57% (71%). This loss of firms is particularly acute for the medium impact sector (where other costs are highest), with percentage increases in firm exits of 77% (100%) compared to the average pre-crisis year.

Figure 7: Firms' Exit Rate



Note: Panel (a) shows the average exit probability for all firms, and then for loss-making and profit-making firms, using panel data from before the crisis. Panel (b) shows the percentage increase of firm exits induced by a three or five month output loss, compared to baseline levels.

1 AGGREGATE NUMBERS AND IMPACTS ON THE ECONOMY

The impact on the overall economy is severe, with large falls in the number of profitable firms, in tax revenue, and increases in employment losses. Table 3 summarises the key numbers for the three-month and five-month lockdown scenarios and the aggregate impact on the economy. From the 72% profitable firms at the pre-COVID baseline, less than 55% of total firms remain profitable after the shock, once material costs are accounted for. The resulting increase in losses is 0.7% of GDP for the three-month shock, a 21% increase in losses relative to the baseline. This suggests that firms will need to substantially increase borrowing. The associated CIT revenue loss is substantial, reaching 25% across all sectors in the three-month shock scenario, and over 35% in the five-month scenario. Despite the temporary nature of the lockdown, the shock generates substantial losses which are counted against any profits made during the remainder of the year. In 2018, CIT accounted for 9.2% of

total tax revenue (equivalent to 1.33% of GDP).⁶ A 25 to 35% decline in revenues from this source would thus have a significant impact on the resources available to the Rwandan government.

Employment losses are also substantial and wage subsidies are limited in their effectiveness. Annual wage bill losses range between 1.3% and 25.3%, depending on the sector and lockdown length. A small response to wage subsidies is observed across the three impact sectors. Nonetheless, even under the assumption of a 90% wage subsidy, payroll losses across all sectors reduce by only 1.9 (3.4) percentage points for a three-month (five-month) lockdown. This indicates that a wage subsidy is unlikely to “rescue” firms, as this does not enable firms to compensate for their other costs in a scenario where sales revenues are reduced.

Increases in firm exits are relatively small, meaning that associated output and payroll losses are also small, but this is likely an under-estimate. Across all sectors, the

⁵We assume here that any firm that does not file a declaration or files a nil declaration has “exited”. As a result, “exits” might capture firm behaviour other than true exits, such as strategic nil-filing, changes of TIN number, or, in some cases, late-filing or a reduction in turnover that takes a firm below the declaration threshold.

⁶UNU-WIDER/ICTD Government Revenue Dataset

simulations estimate that firm exits increase by 57% (71%) after a three-month (five-month) lockdown. This corresponds to an increase in the average probability of exits from 14.5% pre-COVID to 22.7%. These additional exits, in the three-month lockdown scenario, lead to a permanent payroll loss equivalent to 0.08% of GDP, and a permanent turnover loss

equivalent to 2.6% of GDP. Overall, our estimates indicate that the size of government rescue packages for firms and workers would need to be large, and the budget support from donors to lower-income countries even larger, to compensate for the loss in tax revenue.

Table 3: Aggregate Impacts by Lockdown Duration and Impact Sectors

	High Impact		Medium Impact		Low Impact		All Sectors		
	3mo	5mo	3mo	5mo	3mo	5mo	3mo	5mo	
Share of firms profitable at baseline	73.2%		65.4%		74.0%		72.1%		
Share of firms still profitable (materials adj.)	54.5%	51.0%	37.8%	29.8%	61.5%	58.0%	54.9%	50.6%	
CIT revenue loss, relative to baseline (%)	42.4%	60.0%	36.6%	51.7%	13.3%	20.2%	24.7%	35.8%	
Absolute losses increase (% GDP)	0.4%	0.7%	0.2%	0.4%	0.1%	0.2%	0.7%	1.3%	
Absolute losses increase (% of baseline)	87.1%	155.5%	19.8%	37.0%	4.8%	9.3%	21.3%	38.9%	
Payroll Loss	No wage subsidy	13.9%	25.3%	6.8%	12.6%	1.3%	2.5%	5.2%	9.6%
	50% wage subsidy	12.8%	23.7%	5.2%	10.2%	0.3%	0.6%	4.0%	7.5%
	90% wage subsidy	11.5%	21.2%	4.0%	7.8%	0.2%	0.4%	3.3%	6.2%
Additional exit rate, relative to baseline	65.0%	78.2%	77.3%	99.6%	42.0%	53.4%	56.8%	71.2%	
Permanent payroll loss from firm exits (% GDP)	0.02%	0.02%	0.04%	0.05%	0.03%	0.04%	0.08%	0.11%	
Permanent turnover loss from firm exits (% GDP)	0.7%	0.8%	0.6%	0.7%	1.3%	1.7%	2.6%	3.2%	

Table 4: Sectors and Impact Categories

SECTORS (ISIC Rev 4 code)	High - Medium - Low Impact	
A AGRICULTURE, FORESTRY AND FISHING	Low Impact	
B MINING AND QUARRYING	Low Impact	
C MANUFACTURING	Low Impact	Medium Impact
	Food products; Beverages; Tobacco products; Basic pharmaceutical products and pharmaceutical preparations	Textiles; Wearing apparel; Leather and related products; Wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials; Paper and paper products; Printing and reproduction of recorded media; Coke and refined petroleum products; Chemicals and chemical products; Rubber and plastic products; Other non-metallic mineral products; Basic metals; Fabricated metal products, except machinery and equipment; Computer, electronic and optical products; Electrical equipment; Manufacture of machinery and equipment n.e.c.; Motor vehicles, trailers and semi-trailers; Other transport equipment; Furniture; Other manufacturing; Repair and installation of machinery and equipment
D ELECTRICITY, GAS, STEAM AND AIR CONDITIONING SUPPLY	Medium Impact	
E WATER SUPPLY; SEWERAGE, WASTE MANAGEMENT AND REMEDIATION ACTIVITIES	Medium Impact	
F CONSTRUCTION	Medium Impact	

G WHOLESALE AND RETAIL TRADE other than food, pharmacies, gas stations	High Impact	Low Impact
	Automobile Dealers; Other Motor Vehicle Dealers; Furniture Stores; Home Furnishings Stores; Clothing Stores; Shoe Stores; Jewelry, Luggage, and Leather Goods Stores; Sporting Goods, Hobby, and Musical Instrument Stores; Book Stores and News Dealers; Department Stores; Florists; Office Supplies, Stationery, and Gift Stores; Other Miscellaneous Store Retailers; Consumer Goods Rental; General Rental Centers; Apparel, Piece Goods, and Notions Merchant Wholesalers; Automotive Parts, Accessories, and Tire Stores; Direct Selling Establishments	Remaining sub-categories
H TRANSPORTATION AND STORAGE	High Impact	Medium Impact
	Scheduled Air Transportation; Nonscheduled Air Transportation; Taxi and Limousine Service; School and Employee Bus Transportation; Other Transit and Ground Passenger Transportation; Support Activities for Air Transportation; Support Activities for Water Transportation; Traveler Accommodation	
I ACCOMMODATION AND FOOD SERVICE ACTIVITIES	High Impact	Medium Impact
	Special Food Services; Drinking Places (Alcoholic Beverages); Restaurants and Other Eating Places	Remaining sub-categories

J INFORMATION AND COMMUNICATION	Low Impact	
K FINANCIAL AND INSURANCE ACTIVITIES	Medium Impact	
L REAL ESTATE ACTIVITIES	Medium Impact	
M PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	Low Impact	
N ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	Low Impact	
O PUBLIC ADMINISTRATION AND DEFENCE; COMPULSORY SOCIAL SECURITY	Low Impact	
P EDUCATION	Medium Impact	
Q HUMAN HEALTH AND SOCIAL WORK ACTIVITIES	Low Impact	
R ARTS, ENTERTAINMENT AND RECREATION	High Impact	Medium Impact
	Performing Arts Companies; Spectator Sports; Independent Artists, Writers, and Performers; Amusement Parks and Arcades; Gambling Industries; Other Amusement and Recreation Industries	Remaining sub-categories
S OTHER SERVICE ACTIVITIES	High Impact	Medium Impact
	Offices of Dentists; Personal Care Services; Other Personal Services	Remaining sub-categories

CALCULATION DETAILS FOR TABLE 3

Each figure is calculated for a specific Impact category (High, Medium, Low impact and All sectors) and for a specific lockdown scenario (three and five months):

1. Share of firms profitable at baseline: (1) number of firms with positive profit margin before output shock, divided by (2) total number of firms, expressed as percentage.
2. Share of firms still profitable (material adj.): (1) number of firms with positive profit margin, after material costs adjustment proportional to the shock, divided by (2) total number of firms, expressed as percentage.
3. CIT revenue loss relative to baseline: (1) sum of all firms' profits at baseline multiplied by the corporate income tax rate minus (2) sum of all firms' profits after lockdown multiplied by the corporate income tax rate, divided by (1) and expressed as percentage.
4. Absolute losses increase (% GDP): (1) absolute value of the sum of all firms' losses after lockdown minus (2) absolute value of the sum of all firms' losses at baseline, divided by (3) GDP (current LCU of the same year), expressed as percentage.
5. Payroll Loss, at different wage subsidy rate: (1) sum of all firms' new labor costs under lockdown, divided by (2) the sum of all firms' labor costs at baseline, expressed as percentage.
6. Percentage increase in exit rate relative to baseline: (1) exit rate of firms after lockdown minus (2) exit rate of firms at baseline, divided by (2) and expressed as percentage.
7. Permanent output loss from firm exit (% GDP): (1) additional exit rate relative to baseline multiplied by (2) the sum of all firms' turnover at baseline, divided by (3) GDP (current LCU of the same year), expressed as percentage.
8. Permanent payroll loss from firm exit (% GDP): (1) additional exit rate relative to baseline multiplied by (2) the sum of all firms' labor costs at baseline, divided by (3) GDP (current LCU of the same year), expressed as percentage.